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Volume 103
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51st Annual Meeting of the British Society for Paediatric Endocrinology and Diabetes, 2024

8–10 October 2024, Glasgow

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CME Symposium 4

CME4.1

Fertility preservation and when to refer? (male fertility)

Rod Mitchell
University of Edinburgh/Royal Hospital for Children and Young People, Edinburgh, United Kingdom

Fertility preservation is an increasingly important aspect of clinical care for many patient groups. For children and young adolescents, this is most commonly offered to those who are due to receive gonadotoxic therapies such as chemotherapy and radiotherapy. For pubertal patients at risk of infertility, it may be possible to obtain sperm for cryopreservation from a semen sample or via surgical sperm extraction prior to gonadotoxic therapy. For prepubertal patients, the options for fertility preservation centre around preserving testicular tissue containing spermatogonial stem cells. The use of cryopreserved sperm is well established as a proven method to generate offspring using IVF/ICSI; however, for cryopreserved prepubertal testicular tissues the options for restoring fertility potential remain experimental. This presentation will focus on identifying young males at risk of future infertility and the options for future fertility. We will discuss assessment of reproductive function and fertility and the approach to referral for fertility preservation. Finally, we will discuss the options for using cryopreserved testicular tissue or cells to restore fertility in adulthood.

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Plenary

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Endocrine Symposium 3

ES3.1

AI-powered breakthroughs in paediatric endocrinology

Paul Dimitri
Sheffield Children's NHS Foundation Trust, Sheffield, United Kingdom

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. AI systems perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation. AI encompasses a variety of technologies, including machine learning, natural language processing, robotics, and computer vision, all aimed at creating systems capable of performing complex tasks autonomously. AI-driven technologies, including machine learning algorithms and predictive analytics, are poised to enhance the precision and efficiency of clinical decision-making and will revolutionise the diagnosis, treatment, and management of endocrine disorders in children. AI-powered diagnostic tools can interpret medical images and laboratory results with remarkable accuracy. For example, facial recognition technology can diagnose genetic conditions by identifying characteristic facial features. AI algorithms are also being used to diagnose thyroid disease, diagnose pituitary tumours, predict metabolic outcomes, identify growth disorders, anal and predict central pubertal precocity, facilitating timely interventions and reducing the need for more extensive testing. Additionally, AI chatbots support patient care by providing real-time information and answering queries, enhancing patient engagement and adherence to treatment plans. AI-driven clinical decision support systems assist endocrinologists by offering evidence-based recommendations, ensuring that each child receives the most effective and tailored care. Generative AI, a subset of artificial intelligence focused on creating new content from existing data, is revolutionizing medicine. By leveraging advanced algorithms and vast datasets, generative AI models can produce synthetic medical images, simulate complex biological processes, and generate personalised treatment plans. Despite the promising benefits, the implementation of AI in paediatric endocrinology must address inherent challenges. These include ethical considerations such as data privacy, algorithmic bias, and the need for continuous validation of AI systems. Bias in AI algorithms can lead to disparities in care, particularly for underrepresented populations. Collaborative efforts between clinicians, data scientists, and policymakers are essential to ensure the safe and effective deployment of AI technologies. As technology continues to evolve, the integration of AI into clinical practice promises a future where paediatric endocrine care is more precise, efficient, and accessible.

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ES3.2

Benchmarking in paediatric endocrinology

Justin H. Davies[1,2]
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Achieving high quality medical care is challenging. Constant assessment is required to identify areas of best practice and deficits in care. The quality of healthcare is multifaceted as healthcare is a complex process. Benchmarking can be an effective measure to assess quality of healthcare. Clinical benchmarking is a systematic process in which current practice and care are compared to, and amended to attain, best practice and care. Benchmarking has the potential to drive improvements in clinical care and enhance outcomes, enable better targeting of limited resource and optimise efficiency and cost saving. A pre-requisite to benchmarking is the development of quality indicators. Although quality indicators are not a direct measure of quality of care, they serve as proxies to demonstrate whether excellence in care is achieved. When constructing quality indicators, the objective is to identify key parameters that are relevant, valid and can be operationalised to distinguish good from poor quality care. Quality indicators can be classified as structural, process and outcome quality, and can

facilitate monitoring of care and development of health policy. The use of clinical benchmarking is variable in paediatric disciplines and it is underutilised in paediatric endocrinology. Using studies of care in children living with congenital adrenal hyperplasia and differences of sex development, this lecture will provide an overview of the emerging evidence and challenges for developing quality indicators and benchmarking in paediatric endocrinology.

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Diabetes Symposium 1

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Diabetes Symposium 2

DS2.1

Abstract unavailable

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DS2.2

Past, present and future of closed loop

Roman Hovorka
University of Cambridge, Cambridge, United Kingdom

Closed loop systems comprising continuous glucose monitor, control algorithm and insulin pump are changing lives of people with type 1 diabetes. The lecture will outline the evolution of closed loop technologies and highlight benefits documented across all age groups including very young children, children, teenagers, adults, and older adults. Burden of diabetes is reduced, glucose control improved, and quality of life increased. These achievements result from transformative translational research including that carried out at the University of Cambridge. Wider clinical practice adoption is underway underpinned by the NICE guidance and equitable access is the goal.

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Diabetes Symposium 3

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How Do I?

How Do I? (Endocrine)

HDI1.1

Abstract unavailable

DOI: 10.1530/endoabs.103.HDI1.1

HDI1.2

The endocrine approach to childhood hypoglycaemia

Indi Banerjee
Royal Manchester Children's Hospital, Manchester, United Kingdom

Hypoglycaemia is a paediatric endocrine emergency requiring prompt action. A delay in recognition and treatment can result in brain injury and lifelong neurodisability. Severe and recurrent hypoglycaemia is likely to be caused by excess and unregulated insulin release in Congenital Hyperinsulinism (CHI), but other causes such as Adrenal Insufficiency should also be considered. The treatment of CHI can be difficult and complex and calls for a networked approach in conjunction with specialist centres. While CHI is mostly prevalent in neonates and young infants, idiopathic ketotic hypoglycaemia (IKH) is more common in older children. The treatment of IKH hinges on the prevention and use of emergency glucose regimens during periods of intercurrent illness; however, IKH can also be complex and unpredictable, requiring review by both endocrine and metabolic teams. Hypoglycaemia management can be challenging and resistant to therapies, particularly in CHI. On an optimistic note, there is considerable joined up effort from researchers, patient organisations and biotechnology industries to design new therapies and advanced methods of monitoring that may reduce the risk of neuroglycopaenia and preserve brain health.

DOI: 10.1530/endoabs.103.HDI1.2

How Do I? (Diabetes)

HDI2.1

How Do I? Support exercise and sports performance in T1D

Francesca Annan
University College London NHS Foundation Trust, London, United Kingdom

I am a clinical dietitian with an MSc in Sports and Exercise Nutrition. This presentation will explore how I support CYP living with Type 1 Diabetes to manage glucose levels when they are being active. I will share my person centred athlete first, food first approaches to clinical practice and how evidence from the fields of sports nutritions, exercise physiology and diabetes care can be incorporated into clinical practice.

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HDI2.2

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Debate

D1.1

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D1.2

Abstract unavailable

DOI: 10.1530/endoabs.103.D1.2

Personal Practice Session

PPS1

Management of abnormal TFTs - when to hold your nerve?

Tim Cheetham
Newcastle University, Newcastle upon Tyne, United Kingdom

The best doctors will do more tests and give more medicines - or maybe not. This presentation will discuss when it is good to watch and wait or even discharge the young person with supposedly abnormal' thyroid function tests. Some of the clinical / biochemical clues that may help to prevent a lifetime on thyroxine (when this is not really needed) will be highlighted. Bottom line - many healthy people have numbers outside a quoted reference range and try to make sure that one of your best friends is a clinical biochemist.

DOI: 10.1530/endoabs.103.PPS1

Oral Communications

CME Case Presentations 1

OC1.1

Phenotypic diversity in siblings with a rare cause of Hypophosphataemic rickets

Khubaib Ahmed & Talat Mushtaq
Leeds Children's Hospital, Leeds, United Kingdom

Generalised arterial calcification of infancy (GACI) is a rare genetic disorder caused by inactivating variants in the ENPoc10.6 with estimated incidence of 1:200,000 pregnancies. Mortality estimated at 55% within first 6 months. It is characterised by arterial intimal calcification leading to stenosis affecting all major vessels. The index case presented with hypo-phosphataemic rickets at 18 months of age. Genetic testing demonstrated a novel mutation in Ectonucleotide pyrophosphatase-phosphodiesterase (ENPP1) gene which required further functional mRNA analysis. ENPP1 is also associated with GACI. Further imaging did not demonstrate any cardiovascular calcification. Sadly, at 4.4 years of age he passed away following a brief illness. A post-mortem noted some heart muscle fibrosis which may have been due to early life arterial calcification. The subsequent pregnancy demonstrated extensive arterial calcification and the mother was treated with oral Etidronate (a first-generation non-nitrogen containing bisphosphonate) during the last 2 weeks of the pregnancy. The infant was born at 35 weeks gestation weighing 2.95 kg. There was extensive severe calcification of the major arteries including calcification of the aorta, pulmonary and carotid arteries. Furthermore there was also calcification in the shoulders and peri-articular tissues. She had reno-vascular hypertension requiring angioplasty and also had cardiovascular compromise. Medical treatment included Aspirin and Amlodipine. More specific treatment to stabilise the calcification was commenced with Etidronate to aid calcium absorption is sodium thiosulphate 3g IV once daily 5 days a week was used. both continued for about a year and This resulted in gradual resolution of the calcification and marked clinical improvement. She developed biochemistry consistent with hypophosphataemic rickets and commenced on oral alfacalcidol and phosphate. She is now 5 years old. These two siblings demonstrate the diverse phenotypes in ENPP1 mutations. If present; GACI is associated with a poor prognosis, but this does improve after the first year of life. There may still be residual arterial abnormalities even after resolution of the calcification as assumed in her brother. Medical treatment with Etidronate and Sodium Thiosulphate probably contributed to the improvement. Both children had hypophosphataemic rickets. The sister is being evaluated for an international study for enzyme replacement therapy.

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OC1.2

A case of kearns-sayer syndrome presenting with hypoglycaemia and adrenal insufficiency

Sandipan Paul & Chritina Louca
Lister Hospital, Stevenage, United Kingdom

Background
Hypoglycaemia is a common critical condition in paediatric emergencies, with diverse aetiologies including metabolic disorders and endocrine dysfunctions. Adrenal insufficiency is a life-threatening cause, that requires prompt diagnosis and intervention. This case study presents a rare incidence of hypoglycaemia secondary to adrenal failure in a paediatric patient with Kearns-Sayre Syndrome (KSS), a mitochondrial disorder affecting multiple systems.
Case Presentation
A 4-year-old boy, initially presented with significant and recurrent hypoglycaemia. A poor cortisol response(292 nmol/l) during hypoglycaemia was noted. Synacthen test confirmed adrenal insufficiency with cortisol levels of 267 nmol/l at 0 minutes, 234 nmol/l at 30 minutes, and 334 nmol/l-60 minutes as well as ACTH 375 ng/l, Renin > 500 and low aldosterone. Hydrocortisone and fludrocortisone replacement was commenced.
Investigations
Urinary steroid profile was abnormal but not diagnostic - Elevated DHEA and unusual pregnenolone metabolites. Adrenal antibodies were negative and VLCFA, plasma amino acids, urinary organic acids and free carnitine were normal. Gross lactic aciduria and ketonuria were noted. MRI scans showed no abnormalities including normal adrenals. Lactate was persistently raised 5-8 mmol/l, which led to further investigation including mitochondrial DNA testing. This revealed a 2kb deletion consistent with Kearns-Sayre/Pearson spectrum disorder. Subsequently, the echocardiogram and nerve conduction studies were normal but he has developed significant liver dysfunction and failure to thrive and exocrine pancreatic insufficiency.
Kearns-Sayre Syndrome
KSS is a rare (estimated prevalence1/1,25,000) mitochondrial genetic disorder with multisystem involvement. Typically manifesting in childhood, its signs and symptoms vary based on multi-organ involvement- CNS, cardiac, skeletal muscle, and endocrine manifestations- adrenal insufficiency, pancreatic exocrine insufficiency, lactic acidosis, microalbuminuria, transaminitis, ongoing weight loss, and intolerance to Creon. Diagnosis modality for KSS is to identify deletion of mitochondrial DNA genome by Next-generation sequencing in peripheral blood leukocyte sample. Most patients could live for several decades.
Learning Points
This case is an example of inherited metabolic disorders, an important differential in adrenal insufficiency. Persistent raised lactate levels should prompt further investigation despite a normal initial "metabolic screen". Understanding adrenal insufficiency within the broader context of rare metabolic conditions like Kearns-Sayre Syndrome is crucial for accurate diagnosis and effective management.

DOI: 10.1530/endoabs.103.OC1.2

CME Case Presentations 2

OC2.1

Facial asymmetry revealing hypothyroidism and pituitary hyperplasia in a young child

Vasiliki Alexopoulou[1], Shivaram Avula[2], Jude Joseph[3], James Heyden[4] & Joanne Blair[1]
[1]Department of Endocrinology, Alder Hey Children's Hospital NHS Trust, Liverpool, United Kingdom; [2]Department of Radiology, Alder Hey Children's Hospital NHS Trust, Liverpool, United Kingdom; [3]Department of Paediatrics, Arrowe Park Hospital, Wirral, United Kingdom; [4]Department of Oncology, Alder Hey Children's Hospital NHS Trust, Liverpool, United Kingdom

Introduction
We present an unusual case of pituitary hyperplasia in primary hypothyroidism in a 4-year-old female in whom timely diagnosis averted invasive tests.
Case Presentation
A 4.7year old female presented with long-standing facial asymmetry. Born at term with an uneventful pregnancy, medical history and normal neonatal TSH blood spot screen. There were no symptoms of hypothyroidism. Height was 101.1 cm (-1.4SD), BMI 19.7 kg/m2 (2.5SD) and she was prepubertal. Examination revealed a smooth, modestly enlarged thyroid, right-side lip droop, while the rest of the cranial nerve and general examination were normal. Brain MRI showed an anterior pituitary lesion (13x7x14mm), displacing the optic chiasm, with a normal pituitary stalk. Blood tests showed primary hypothyroidism (Table 1), normal 09.00 ACTH and cortisol (4.7 pmol/l and 283 nmol/l respectively), elevated prolactin 798mU/l (NR <450mU/l). Thyroid peroxidase antibodies were modestly elevated (37iu/ml, NR <33.9). The patient was reviewed by the Endocrinology and Neuro-oncology Multidisciplinary Team. Pituitary changes were consistent with pituitary hyperplasia secondary to primary hypothyroidism, and facial palsy was attributed to hypothyroidism. Further tests showed negative plasma AFP and HCG, normal thyroid ultrasound scan (five weeks after the start of treatment), and bone age 5.1 years (TW2, BoneXpert). Levothyroxine replacement was initiated (12.5 mg daily for two weeks, then 25 mg). After two months, the patient was brighter and more alert, fT4 normalised, TSH fell and prolactin returned to the normal range (142mU/l, NR <500mU/l). MRI brain showed reduction of the size of the pituitary gland.
Discussion
Peripheral and entrapment neuropathies are well-documented in hypothyroidism but are rare in children. Cranial nerve dysfunction due to primary hypothyroidism has not been reported in a child previously. It is notable that this child had no symptoms of hypothyroidism, and height and bone maturity were not affected. Pituitary enlargement and hyperprolactinaemia can occur in primary hypothyroidism and typically resolve with Levothyroxine treatment. It is important to consider this diagnosis to avoid invasive tests, such as lumbar puncture for CSF tumour markers or pituitary biopsy.
Table 1. Thyroid function profile

	TSH (0.7-0.59 mIU/l)	FT4 (12.3-22.8 pmol/l)	FT3 (3.7-5.8 pmol/l)
Baseline	>150	3.9	-
1 month	26.4	15.1	6.6
2 months	6.89	12.3	6.0

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OC2.2

16 Years of learning: the first patient treated with asfotase alfa for perinatal hypophosphatasia

Catriona McKay[1], Noina Abid[1], Nick Bishop[2], Paul Arundel[3] & Mairead McGinn[1]

[1]Royal Belfast Hospital for Sick Children, Belfast, United Kingdom; [2]School of Medicine & Population Health, University of Sheffield, Sheffield, United Kingdom; [3]Paediatric Bone Disease Service, Sheffield Children's Hospital, Sheffield, United Kingdom

We present the first paediatric patient treated with Asfotase Alfa (AA) or 'Strensiq', for perinatal Hypophosphatasia (HPP), who has turned 16 and approaches the end of her time in paediatric care. She is the child with the longest treatment duration worldwide. We reflect on the 16 years of learning she has provided for endocrinologists globally. HPP is a rare, inherited, metabolic bone disease, characterised by defective bone and teeth mineralisation. It is caused by mutations in the ALPL gene which reduce the activity of the enzyme Tissue Nonspecific Alkaline Phosphatase 'TNSALP'. Previously perinatal HPP was a lethal condition. In 2022, NICE recommended AA, (a bone targeted enzyme replacement therapy), as a treatment option. Our patient was born at 38 + 5 weeks. In-utero multiple fractures were detected. Postnatally she had a low ALP (17U/l) and following a grossly abnormal skeletal survey and genetic testing, she was diagnosed with HPP. At 5 months old her length and weight were $<0.4^{th}$ centile. She was hypotonic, vomiting, and irritable. An updated skeletal survey demonstrated progressive deterioration of the mineralisation status of her whole skeleton with fractures of upper and lower limbs and ribs. She was admitted for symptom control and felt to be in the end stages of her disease. Following discussion with the paediatric metabolic bone team in Sheffield, she flew to Winnipeg and enrolled as patient 01-01 in the ENB 002-08 study, the first trial of Recombinant 'TNSALP' enzyme replacement. She started AA treatment in October 2008, initially intravenously then a 3 times weekly subcutaneous dose. She deteriorated on the initial 1 mg/kg dose but improved on 2 mg/kg. She returned home 22 weeks later and remains on AA. The course for patients surviving into adulthood with perinatal HPP is complicated, despite treatment with AA. This patient has associated morbidity - scoliosis, craniosynostosis, short stature, nephrocalcinosis and bilateral femoral bowing. She awaits further elective surgery. AA is allowing patients who would have previously died in infancy to survive into adulthood. This patient is sitting her GCSEs and plans to be a nurse. This case serves as a reminder to us of the importance of clinical research.

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CME Case Presentations 3

OC3.1

Phenotypic features of two brothers with a rare X-linked insulin-receptor substrate 4 (IRS4) mutation and the suspected role of IRS4 in the HPT axis

Sarah McCarrison[1,2], Shubhangi Shewale[3], Mark Hamilton[4] & Sze Choong. Wong[1,2]
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Introduction
Mutations in *IRS4* have recently been shown to cause X-linked congenital central hypothyroidism in males. We present two brothers with *IRS4* mutation who presented to the endocrine service in adolescence.
Case description
The younger brother presented with suspected vitiligo to paediatric dermatology at age 12. Thyroid function was performed to rule out autoimmune primary hypothyroidism, but detected low FT4 (6.7 pmol/l) and normal TSH. Height SDS was +0.10. Given the diagnosis of central hypothyroidism, combined pituitary function test was performed with normal growth hormone and cortisol status. Pituitary MRI did not identify any abnormalities. Genetic testing revealed a pathogenic, frameshift mutation in *IRS4*. Progression through puberty was normal with pubertal staging of G5P5 15ml testes aged 13.6 years. Adult height was 172.9 cm (within mid-parental height). The older brother presented with concerns regarding lack of puberty to adult endocrinology at age 16.3 years during the COVID-19 pandemic (not formally examined but subsequent self-assessment noted to be G1P2). There was no clear family history of delayed puberty. Testosterone was 0.5 nmol/l, LH 2.2U/l in keeping with early puberty but delayed for his age. Height Z-score was -2.3 SDS, bone age 12.2 years. He was commenced on testosterone and responded well (pubertal staging of G3P3 8 ml testes age 16.9 years). Following diagnosis of *IRS4* mutation in the younger brother, it was noted that he also had low FT4 (8.4 pmol/l) with normal TSH. Genetic testing confirmed he carried the same pathogenic mutation in *IRS4*. Adult height was 174 cm. Both brothers had normal oral glucose tolerance tests (*IRS4* may have an impact on glucose homeostasis). DXA fat mass index Z-score for younger brother was 0 and for older brother was -0.4. Genetic testing of the mother revealed she was a heterozygous carrier of the *IRS4* mutation.
Conclusion
IRS4 mutations have recently been reported to cause central hypothyroidism in a small number of patients. The *IRS4* protein is known to bind to insulin, IGF-1 and leptin receptors and has been found to be expressed in human pituitary and hypothalamus. The exact role of *IRS4's* impact on puberty remains unclear and warrants further research.

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OC3.2

Diabetes and deafness: not just wolfrom

Claire Roome[1], Ismail Elbeshlawi[1], Abdelhadi Habeb[2] & Rachel Besser[1]
[1]Oxford University Hospitals NHS Foundation Trust, Oxford, United Kingdom; [2]National Guard Hospital, Madinah, Saudi Arabia

A 5-year-old girl transferred into our service with antibody negative diabetes (to islet antigen 2 and glutamic acid), diagnosed aged 15 months, following a 4-week history of polyuria and polydipsia, without diabetic ketoacidosis (C-peptide (CP) 576 pmol/l and presenting glucose 14 mmol/l). She was treated with multiple daily injections from diagnosis. There was a history of severe progressive sensorineural deafness since six months, and iron deficiency normocytic anaemia. Genetic testing was negative for the deafness panel R67, which includes Wolfram syndrome (diabetes mellitus, diabetes insipidus, optic atrophy, and deafness). The family were of Pakistani ethnicity, and parents were first cousins. Given the history of syndromic antibody negative diabetes, further genetic testing was sent for the R153 panel (Exeter genetics laboratory), confirming the diagnosis of Thiamine-responsive megaloblastic anaemia (Rogers syndrome). This is a rare autosomal recessive condition, comprising one or more features of megaloblastic anaemia, diabetes mellitus and sensorineural deafness. The phenotype is due to a loss of function mutation of SLC19A2, encoding for high affinity thiamine transporter 1, the main thiamine transporter expressed in haematopoietic stem cells, pancreatic beta cells and inner ear cells. Thiamine is essential for beta cell function and a co-factor for other intracellular enzymes. Absence of the transporter means thiamine cannot be transported into the cells at physiological levels. Treatment at higher concentrations allows thiamine to cross cell membranes by diffusion. After 7 weeks of titrating oral thiamine (100 mg once daily), there was a reduction in insulin dose (0.71 units/kg/day baseline, 0.58 units/kg/day at 7 weeks) and a resolution in hypoglycaemia without a deterioration in Haemoglobin A1c (58 mmol/mol). This mirrored an improvement in pancreatic CP production (CP, baseline: 7 pmol/l, 497 pmol/l at 7 weeks). Further dose titration is ongoing. We propose that SLC19A2 is added to the deafness panel, to allow a prompt diagnosis. Thiamine treatment is most effective as early as possible, to reduce or reverse insulin requirement. In this case, even after a 3-year delay in thiamine treatment, there was a clinically meaningful treatment response. This case highlights the importance of remaining clinically curious, even in the context of reassuring pre-existing genetic tests.

DOI: 10.1530/endoabs.103.OC3.2

CME Case Presentations 4

OC4.1

Reassessing pancreatectomy in diffuse congenital hyperinsulinism: a tale of two brothers with homozygous KCNJ11 variants

Hamza Rafique[1], Angela Lucas-Herald[2] & M Guftar. Shaikh[2]
[1]University of Glasgow, Glasgow, United Kingdom; [2]Royal Hospital for Children, Glasgow, United Kingdom

Congenital hyperinsulinism (CHI) is a rare but serious disorder characterised by a dysregulated increase in insulin secretion, leading to hypoglycaemia. Existing literature on CHI highlights the importance of early recognition and maintenance of blood glucose levels, due to the risk of neurological damage posed by uncorrected hypoglycaemia. The cases presented highlight the treatment of two brothers who developed neonatal hypoglycaemia due to diffuse CHI resulting from homozygous KCNJ11 variants. These cases demonstrate the challenges in maintaining normoglycaemia in cases of CHI through medical and surgical therapies. The older sibling, Brother 1, underwent pharmacological treatment and a near-total pancreatectomy at 2.5 months. The outcomes of Brother 1's treatment highlight the limitations of pancreatectomy in the management of diffuse CHI, as he experienced challenges such as continued hypoglycaemic episodes and eventual development of

insulin-dependent diabetes. Brother 2 was managed with pharmacological therapies and a long-term feeding regimen via gastrostomy. At 6 years he was able to maintain normoglycaemia with weaning of octreotide therapy. This paper contributes to our understanding of how to best manage diffuse CHI by emphasising the limitations of pancreatectomy and highlighting the adverse long-term outcomes of this surgery – namely ongoing hypoglycaemia, diabetes and pancreatic exocrine insufficiency.

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OC4.2

An unusual presentation of paediatric sarcoidosis

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Sarcoidosis can be a multi-system granulomatous disorder usually seen in adults. Paediatric sarcoidosis is rare and can be associated with varied presentations. We present the case of an unusual presentation of sarcoidosis in a 12-year-old girl who attended with an enlarging neck swelling, hypercalcaemia and worsening renal function. Most reported cases in the Paediatric population are multi-organ and affect the lungs, liver and lymphatic system. Renal involvement with Paediatric Sarcoidosis is exceedingly rare and there is a paucity of reported cases.

Description and Discussion

The history reported was of an enlarging neck swelling for over a year at the time of presentation. On examination she had a large goitre which was symmetrical and smooth. No proptosis/exophthalmos was noted. She was initially reviewed by the GP and blood tests revealed an elevated TSH (61.78), low Free T4 (8.6), low Vitamin D (32) and normal Ferritin. TPO and Thyroglobulin Antibodies were negative. She was started on treatment with Thyroxine. In the interim she had routine blood tests which revealed an AKI. Renal function was noted to be deranged (Cr 139). A renal scan was arranged for her which was reported as an increase in cortical reflectivity. This was discussed with the tertiary renal team and was felt to be echogenic with no evidence of cysts. She was then admitted with worsening renal function (Cr 224) and hypercalcaemia (cCa 3.58) and was commenced on hyperhydration. An FNAC biopsy revealed **non-necrotising granulomatous inflammation**. Angiotensin converting enzyme was elevated significantly (>200) as well as 1,25 dihydroxy-cholecaliferol (307 pmol/l). Investigations for Tuberculosis were negative. These investigations confirmed the diagnosis of Sarcoidosis.

Conclusion

Paediatric Sarcoidosis is rare and is not usually a differential in these cases. Based on uncertain aetiology and a small number of reported cases, children presenting with multisystem involvement and renal disease should be worked up for Sarcoidosis. The diagnosis is also difficult to make as children are often missed or the work up is delayed and there is no consensus on the criteria for diagnosis. In this case, a biopsy and an increased ACE level pointed towards the correct diagnosis.

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Endocrine Oral Communications 1

OC5.1

BRINP2 gene variants are implicated in severe delayed puberty associated with neurodevelopmental phenotypes

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The genetic aetiology of central delayed puberty is closely related to the development and function of the gonadotropin-releasing hormone (GnRH) endocrine network. GnRH is the master hormone regulating the reproductive axis and its pulsatile secretion from neurons of the mediobasal hypothalamus is crucial for puberty onset and fertility. Loss-of-function in genes in GnRH neuron pathways can lead to a phenotypic spectrum from self-limited delayed puberty (SLDP) to partial or complete hypogonadotropic hypogonadism (HH). Neurodevelopmental disorders such as autism and ADHD are increasingly being recognised as a shared trait with central delayed puberty and may be due to a common aetiology. We identified the Bone morphogenetic protein/retinoic acid inducible neural-specific 2 (*BRINP2)* gene as a candidate of interest, as it was found to be significantly upregulated during GnRH neuronal development in transcriptomic analyses and expressed in key hypothalamic nuclei. Whole exome sequencing (WES) data from 180 UK cohort probands with DP demonstrated potentially pathogenic rare coding variants in *BRINP2* in probands with either SLDP or partial HH. Probands were noted to have additional phenotypes of autism, ADHD and obesity. In collaboration with the international DPGen consortium, WES data from a further 233 probands with SLDP were examined and 3 further variants of interest in *BRINP2* were identified. These 7 variants are all rare or ultra-rare and are predicted to be pathogenic by *in silico* tools including CADD, REVEL and Primate AI. Protein expression of the p.I629V mutant was strongly reduced as compared to reference protein. BRINP2 has been shown to inhibit neuronal cell proliferation by negative regulation of cell cycle transition and to be up-regulated by estradiol. Variants in this gene have been previously associated with autism in an epidemiological study. *Brinp2* knockout mice show hyperactive behaviour representative of human attention-deficit hyperactivity disorder, but pubertal timing has not been assessed. Thus, *BRINP2* is a novel candidate gene for the aetiology of central delayed puberty with associated neurodevelopmental phenotypes. We have investigated the role of *BRINP2* in GnRH biology via wildtype and mutant protein expression and sub-cellular localization, as well as gene expression in mouse hypothalamic tissue across development.

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OC5.2

Minipuberty: a golden phase for optimal treatment. recombinant gonadotropin therapy during minipuberty in males with hypogonadotropic hypogonadism: a case series

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Introduction

The hypothalamic-pituitary-testicular (HPT) axis is highly active in healthy male newborns until 3-6 months of age. During this phase, namely 'minipuberty,' Sertoli cells are stimulated by follicle-stimulating hormone (FSH), increasing testis volume and serum levels of AMH and inhibin B. In addition, luteinizing hormone (LH) promotes testosterone synthesis in Leydig cells, contributing to normal penis size and testicular position in the scrotum. In congenital hypogonadotropic hypogonadism (CHH) minipuberty is absent due to gonadotropin deficiency. Whilst standard treatment is with testosterone replacement, recent literature on treatment with recombinant gonadotropins to replace minipuberty is encouraging. This study describes the impact of recombinant FSH (r-FSH), with human Chorionic Gonadotropin (hCG) or recombinant LH (r-LH), in male infants with CHH or combined pituitary hormone deficiency (CPHD) treated during minipuberty.

Methods

A longitudinal retrospective study of a UK male CHH cohort managed during minipuberty at Barts Health NHS Trust.

Objective

To assess changes in penis size, testis volume and position, serum levels of LH, FSH, testosterone, AMH, and inhibin B, recorded in our bespoke REDCap database.

Results

Five male infants with CHH or CPHD received recombinant gonadotropic therapy during minipuberty (median age 0.4; range 0.2-0.6 years). All had micropenis and microorchidism (testes volume $\leq$0.4 mL by ultrasonography), and four had cryptorchidism. No adverse effects were observed. Post-treatment with r-FSH combined with hCG or r-LH, marked increments were observed in penis length (median increase 12.5; range 2.0-25 mm), testicular volume (median increase 0.3; range 0.1-1.13 cc), serum FSH (median increase 22.7; range 0.0-55.0 IU/l), and inhibin B (median increase 256; range 36.9-605.1 pg/ml). Improvements in testes position, serum LH and testosterone concentrations were more variable, with 2 patients showing improvements in testes position, whether into scrotum or distal inguinal canal.

Discussion

Our findings support the potential benefits of recombinant gonadotropic therapy to replace minipuberty in infants with CHH, by stimulating Sertoli cell populations and resolving micropenis. In this small series the best outcomes were seen with combined r-LH/r-FSH therapy for 4 months. Combined gonadotropins have the potential to facilitate future fertility in infants with CHH, but long term follow data are needed.

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OC5.3

Crinecerfont in children and adolescents with congenital adrenal hyperplasia due to 21-hydroxylase deficiency: results from the phase 3 CAHtalyst pediatric study

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Background

In phase 2 studies, crinecerfont reduced ACTH and adrenal androgens in adults and adolescents with classic congenital adrenal hyperplasia due to 21-hydroxylase deficiency (CAH). CAHtalyst Pediatric (NCT04806451, EudraCT 2020-004381-19) is the largest interventional trial to date in pediatric patients with classic CAH.

Methods

Male and female participants, aged 2-17 years with elevated androstenedione and 17-OHP and taking GC at doses >12 mg/m^2/d (hydrocortisone equivalent), were randomized (2:1) to twice-daily crinecerfont (25, 50, or 100 mg, based on weight) or placebo for 28 weeks. GC doses were maintained stable for 4 weeks and then reduced to a target dose of 8-10 mg/m^2/d by Week 28 provided that androstenedione was controlled ($\leq$120% of the baseline level or $\leq$upper limit of normal).

Results

Among 103 randomized participants (69 crinecerfont, 34 placebo), 53 were male, mean age was 12.1 years (range, 4-17), and $>$95% reached Week 28. Mean androstenedione (pre-morning GC dose) decreased from baseline to Week 4 with crinecerfont (14.1 to 7.3 nmol/l) but increased with placebo (16.9 to 19.0 nmol/l). The least-squares mean difference (LSMD) for androstenedione change from baseline was -9.3 nmol/l ($P=0.0002$; primary endpoint). 17-OHP decreased from baseline to Week 4 with crinecerfont (258 to 84 nmol/l) but not placebo (273 to 285 nmol/l), with an LSMD of -195 nmol/l ($P<0.0001$; key secondary endpoint). At baseline, mean GC doses were similar between the crinecerfont and placebo groups (16.5 and 16.3 mg/m^2/d). At Week 28, GC dose was lower with crinecerfont than placebo (12.8 and 17.0 mg/m^2/d), and the LSMD for GC percent change from baseline was -23.5% ($P<0.0001$; key secondary endpoint). Headache, pyrexia, and vomiting were the most common adverse events.

Conclusions

In pediatric patients with classic CAH, crinecerfont significantly decreased androstenedione and 17-OHP during a 4-week GC-stable period, enabling subsequent reduction in GC dosing while maintaining androstenedione control.

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OC5.4

Premature adrenarche, body composition and metabolic dysfunction – a pilot study

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Introduction

Premature adrenarche (PA) is characterised by elevated adrenal androgens in pre-pubertal children presenting pubic/axillary hair, body odour, greasy hair, and transient growth acceleration. It is still unclear if children with PA are at increased risk of developing metabolic dysfunction or progressing to Polycystic Ovary Syndrome (PCOS) after puberty.

Aim

We launched a deep phenotyping study in children with PA from our large, multi-diverse population in the West Midlands. We report on body composition, patterns and severity of androgen excess and clinical cardiometabolic risk markers.

Design and Methods

Single-centre cross-sectional study in children with PA. We assessed body composition [clinical auxology and dual-energy absorptiometry (DEXA)], androgen profile (DHEAS [radioimmunoassay], androstenedione [A4] and testosterone [T] [liquid chromatography/tandem mass spectrometry]), fasting glucose, HbA1c and cholesterol/triglycerides.

Results

42 PA children (35 girls and 7 boys) were included; precocious puberty and congenital adrenal hyperplasia were excluded. The age range was 4-9 years and 56% were of non-White background. Median BMI z-score was $+1.2$ (range -0.66; $+3.72$). All children had elevated DHEAS (median: 3.24 mcmol/l; range 1.1-8.8); in four girls, A4 was elevated above one-fold the upper normal limit; in all, T levels were within the normal range. Median HbA1c was 33 mmol/mol (range 27-39), fasting glucose was 4.8 mmol/l (range 4.3 – 5.3); fasting cholesterol and triglyceride levels were within normal ranges. Linear regression analysis showed a significant positive correlation between DHEAS and fasting glucose ($r2=0.10$; $P = 0.042$), which did not reach statistical significance after adjusting for BMI z-score. DHEAS correlated significantly with fat-free mass index (FFMI; $r2=0.19$; $P = 0.013$), but not with waist:hip ratio, fat mass index (FMI), % body fat or android/gynoid fat ratio. No association found between DHEAS and HbA1c, lipids, or BMI z-score, or BMI z-score with any metabolic parameters.

Summary and Conclusion

Our pilot cohort of PA children is characterised by DHEAS excess. Based on standard clinical parameters, a clear metabolic risk signature has not yet been recognised. Recruitment of children with PA and the establishment of matched control cohort is ongoing, which will include in-depth biochemical assessment such as untargeted metabolomics and multi-steroid profiling.

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OC5.5

Glucocorticoid replacement therapy in congenital adrenal hyperplasia and its associations with growth outcomes - real world data analysis from an international cohort of 1500 patients

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Background and Aim
Previous research using data from the I-CAH registry showed wide variation between countries in the provision of glucocorticoid (GC) replacement in congenital adrenal hyperplasia (CAH). In this study, we aimed to establish the impact of different GC doses on height and weight in children and young people with CAH.
Methods
Data from children with CAH recorded in the I-CAH registry since 2003 was collected, providing a cohort of 1522 patients (770 females) from 22 countries (60 centres). We analysed information from 12,401 clinic visits, to study the relationship between GC doses (hydrocortisone (HC) equivalent/m^2/day) and height and weight standard deviation scores (SDS) calculated for age and sex, using the WHO normative data
Results
We found wide variability in the relative daily GC dose used in different countries, ranging between a mean of 5.0 ($\pm$2.1) to 19.6 ($\pm$7) HC-equivalent/m^2/day. The country where patients were treated was found to influence significantly the GC dose used, as shown by regression analysis ($R^2 = 0.17$, $P < 0.01$). Height-SDS' were low (under 0) during infancy and increased during early childhood up until the age of 9 years, then decreased again, following an "inverted U-shape" trend with age. In patients under 9 years of age, height-SDS increased with the GC dose ($R^2 = 0.01$, $P < 0.01$), while in older patients the relationship was inverse ($R^2 = 0.01$, $P < 0.01$). Multivariable regression showed that weight, relative GC dose and the country of residence accounted for up to 70% of the variance in height-SDS in both patients younger than 9 years (boys: $R^2 = 0.73$, $P < 0.01$; girls: $R^2 = 0.67$, $P < 0.01$) and those over 9 years (boys: $R^2 = 0.51$, $P < 0.01$; girls: $R^2 = 0.62$, $P < 0.01$). Weight-SDS increased weakly with the GC dose ($R^2 = 0.002$, $P < 0.01$), however, a stronger relationship was found with birth weight and patients' country of origin (boys: $R^2 = 0.19$, $P < 0.01$; girls: $R^2 = 0.20$, $P < 0.01$).
Conclusions
We believe that our findings indicate wide variations in clinical practice for GC replacement in children with CAH. Importantly, the relative GC doses used appear to have a significant impact on patients' growth. The low height-SDS during infancy may indicate growth suppression by GC overexposure in early life, highlighting the need to optimise steroid replacement.

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OC5.6

Diagnostic testing using gene panels for severe childhood growth failure and multiple pituitary hormone deficiency in England

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Background
A genetic cause is found in up to 40% of children presenting with severe short stature and 30% with multiple pituitary hormone deficiency (MPHD) in selected

cohorts. Since 2020, to inform diagnosis and tailor management, clinicians may access gene panels provided by three NHS England genomic laboratory hubs (GLHs) as part of the Genomic Medicine Service in England for short stature management: **R147** 'Growth failure in early childhood' (eligibility: height/length $<$-3 SDS at age $\geq$2 years and/or clinical features indicative of Silver-Russell syndrome) and **R159** 'Pituitary hormone deficiency' (eligibility: deficiency of $\geq$2 pituitary hormones of neonatal/childhood-onset). The diagnostic yield and use of these panels by clinicians is unclear.

Methods

Data from **R147** and **R159** panels were reviewed from laboratories in two GLHs (Exeter and West Midlands) from 2020 to present. The diagnostic yield was defined as genetic variants classed as "likely pathogenic" or "pathogenic" using the American College of Medical Genetics & Genomics and Association of Clinical Genomic Science guidelines. Abbreviated patient postcodes were collected to determine panel usage by each GLH geographical area.

Results

871 patients had **R147** panel testing and 235 patients had **R159** panel testing across both GLHs. Diagnostic yield for **R147** was 8.0% (70/871): *PTPN11* (n = 28, 3.2%); *ACAN* (n = 7, 0.8%); *CCDC8* (n = 5, 0.6%); *FGFR3* (n = 5, 0.6%); *IGF1R* (n = 3, 0.3%); *PLAG1* (n = 3, 0.3%); *OBSL1*, *RIT1*, *SOS1* (n = 2, 0.2% for each); *ANKRD11*, *BRAF*, *CUL7*, *FANCA*, *GH1*, *GHR*, *HMGA2*, *MAP2K1*, *MAP2K2*, *NPR2*, *SHOC2*, *SOX3*, *SRCAP1* (n = 1, 0.1% for each). Diagnostic yield for **R159** was 7.7% (18/235): *PROP1* (n = 6, 2.6%); *FGFR1*, *GLI2*, *HESX1*, *IGSF1*, (n = 2, 0.9% for each); *CHD7*, *GNRHR*, *OTX2*, *POU1F1* (n = 1, 0.4% for each). Significant variability in panel requests across geographical areas covered by GLHs was found.

Conclusions

PTPN11 and *PROP1* were the most frequent gene changes identified by the short stature and MPHD panels respectively. Diagnostic yields for both gene panels was low. Although real-world utility of both gene panels was low, clinicians should remain aware of the benefits of gene panel testing. Strategies are needed to increase gene panel usage, refine eligibility criteria and improve panel diagnostics for childhood short stature and MPHD disorders.

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OC5.7

A novel human disorder: QSOX2 deficiency-induced growth restriction, gastrointestinal dysmotility and immune dysfunction highlights a new mechanism of disease

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Background

Defects in growth hormone (GH) action account for a substantial percentage of endocrine causes of growth restriction but are frequently unrecognised due to wide clinical and biochemical variability. We report five probands from three families who present with short stature, features of atypical growth hormone insensitivity (GHI), immune dysfunction, atopic eczema, and gastrointestinal pathology associated with recessive variants in *QSOX2*.

Methods

QSOX2 domain boundary locations were modelled using the IntFOLD7 server and interaction partners identified using the PINOT server. Mutagenesis of an N-terminal FLAG tagged-*QSOX2* cDNA generated variant constructs. All experiments were performed using a HEK 293-hGHR cell line. QSOX2 and STAT5B cellular localisation were assessed by western blotting and immunofluorescence. Nano-luciferase complementation assays evaluated QSOX2-STAT5B interactions. Mitochondrial morphology/membrane potential of patient fibroblasts were examined by confocal microscopy and TMRE assays.

Results

We describe the first pathological *QSOX2* variants, discovered by next generation sequencing of five individuals with growth restriction. We demonstrated a direct interaction between QSOX2 and STAT5B using NanoBit complementation assays. Bioinformatic analyses suggested that this interaction occurred via the QSOX2 sulfhydryl oxidase structural domain, which was disrupted for all variants. All variants led to robust GH-stimulated tyrosine phosphorylation of STAT5B. STAT5B nuclear translocation was attenuated with resultant reduced STAT5B downstream transcriptional activities. Intriguingly, robust GH-induced STAT5B phosphorylation correlated with reorganisation of oxidative phosphorylation complexes and diminished mitochondrial membrane potential in patient-derived dermal fibroblasts. Confocal microscopy showed markedly fragmented mitochondria in patient derived fibroblasts only following GH, but not when untreated or following IGF-1 stimulation. A concomitant increase in phospho-Ser616-DRP1 (Dynamin-related protein 1), a pro-fission marker of mitochondrial fragmentation, was observed. Increased cytoplasmic p-STAT5 in fibroblasts co-localised to the mitochondrial outer membrane suggesting that in the absence of functional QSOX2, p-STAT5 may impact mitochondrial fragmentation via enhanced DRP1-S616 phosphorylation.

Conclusion

QSOX2 deficiency should be suspected in individuals with features of growth restriction, atypical GHI, low IGF-1, atopic eczema, feeding difficulties, gastrointestinal dysmotility and recurrent infections. QSOX2 deficiency modulates human growth by impairing GH-STAT5B downstream activities and mitochondrial dynamics, contributing to multi-system dysfunction. Therapeutic rhIGF-1 may circumvent the GH-mediated STAT5B molecular defect and potentially alleviate organ specific disease.

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OC5.8

Oral risedronate therapy in duchenne muscular dystrophy: the john walton muscular dystrophy centre experience

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Introduction

International standards of care for DMD recommend yearly spinal imaging for those on GC and the use of bisphosphonates (BP) for those with symptomatic or moderate asymptomatic vertebral fractures (VF). In view of the significant morbidity associated with VF and the potential for VF cascade, however, there may be justification for prophylactic BP in DMD. Although IV BP are used for treatment, there may be practical and cost advantages of using oral BP prophylactically, but there is limited evidence for this. From January 2008, oral BPs (risedronate) were offered to all boys starting or treated with daily GC attending the John Walton Muscular Dystrophy Centre in Newcastle upon Tyne, UK. This was done routinely until around 2015 but smaller numbers have also continued to be offered it since; this audit describes that cohort.

Methods

A retrospective notes and radiology review of the 92 patients who were started on oral risedronate between 2008 and 2022 was performed. Time to VF was calculated from start of GC to censor date of either date of x-ray when VF was first reported or last x-ray date without a VF.

Results

Spinal imaging was available for 76/92 patients. 47/76 sustained at least 1 VF during follow-up, of these 39/47 had started risedronate before first VF. 19 patients started risedronate within first year of GC exposure and had longitudinal XR FU with no VF at baseline. Of these, 6/19 had a subsequent VF (mean follow-up (FU) 9.7 years, range 6.1-11.9y), while 13/19 had no VF after 9.6 years FU (range 3.7-13.1y). 53/92 stopped risedronate during FU: (17 changed to zoledronate after VF, 5 to alendronate, 14 stopped BP due to SE including swallowing difficulties, 5 stopped due to improvement in bone density or stopping GCs, unknown in 12).

Conclusions

This audit suggests that oral risedronate is generally well tolerated and may be useful prophylactically as the time to first VF in the prophylactic cohort is significantly longer than reported in other DMD datasets. A well-designed prospective study is needed to further evaluate the utility of prophylactic BP in DMD.

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OC5.9

Genomic diagnoses in DSDs – 10-year experience from a regional DSD service

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A regional multidisciplinary paediatric DSD clinic has been established in our university hospital since 2006, involving specialists from endocrinology and urology. Selected patients were referred to clinical genetics until 2015, when a clinical geneticist and genetic counsellor joined the DSD team. This was prompted by the increasing recognition of the role of genomics in DSD and availability of an increasingly diverse array of genomic tests through NHS labs. The clinic is held face-to-face 4 times a year, with two parallel rooms of one representative from each speciality (endocrinology, urology and genetics). We present an overview of the DSD clinic and the genomic landscape of DSDs from January 2015 to May 2024. 135 new patients were seen in the DSD clinic in this period. Congenital adrenal hyperplasia (CAH) was the commonest diagnosis, accounting for 23% (31/135) patients. One patient had 11-beta hydroxylase deficiency, and the rest had 21-hydroxylase deficiency. A wide range of DSD syndromes (total 35 patients, 26%) were diagnosed, including 7 patients with complete androgen insensitivity syndrome and 4 with 5-alpha reductase deficiency. Many patients with mosaic karyotypes involving the sex chromosomes were within this subgroup. Rarer DSD syndromes included Leydig cell hypoplasia, MAP3K1-related gonadal dysgenesis, and true isolated 17,20 lyase deficiency. The most diverse category (26/135, 19%) were patients with 'other syndromes', including monogenic, chromosomal and non-genetic diagnoses. In this category, 16 patients had a genetically confirmed diagnosis, from common syndromes (Prader-Willi, Noonan and Aarskog) to rare (Frasier syndrome) or super-rare (Lin-Gettig syndrome) disorders. One patient was diagnosed clinically with PAGOD syndrome, an extremely rare condition of unknown cause. 25 (19%) patients were diagnosed with an isolated urological anomaly such as hypospadias and/or undescended testes. 18 (13%) patients were found *not* to have a DSD after thorough assessment. Most referrals had been due to concern about appearance of the genitalia and family could be reassured. Our data highlights the crucial role of detailed phenotyping, family history, and genomic testing in increasing the diagnostic yield in patients referred to the DSD clinic, facilitating appropriate medical management, risk reduction (e.g. gonadoblastoma), and genetic counselling for the wider family.

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Endocrine Oral Communications 2

OC6.1

DXA lean mass index as a predictor of loss of ambulation in duchenne muscular dystrophy and potential biomarker to initiate osteoporosis therapy prior to fractures

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Background
Recent evidence highlights the dramatic loss of trabecular bone following loss of ambulation in people with DMD. An opportunity to introduce osteoporosis therapy without fractures is when loss of ambulation is imminent. There is a need to explore biomarkers to predict loss of ambulation, that can be assessed in the clinic, to guide such discussions.
Methods
A retrospective study was conducted in 26 boys with DMD treated with daily glucocorticoid. Lean mass and fat mass from DXA, performed during routine bone monitoring, was obtained at three timepoints. Thirteen remained ambulant through-out follow-up and thirteen others were non-ambulant at the third DXA scan. Lean mass index (LMI) and fat mass index (FMI) were converted into Z-scores. Descriptive data presented as median (range). Statistical significance was noted at $P < 0.05$.
Results
Median glucocorticoid dose (prednisolone equivalent in mg/kg/day) in the group that remained ambulant were 0.5 mg/kg/day (0.5, 0.8), 0.5 mg/kg/day (0.3, 0.8) and 0.6 mg/kg/day (0.3, 0.7), respectively [$P = 0.37$]. Median glucocorticoid dose (prednisolone equivalent in mg/kg/day) in the group that lost ambulation was 0.7 mg/kg/day (0.5, 0.8), 0.5 mg/kg/day (0.3, 0.8) and 0.3 mg/kg/day (0.2, 0.8), respectively [$P < 0.001$]. Median LMI Z-scores in those that continued to be ambulant were low, but remained stable at -1.9 (-3.8, +3.1), -1.5 (-4.4, +1.9) and -2.1 (-4.5, -0.3), respectively [$P = 0.72$]. Median LMI Z-scores in those that lost ambulation by the third DXA declined with follow-up and were -3.0 (-4.1, -1.2), -4.3 (-5.7, -0.1) and -4.6 (-6.9, -3.3), respectively [$P < 0.001$]. Median LMI Z-scores were significantly lower at 2nd DXA in this group [$P < 0.001$]. Logistic regression analysis with LMI Z scores at 2nd DXA and duration of glucocorticoid as co-variates identified LMI Z-scores as a significant independent factor [$P = 0.025$, Exp(B) 0.4, 95%CI for Exp(B) 0.1, 0.9] that predicts loss of ambulation.
Conclusion
In boys with DMD, DXA LMI Z-scores declined significantly with follow-up in those that lose ambulation. Our study provides the first evidence of the potential utility for DXA LMI Z-scores to predict loss of ambulation, thus extending the clinical utility of DXA in DMD to identify those where bone protective therapy can be considered without fractures.

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OC6.2

BSPED audit of clinical standards for differences of sexual development (DSD)

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Introduction
BSPED standards for the management of infants or adolescents presenting with suspected differences in sex development were developed in 2017, aimed at identifying optimal service requirements to provide best clinical practice and ensure equity of access. They were audited 2019 and reaudited in 2023.
Aim
To document structures of UK DSD care delivery, assess current service provision against benchmarks and share best practice to support improvements and developments of these highly specialised and sensitive services.
Methods
Surveys were distributed via email to clinical leads in all 23 UK centres. Data were collected on a range of information about services across 6 clinical standards. Additionally, clinical leads were requested to distribute a supplementary survey to their MDT members to evaluate continuous professional development activities.
Results
All 23 centres responded to the primary survey and 84 individuals responded to the CPD questionnaire. Improvement was observed in 4 out of 6 clinical standards from 2019 to 2023. The presence of MDTs increased from 18/21 centres in 2019 to 22/23 in 2023. More centres record their patients on registries (2019: 16/21, 2023: 19/23). Specifically, 14/23 record on iDSD and all consent for this. More centres are also involved in QI projects (2019: 10/21, 2023: 13/23,) and research (2019: 14/21, 2023: 17/23). Common barriers to meeting standards throughout centres included limited clinical psychology services, challenges in registry data input, restricted access to radiology services, and variable transition provisions. The successful audit cycle has prompted a recognition of the necessity to refine BSPED clinical standards, especially in defining MDT membership, delineating the roles of key workers and specialist nurses, and specifying inclusion criteria for DSD registries. Furthermore, there exist various opportunities for Quality Improvement Projects (QIPs), such as resource sharing (e.g., guidelines, referral pathways, feedback tools) and development of appropriate transition pathways to adult services.
Conclusions
Despite current pressures within the NHS, there has been significant improvement across clinical standards in DSD MDT service provision. This audit has underscored unmet needs common across centres, with a commitment to tangible future improvements. We would like the thank the DSD special interest group for their collaboration.

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OC6.3

Systematic review of cardiometabolic outcomes in young people with gender dysphoria and the impact of puberty blockers

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Background
Recent studies have demonstrated an increased risk of cardiovascular disease in transgender adults compared to the cisgender population. It remains uncertain whether this increased risk is due to hormonal treatment or if individuals with gender dysphoria inherently have a higher baseline risk for cardio-metabolic complications. Within the UK, until recently, following confirmation of diagnosis according to WPATH criteria, gonadotropin-releasing hormone analogues (GnRHa) could be prescribed in these adolescents if there were signs of puberty. This systematic review aims to assess the cardiometabolic status in treatment-naive adolescents with gender dysphoria and evaluate the impact of GnRHa on these outcomes.
Methods
Three databases were searched for studies which evaluated cardiometabolic outcomes in adolescents with gender dysphoria <18 years and/or those who had had been treated with GnRHa. Quality assessment was performed using an adapted version of the Newcastle-Ottawa Scale for cohort studies in gender dysphoria. The Preferred Reporting Items for Systematic Reviews and Meta-analyses reporting guidelines were used.
Results
Ten pre-post studies and five cross-sectional studies published between 2014 and 2023 fulfilled eligibility criteria. Seven studies (47%) provided data on baseline characteristics and ten studies (67%) provided data on the impact of GnRHa. There was a total of 3865 adolescents with gender dysphoria and 81006 age-matched cisgender controls. Multiple studies reported an increased prevalence of overweight and/or obesity or an increased BMI z-score in adolescents with gender dysphoria at baseline. There was no evidence of significant change in BMI following treatment for approximately one year. The evidence available for body composition, blood pressure and metabolic markers was limited and/or conflicting, both at baseline and following GnRHa treatment. Quality assessment identified twelve moderate quality and three low quality studies.
Conclusion
This systematic review found an increased risk of excess weight in young people with gender dysphoria, although no evidence was found of an increase in BMI with GnRHa treatment. Due to limited data, no definitive conclusions can be made about other cardiometabolic outcomes in adolescents with gender dysphoria and following pubertal suppression. Longitudinal prospective studies with standardized designs and key outcome measures are essential for advancing knowledge in this area.

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OC6.4

Low-level chromosomal mosaicism does not explain the spontaneous menarche seen in some women with 45,X turner syndrome

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Introduction
Ovarian insufficiency in Turner Syndrome (TS) classically presents with absent puberty and primary amenorrhea. However, a proportion attain menarche spontaneously, with later reproductive phenotypes ranging from early-onset secondary amenorrhea, to ongoing menstrual cycles, to spontaneous pregnancies. TS karyotypes include monosomy X (45,X); X chromosome mosaicism (e.g., 45,X/46,XX); and X chromosome rearrangements (e.g., ring X). The additional X chromosome gene dosage conferred by the non-45,X cell lines has been proposed to account for the improved reproductive function associated with non-45,X TS. However, it is unknown why some women (~15%) with non-mosaic 45,X TS present with relatively conserved ovarian function rather than the expected primary amenorrhea. We hypothesised that low-level, previously undetected non-45,X cell lines may explain this phenomenon, and that single nucleotide polymorphism (SNP) genomic arrays may provide the resolution to detect this.
Methods
We performed SNP arrays (Illumina Global Screening Array v3.0; UCL Genomics) in women with TS attending University College London Hospital. Inclusion criteria included those with 1) 45,X karyotype on 30 cell line peripheral lymphocyte analysis; and 2) evidence of conserved ovarian function as suggested by spontaneous pubertal development and menarche with at least one spontaneous clinical menstrual cycle. Genomic data were analysed in GenomeStudio 2.0 (Illumina; CNVPartition).
Results
A total of 11 women with 45,X TS and evidence of conserved ovarian function were recruited. Of these, 9 had a 45,X sex chromosome complement matching their documented peripheral karyotypes. Two women had mosaicism not detected by peripheral karyotype analysis: one with an isochromosome X (45,X[75%]/46,X,i(X)[25%]) and another a ring X (45,X[87%]/46,X,i(X)(p22q23)[13%]).
Conclusions
The relatively preserved reproductive function seen in this cohort of women with 45,X TS is potentially explained by previously undetected low-level chromosomal mosaicism in a minority. However, we show that the spontaneous ovarian function seen occasionally in 45,X TS is mostly not associated with peripheral low-level chromosomal mosaicism. Explanations for this must lie beyond X chromosome haploinsufficiency or tissue-specific mosaicism within the ovaries of women with 45,X karyotypes. More broadly, we demonstrate the value of SNP array analysis in TS when faced with unexpected genotype-phenotype associations.

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OC6.5

Rare causes of silver-russell syndrome frequently present with atypical features highlighting important implications for genetic testing and clinical management

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Background
Silver-Russell Syndrome (SRS) is a complex multi-system condition and timely diagnosis is important for appropriate management, access to therapy and to reduce the burden of diagnostic uncertainty. A clinical diagnosis is made using the Netchine-Harbison Clinical Scoring System (NH-CSS) with a score ≥ 4, and (epi)genetic investigation is recommended in those with an NH-CSS ≥ 3. A molecular defect is identified in ~60% of SRS cases. Monogenic defects in imprinted (*CDKN1C* and *IGF2*) and non-imprinted (*HMGA2* and *PLAG1*) genes are increasingly recognised as rare causes of SRS, but genetic testing is reserved for patients with a strong clinical suspicion. We aimed to identify the key presenting features of monogenic SRS and assess the validity of NH-CSS to identify these cases.
Methods
An extensive literature search identified a cohort of monogenic SRS, including *CDKN1C* ($n = 17$), *IGF2* ($n = 21$), *HMGA2* ($n = 17$) and *PLAG1* ($n = 10$) gene defects. The associated clinical phenotypes including the NH-CSS criteria were interrogated in all the cases.
Results
A clinical SRS diagnosis (NH-CSS $\geq 4/6$) was noted in 86% *IGF2*, 65% *HMGA2*, 53% *CDKN1C* and 40% *PLAG1* cases. Relative macrocephaly (OFC ≥ 1.5 SDS above birth weight and/or length SDS) was observed in 81% *IGF2*, 59% *CDKN1C*, 29% *HMGA2*, and 20% *PLAG1*. Prominent forehead was reported in 94% *CDKN1C*, 86% *IGF2*, 71% *HMGA2*, and 60% *PLAG1* and body asymmetry in 29% *IGF2* and 6% *HMGA2*. Distinct clinical features (not typically associated with SRS) included: *CDKN1C*, 6% challenging behaviour, 12% diabetes, and 12% asthma; *IGF2*, 5% intellectual delay, 43% cardiac abnormalities, 29% cleft palate; *HMGA2*, 29% microcephaly (OFC $>$-2 SDS), 12% gastrointestinal manifestations; and *PLAG1*, 30% microcephaly, 10% learning difficulties, 10% gastrointestinal manifestations.
Conclusions
NH-CSS criteria was poor at identifying monogenic SRS missing the diagnosis in 60% *PLAG1,* 47% *CDKN1C*, 35% *HMGA2* and 14% *IGF2* gene defects. The presence of atypical clinical features, including microcephaly and learning difficulties, should not preclude clinicians from investigating for rarer causes of SRS. This emphasises the need to extend the molecular investigation of apparent and atypical SRS to inform clinical management decisions and enhance outcomes for affected individuals.

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Diabetes Oral Communications 1

OC7.1

Does severity of DKA presentation associate with autoantibody status, deprivation or ethnicity - a two-centre retrospective cohort

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Background
Almost 25% of all paediatric patients present at diagnosis in DKA in the UK. DKA at presentation is associated with poorer glycaemic control in the longer-term with implications for morbidity and mortality in adulthood. It is reported that presentation in DKA is associated with younger age, socio-economic deprivation, ethnic minority background and no family history of T1D.
Aim
To explore if deprivation, ethnicity or auto-antibody (AAB) status leads to differences in presentation in 2 large centres (London and Birmingham) serving multi-ethnic populations.
Methods
Retrospective case note review of all children diagnosed with T1D over 12 months period (ending December 2023) within 2 centres. Patients were grouped according to presentation (severe DKA, mild-moderate DKA or no DKA), ethnicity (white vs non-white/mixed), Index of Multiple Deprivation (IMD) quintile and AAB status. Statistical analysis was performed with Fisher's exact test.
Results
75 children (32M: 43F) presented with new onset T1D. Mean age at presentation was 9.1 years (range 1-16). 25 (33.3%) were in severe DKA, 15 (20.0%) in mild/moderate DKA and 35 (46.7%) not in DKA at presentation. Mean age of presentation for severe DKA vs no DKA was 9.2 years vs 9.6 years ($p = 0.63$). No difference seen in severity of DKA and AAB status (severe DKA$n = 4$ for $>=2$AAB positive,$n = 14$ for 1AAB positive, no DKA$n = 9$ for >2AAB positive,$n = 11$ for 1AAB positive, $P = 0.3$). No difference seen in presentation based on ethnicity (non-white: severe DKA$n = 15$ vs no DKA$n = 29$; white: severe DKA$n = 15$ vs no DKA$n = 21$; $P = 0.6$). Most of the population were from the lowest IMD quintile (1-2,$n = 59$ vs 16 from IMD quintiles 3+) but no difference was seen in presentation comparing IMD quintiles in DKA severity (severe DKA: IMD quintile 1-2$n = 20$, IMD 3+$n = 5$, $P = 0.76$).
Discussion
No differences in presentation at diagnosis in DKA based on age, ethnicity or deprivation quintile were observed although our cohorts are heavily skewed in terms of ethnic diversity and deprivation compared to national data. More worryingly, patients present to our centres at diagnosis in DKA at almost twice the national average which needs further investigation.

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OC7.2

A regional audit of diabetic ketoacidosis (DKA) presentations at diagnosis of type 1 diabetes (T1DM) and DKA management

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Background
Diabetes Ketoacidosis (DKA) is a life-threatening emergency. National Paediatric Diabetes Audit 2022/23 showed that 23.3% of children and young people (CYP) with a new diagnosis of type 1 diabetes (T1DM) presented in DKA. Delayed presentations of DKA were common across emergency departments nationally during the COVID-19 pandemic. Similar observations were reported by diabetes professionals across the West Midlands (WM) region two years on.
Objectives
To conduct a multisite regional review of DKA presentations among paediatric patients with a new diagnosis of T1DM. To audit management of DKA against BSPED guidelines.
Methods
A prospective audit over three-months (December 2022 - February 2023) of paediatric patients presenting in DKA at diagnosis of TIDM at all 11 paediatric diabetes centres in the WM area, coordinated by WM Child and Young People's Diabetes Network (CYPWMDN).
Results
There were 115 newly diagnosed T1DM patients aged between 22 months and 16 years; 40(35%) presented in DKA, 17(42.5%) in severe DKA. 39% of CYP had prior contact with health care professionals (HCP), with symptoms reported being polydipsia (86%), polyuria (76%), weight loss (75%) and fatigue (74%). Signs of shock were noted in 13(32%) patients. Most patients (35, 87%) had fluid deficit correctly identified. Only 4 patients were started on higher insulin infusion rate of 0.1U/Kg/hr. Insulin was started at 1-2 hours from presentation in 37.5% but delayed >2hrs in 62.5%. 17(42.5%) patients experienced hypokalaemia, all of whom were on the higher insulin infusion rate, and 4(10%) developed hypoglycaemia. Median time to resolution of DKA was 21 hours irrespective of insulin infusion rate.
Conclusion
Our data shows a higher incidence of DKA at diagnosis as compared to previously reported figures and an ongoing need to raise awareness of diabetes symptoms among health care professionals to prevent delayed diagnosis. Our audit also shows frequent delays in starting insulin, high incidence of hypokalaemia during treatment with a higher insulin infusion rate and no evidence of earlier resolution of DKA with use of higher insulin infusion rate.

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OC7.3

Glycaemic control of children and young people with type 1 diabetes fasting during ramadan at a single london paediatric diabetes unit

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Introduction
During the month of Ramadan, healthy Muslims are required to fast from dawn until sunset. Whilst the Quran states that those who are chronically unwell and children are exempt, many individuals with diabetes choose to fast. The duration of fasting may be over 12 hours increasing the risk of diabetes related complications such as hypoglycaemia. We present data of children and young people (CYP) with Type 1 Diabetes Mellitus (T1DM) who fasted during Ramadan at a single paediatric diabetes centre in London. Prior to Ramadan all patients were given education in the form of an information leaflet and individual support if they expressed a desire to fast. The patients had access to the diabetes team 24 hours a day. Our aim was to evaluate safety and glycaemic control through reviewing time in range (TIR) and hypo/hyperglycaemic episodes from retrospective data before and during Ramadan.
Results
Fourteen CYP chose to fast. The mean age of patients was 15 years. Eight were males. The average duration since T1DM diagnosis was 6 years. All were using insulin pumps, one had a pump holiday during part of the fast. Prior to fasting seven patients could be considered high risk due to regular or severe hypo/hyperglycaemic episodes. Most patients recorded similar carbohydrate consumption during Ramadan to before fasting. There was no significant difference in TIR, frequency of hypo/hyperglycaemia or HbA1c. Five patients experienced hypoglycaemic episodes, however only one had significantly more episodes compared to the month prior, and as a consequence of fasting. This was addressed with support from the team. There were no hospital admissions, diabetic ketoacidosis or serious incidents. Only two patients called the diabetes team with specific queries due to fasting.
Conclusion
This evaluation highlights that with appropriate support it can be safe for CYP to fast for Ramadan and it is not associated with a short-term glycaemic deterioration. It is important to ask patients directly about lifestyle and religious choices to inform management. All patients who wish to fast should receive appropriate risk assessment and structured education to ensure they do so safely. There is a need for guidance for CYP and clinical trials to provide evidence-based support.

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OC7.4

Short term outcomes for children with new onset diabetes and confirmed SARS-CoV-2 Infections – a case series

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Background
There were marked increases in new onset diabetes in adults and children during the COVID-19 pandemic. Studies showed that some adults with COVID-19 and new diabetes went into remission, there are no follow up studies of children who developed diabetes in the pandemic.
Aims and methods
We conducted a medical record review of children with laboratory confirmed SARS-CoV-2 infection and new onset diabetes ($n = 13$) and compared their outcomes with controls, children diagnosed with new onset diabetes in the pre-pandemic period ($n = 26$). All participants were recruited from the DIMPLES (Diabetes Mellitus in Children and Young People in the SARS-CoV-2 Pandemic) study. This secondary analysis of the DIMPLES dataset was approved by the HRA (IRAS 287804). For each child with new diabetes in the pandemic period, one random control and one matched control of a child with new diabetes from the pre-pandemic period was chosen. Matching was done for age, gender and ethnicity.
Results
The mean age at diagnosis was 11.1 years (IQR 2.3-15 years). All children had a diagnosis of Type 1 diabetes. 6/13 children with SARS-CoV-2 infection presented with DKA, 8/26 diagnosed in the pre-pandemic period presented with DKA. The mean HbA1c in the COVID-19 group was similar to the control group and tracked at 69 mmol/mol $\pm$ 21 mmol at 6 months after diagnosis, 65 mmol/mol $\pm$ 19 mmol at 12months, 69 mmol/mol $\pm$ 20 mmol at 18 months after diagnosis. The number of hospital admissions for DKA/hypoglycaemia post diagnosis were similar across both groups. One child who was NPA positive for SARS-CoV-2 presented with Grave's disease and severe DKA at diagnosis. There were no increases in autoimmune conditions in other children who were SARS-CoV-2 positive at 18 months of follow up.
Conclusion
Children who tested positive for SARS-CoV-2 and developed new onset diabetes showed similar outcomes to those who developed diabetes in the pre-pandemic period at 18 months after diagnosis. Unlike adults none of the children had remission of diabetes. All children who developed new onset diabetes had one or more pancreatic autoantibodies suggesting a genetic predisposition to T1DM. Longer term follow up of this cohort is recommended to evaluate for any emerging differences.

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OC7.5

Comparison of glycaemic control across different ethnic and socio-economic groups in a cohort of children using hybrid closed loop systems

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Introduction
At our centre, we adopted a hybrid virtual flipped learning model to onboard children with type 1 diabetes onto hybrid closed-loop (HCL) systems. This approach doubled staff capacity, facilitating a five-fold increase in onboarding. We achieved a 16% improvement in time in range (TIR, 3.9-10.0 mmol/l) and aimed to evaluate absolute glucose levels post-HCL across minioritised groups.
Objectives
Evaluate absolute glycaemic control among different ethnic and socioeconomic status (SES) groups over the first 90-days of HCL system use.
Methods
Retrospective analysis (2019-2024) of CYP transitioning from CGM to HCL. Data on demographics and glucose metrics were collected from patient records and manufacturer's online databases, excluding those with less than 50% data capture. 90-day CGM data pre and post HCL were compared between different ethnic and SES groups.
Results
A total of 169 CYP (53% male) with a mean age of 12.4 ($\pm$3.6) years and T1D duration of 6.0 ($\pm$3.7) years were included. The majority ($n = 95$/56%) were of non-white ethnicity [South Asian (SA),$n = 59$, 35%; Black (B),$n = 26$, 15%; White (W)$n = 74$, 44%]. A third each were most deprived (T1,$n = 56$/33%), second most deprived (T2,$n = 56$/33%) and least deprived (T3,$n = 57$/34%). 20 (12%) CYP required an interpreter. At baseline; W, SA and B had comparable time below range (TBR, $<$3.9 mmol/l) (1.5%, 2.4%, 2.8%, $P = 0.053$), TIR (48%, 48%, 45%, $P = 0.499$), and mean blood glucose (MBG mmol/l) (10.7, 10.7, 11.0, $P = 0.716$) respectively. After 90-days of HCL; W, SA and B had comparable TBR (1.9%, 1.9%, 2.6%, $P = 0.169$), TIR (65%, 65%, 63%, $P = 0.519$), and MBG mmol/l (9.2, 9.1, 9.3, $P = 0.587$) respectively. At baseline, T1, T2 and T3 had similar TBR (2.6%, 1.6%, 2.2%, $P = 0.51$), TIR (47%, 47%, 50%, $P = 0.300$), and MBG mmol/l (10.8, 10.9, 10.5, $P = 0.417$) respectively. After 90-days of HCL, there were no significant differences for TBR (2.2%, 1.9%, 1.9%, $P = 0.531$), TIR (65%, 64%, 67%, $P = 0.154$), and MBG mmol/l (9.2, 9.3, 9.0, $P = 0.177$) across T1, T2 and T3 respectively.
Conclusions
Equitable onboarding to HCL systems through innovative educational methods achieves comparable glycaemic improvements in children with type 1 diabetes from diverse ethnic and socioeconomic groups.

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Endocrine Oral Communications 3

OC8.1

A retrospective analysis of anti-tpo results in infants with an abnormal congenital hypothyroidism neonatal screening

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Objective
To evaluate whether Thyroid peroxidase antibody (anti-TPO) screening is a useful tool in the management of Congenital Hypothyroidism (CH) and determining aetiology.
Background
Thyroid peroxidase (TPO) is essential for thyroid hormone synthesis catalyzing the iodination of tyrosine residues and their coupling to form T3 and T4. It is hypothesized that anti-TPO can cross the placenta, bind to TPO, inhibit its activity in the fetal thyroid gland and result in CH.
Design and Method
We retrospectively evaluated 177 patients, born between May 2019 and May 2021, who had been referred to Great Ormond Street Hospital following an abnormal CH neonatal screening. We retrospectively assessed the infants with a positive anti-TPO status and explored their maternal anti-TPO status, their ongoing management and their 3-year outcome.
Results
Of the 177 infants with an abnormal CH bloodspot TSH screening test, 141 (79.6%) had recorded TPO antibody results. Among these, 11 (7.8%) were positive for anti-TPO, and all required treatment with levothyroxine at diagnosis (TSH 33.5 to $>$ 375mU/l). Among the 139 mothers tested, 12 (8.6%) were anti-TPO positive, with 91.7% of their infants also testing positive. Technetium scan showed gland *in situ* in 4, ectopia in 4, dysgenesis in 3. A follow up US confirmed thyroid tissue was present in 2/3 cases with presumed agenesis. Two children were trialled off levothyroxine before age 3. Both had thyroid scans suggestive of dyshormonogenesis and low normal fT4 at diagnosis (venous TSH 33.5 and 117mU/l). A further five children met the criteria for a trial off treatment at 3 years and one child remained off (venous TSH$>$375mU/l; fT4,3.9 pmol/l); absent gland on technetium but present on thyroid US.
Conclusion
Anti-TPO was present in 7.8% of our cohort, with a strong correlation to maternal anti-TPO positivity. Anti-TPO were present in infants with confirmed permanent CH and in 3/11 infants were likely to be the aetiological factor with improvement in thyroid function after 5 months and presumed clearance of antibodies. The absence of technetium uptake in a child with anti-TPO and a milder clinical course should prompt US confirmation.

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OC8.2

Thyroid dysfunction in patients diagnosed with neuroblastoma who received MIBG scans

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Background
Treatment modalities for childhood neuroblastoma include chemotherapy, surgery, and radiotherapy. Metaiodobenzylguanidine (mIBG) scans labelled with radioisotopes can be used for diagnosis and disease surveillance (123 I-mIBG) and treatment (131 I-mIBG) in these patients. Thyroid dysfunction following mIBG scan exposure is a documented complication and thyroid protection with potassium iodide is recommended.
Aim
The audit aimed to identify the prevalence of thyroid dysfunction in a cohort of children diagnosed with neuroblastoma who received mIBG either for diagnosis or treatment.
Patients and method
Retrospective analysis of patient notes of those treated for high-risk neuroblastoma *(patients with stage 4 disease over 1 year of age or MYCN amplified neuroblastoma)* at the Great North Children's hospital in Newcastle from 2005 to 2022.
Results
30 patients received treatment for high-risk neuroblastoma over a period of 17 years; all patients had at least one 123 I-mIBG scan (average 7.3scans/patient). 3 patients had radiotherapy with 131 I-mIBG. 13 patients (43%) had abnormal thyroid function tests at some point after commencement of treatment. 7 patients have been started on thyroxine for subclinical hypothyroidism; all are believed to be related to MIBG exposure. Mean time post treatment completion to commencement of Thyroxine was 4 years (range 0-7years). All the patients prescribed thyroxine had received at least 4 mIBG scans (range from 4-19 scans). The remaining 6 patients are being monitored 'off therapy': (2 patients are believed to be 'sick euthyroid', 3 have normalised spontaneously and 1 has mildly reduced T4 levels with normal TSH.
Conclusion
This audit demonstrated a 43% prevalence of thyroid dysfunction in patients treated for high-risk neuroblastoma who had mIBG scans performed. We recommend surveillance with annual TFTs following completion of treatment in those subject to mIBG exposure. This audit suggests that there may be a link between number of mIBG exposures and likelihood of subsequent thyroid dysfunction.

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OC8.3

Psychological and social characteristics of children and young people living with obesity in portsmouth and southampton

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Introduction
Psychological and socioeconomic risk factors such as neurodiversity, learning needs and deprivation are associated with increased risk of childhood obesity. Increased socioeconomic deprivation is linked with higher psychological adversity. Improved understanding of the interaction between psychosocial risk factors and childhood obesity could change intervention approach; preventing poor adult health, deterioration of quality of life and reduced life expectancy.
Objective
Describe psychosocial characteristics of CYP with severe obesity.
Methods
Data reviewed from CYP seen in Portsmouth (PHU) and Southampton (UHS) CEW (Complications of Excess Weight) clinics between 2022-2024. Data included: deprivation score, WNB rate, neurodiversity, EHCP status, education attendance and children's services involvement.
Results
118 patients reviewed (51 PHU, 67 UHS). 55% (18/51) PHU and 33% (22/67) UHS patients had deprivation deciles in top 20% deprived UK neighbourhoods. WNB rates to hospital appointment across two years was high; in 17/51 33% PHU and 33/67 (49%) UHS WNB rate was more than 10%. Neurodiversity status (diagnosis/awaiting assessment of ASD/ADHD) indicated rates of 53% (27/51) PHU, 45% (30/67) UHS patients. 22% (11/51) PHU patients had ASD diagnosis, 42% (28/67) UHS patients. UK average 1% (NICE, 2020). UK average rates of EHCPs are 4.3% (Gov.uk, 2024). 25% (13/51) PHU patients had EHCPs, 16% (11/67) UHS patients. 13% (9/67) UHS patients were NEET, 6% (3/51) PHU patients. UHS school attendance data was unavailable. PHU indicated 38% CYP have attendance less than 80% compared to national average of 93% (Gov.uk, 2024). Highest previous known level of Children's services support showed 24% (12/51) PHU patients and 13% (9/67) UHS patients had Child in Need plans; England average 3.4%. 18% PHU (9/51) patients and 7% (5/67) UHS patients had Child Protection Plans; England average is 0.4% (Gov.uk, 2024).
Conclusion
CYP in our CEW clinics have notably high rates of neurodiversity, EHCPs, NEET and lower school attendance compared to UK averages. Children's services involvement is significantly higher in CEW patients. We hypothesise that multi-agency, cross-services joint working is essential to meet the complex needs of CYP with severe obesity. Further work is needed to explore the interaction of psychosocial and educational challenges of CYP with severe obesity to guide interventions.

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OC8.4

Impact of specialist psychology provision and outcomes for a DSD service

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Introduction
Differences in sex development (DSD) services now include psychology provision as standard care within MDTs. Caregivers and CYPs have wide-ranging biopsychosocial needs and care should be delivered via holistic, specialist MDTs, including access to specialist clinical psychology.
Objective
Evaluate i) psychology input required for children with DSD, ii) review interventions typically accessed via specialist psychology, iii) evaluate clinician-reported outcomes for families accessing psychology.
Method
Review of patients referred to DSD psychology between 2020-2024. Data collected from clinical notes included: age at referral, number of psychology sessions, intervention focus, referral reason and clinician-reported outcomes.
Results
61 patients were referred (2.2 per month). 47% 46,XY DSD, 46% 46,XX DSD (including 20% congenital adrenal hyperplasia), and 7% sex chromosome DSD. 61% (37) had a joint appointment with psychology and another MDT member. Mean psychology sessions accessed was 4.2, with 271 mean minutes of direct psychology clinical contact per patient. Referral reasons included 'support for parents', 'support preparing for disclosure' and 'helping child understand condition'. Parents/caregivers accessed support with their child in 52% referrals, 11% of referrals were for CYPs without parent/caregiver, and 32% for caregivers/parents. In all cases where support was accessed (78%, 48/61), intervention included multiple areas of focus (e.g., Acceptance and Commitment Therapy, Cognitive Behaviour Therapy, Eye Movement Desensitisation Reprocessing, adjustment to diagnosis, support with disclosure, self-image and identity work). Most frequent psychology reported/related outcomes were 'increased access to resources' 54% (26/48), 'increased caregiver confidence in disclosure' 43% (21/48), 'increased CYP understanding of condition' 41% (20/48) and 'increased CYP confidence regarding condition' 37% (18/48). 72% (44/61) cases required non-direct intervention: MDT liaison, complex case discussion, supporting MDT in challenging conversations, education re psychosocial factors in DSD.
Conclusion
Providing holistic support requires specialist psychology provision encompassing a breadth of expert knowledge, skills and competencies beyond standard child psychology provision, including detailed medical understanding of DSD and challenges associated for CYPs and families. Psychology within DSD MDTs is valued by CYP and parents/caregivers; being a necessary, valuable integrated resource in supporting caregivers and CYP to access appropriate, timely information, supporting them across childhood as their needs evolve.

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OC8.5

The effect of CFTR modulators on growth, body composition and bone health in children and adolescents with cystic fibrosis

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Aim
This study aimed to evaluate changes in growth, body composition and bone health in children and adolescents with CF following treatment with Kaftrio.
Methods
Retrospective study including children with CF who had dual energy X-ray absorptiometry (DXA) prior to starting Kaftrio and after one year of therapy as part of their routine care. DXA lean mass index (LMI: defined as DXA lean mass/height^2) and fat mass index (FMI: defined as DXA fat mass/height^2) were converted to standard deviation scores (SDS) based on LMI and FMI centiles from a cohort of healthy school children from Glasgow. DXA total body less head bone mineral content (TBLH-BMC) and DXA lumbar spine bone mineral apparent density (LS-BMAD) were converted to a SDS based on published UK normative data. TBLH-BMC was adjusted for bone area, age and sex. A control group (age and sex matched) of children with CF, not receiving CFTR modulator therapy, were used at baseline and follow-up.
Results
23 children were included in the study group and 24 in the control group with mean age of 10.4 and 10.7 years respectively. At baseline, mean LMI SDS was significantly lower than a healthy population for both the study group (-1.39, $P < 0.01$) and the control group (-1.48, $P < 0.01$). Mean FMI SDS was significantly higher than a healthy population; study group (1.68, $P < 0.001$) and control group (1.22, $P = 0.002$). Mean TBLH-BMC SDS, was lower than a healthy population for the study group (-0.93, $P < 0.001$) and the controls (-0.87, $P < 0.001$). Mean LS-BMAD SDS showed no significant differences to a healthy population in either study or control groups. Treatment with Kaftrio did not result in significant changes in SDS for height, BMI, FMI, LS-BMAD, or TBLH-BMC compared to the control group at one year follow-up. A significant decrease in LMI SDS was found in the study group (-0.64) compared to control group (0.20) ($P = 0.005$).
Conclusion
Children with CF have abnormalities in bone health and body composition which did not improve following one year treatment with a CFTR modulator. Further research with larger sample sizes and longer follow-up durations is warranted to understand the clinical impact of Kaftrio.

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Diabetes Oral Communications 2

OC9.1

Award-winning virtual schools training package creates capacity to enable 78% of children to access hybrid closed loop therapy

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Introduction
The Birmingham Children's Hospital (BCH) Diabetes Team developed an award-winning Virtual Schools Training Package (VSTP) in response to COVID-19. By 2021, the VSTP facilitated a significant increase in school staff training while drastically reducing training required from healthcare professionals (HCPs). Subsequently, the time saved enabled us to expand support for children and young people (CYP) with type 1 diabetes, notably enhancing their access to continuous subcutaneous insulin infusion (CSII) through in-person training. Building on this success, a Quality Improvement Initiative was launched in November 2022, aiming to expedite the adoption of Hybrid Closed Loop (HCL) Systems via a virtual hybrid model.
Objective
Evaluate the impact of time savings from the VSTP on the accessibility of CSII and HCL Systems.
Methodology
A retrospective analysis was conducted using BCH School Competency databases, diabetes team records, National Paediatric Diabetes Audit (NPDA) results, and CSII/HCL databases at BCH from 2019 to 2024. The analysis focused on VSTP efficacy and efficient use of saved time.
Results
Compared to 2019/20, the VSTP maintained a ~30% increase in competent school staff from 2021-2024. Notably, HCPs saved 160 hours annually post-VSTP setup. Time saved modestly increased in-person CSII onboarding capacity in 2020/21 and 2021/22. Developing the virtual hybrid model in 2022/2023 increased onboarding capacity three-fold in 2023/24. Cumulatively, 78% were using HCL by 2024.
Conclusion
The VSTP saves significant time and increases the number of competent school staff. Leveraging time savings for hybrid virtual training models yields transformative benefits, significantly enhancing access to HCL therapy.

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OC9.2

Improving access to diabetes technology for CYP with diabetes across NENC: a response to poverty proofing, the national paediatric diabetes audit and the NHSE CORE20PLUS5

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The NPDA and NICE Hybrid Closed Loop (HCL) Technology Appraisal (TA) show improved health outcomes and quality of life with the use of diabetes technologies, however, the NPDA also shows persistent inequalities in access by those living in deprivation and from ethnic minority groups, this is reflected in the CORE20PLUS5 for CYP. High levels of deprivation in the North East and North Cumbria (NENC) are a barrier to accessing diabetes technology due to the high specification of mobile devices needed to enable the full functionality of this life-changing technology. Simultaneously, hospital Trusts should engage in activities to responsibly dispose of IT equipment. This project brings these two seemingly unconnected challenges together and provides an innovative solution. The project aimed to reduce inequality in accessing diabetes technology for CYP who live in deprivation whilst providing a sustainable solution to the disposal of unneeded devices within the NHS. A collaborative approach was taken; Gateshead Health NHS Foundation Trust (GHFT) set up processes to refurbish their unneeded Trust devices, and the CYP NENC Diabetes Network worked with voluntary sector partners and diabetes teams to develop process pathways to deliver refurbished phones, laptops and charity sims to families to give them access to diabetes technologies, including HCL devices to meet the NICE HCL TA. Over 12 months from March 2023 to March 2024 - the project received 310 referrals which reflected 31% CYP with diabetes in NENC. - 297 devices donated by GHFT were given to families (232 phones with sim cards donated by Vodafone and 66 laptops). - 60% of referrals were for families living in IMD deciles 1-3, 25% of referrals were for families in IMD decile 1. This project facilitated equitable access to life-changing technology for CYP living with diabetes in NENC. Using the poverty proofing approach of no means testing and no barriers to access, we demonstrated that most referrals came from deprived families whilst also supporting a more sustainable and climate friendly approach to meeting digital healthcare needs. This project can be translated into all healthcare settings and is now an embedded, ongoing service provided by paediatric diabetes healthcare teams across NENC.

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Abstract OC9.1

Year (April-March)	Total number of school staff competent	Hours spent by HCPs on school training	Hours saved by the VSTP	Allocation of saved hours to CSII/ HCL onboarding	Time allocated to developing the HCL programme	Annual number of CYP onboarded CSII/ HCL (new/renewal)	Percentage of cohort using CSII/HCL treatments
19/20	300	200	0	0	0	32 (16/16)	35% (106/299)
20/21	375	160	40	40	0	39 (18/21)	40% (116/290)
21/22	410	40	160	160	0	59 (36/23)	51% (148/289)
22/23	390	40	160	40	120	38 (12/26)	54% (157/291)
23/24	406	40	160	160	0	122 (77/45)	78% (228/293)

OC9.3

Tackling health inequalities, engagement opportunities and metabolic management in young adults living with diabetes – transition safe and sound (TraSS), an NHS england pilot

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Aim
Transition to adult diabetes services is associated with deterioration in service experience and outcomes. We describe the early outcomes of the innovative Transition (NHSE) pilot TraSS, to improve services for 16-24 year old young adults (YA).
Method
A failsafe-officer, transition outreach specialist nurse, youth worker, dietician, psychologist, and project manager were recruited. Integrated pathways were created (between paediatric, three adult services and primary care) for recurrent 'Did not attend' (DNA) or those 'unable to contact (UtC)' and 'high HbA1c'. Referrals were triaged and patients underwent assessment by youth worker and/or transition outreach nurse and support provided as per need and referral reason. Annual psychology screening was instituted.
Results
161 referrals were received from February 2023 – May 2024. Primary referral reasons were unable to contact/not attending, high Hba1c, self-management educations, youth-worker intervention, insulin omission, recurrent admissions, and mental health issues. 104 YA were seen and follow up and support was organised following categorisation into high, medium, or low risk. 40 YAs were referred as DNA/UtC and ($n = 30$) 75% were successfully engaged and supported, and ($n = 20$) 50% were reconnected to their adult teams. 47 YA have attended over 15 peer support and education activities including technology conference, focus group sessions with bowling and ice skating, online travel webinar, online group pump refresher courses and college education sessions. 12 YA were supported during inpatient admissions with education, adopting technology, emotional and practical support, and referrals to mental health. 7/7 that underwent early data revaluation reduced their Hba1c (10 -60 mmol/mol, median reduction of 15 mmol/mol). Health inequalities encountered and required bespoke support included neurodivergence, learning difficulties, homelessness, care leavers, probation, complex multiple co-morbidities, mental health, and not in education, employment, or training (NEET).
Conclusion
Significant progress has been made, in a brief period, in identifying and supporting YA and their services in an innovative, integrated, and efficient manner. Our findings demonstrate the importance of a dedicated community outreach diabetes nurse and youth worker, working alongside both primary care, paediatric and adult teams. Utilising peer support and addressing health inequalities has been integral to the engagement of YA.

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OC9.4

Working above and below the lines: paediatric diabetes health care professionals' experiences of safeguarding and child protection

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Introduction
Managing a child's diabetes is challenging. In some families, overwhelming life complications compromise their ability to realise the recommended management levels for diabetes in childhood. Reliance on the child protection system to provide additional support creates a need to prove maltreatment, specifically within the context of families neglecting medical care. This is the first study exploring how professionals experience identifying and navigating safeguarding concerns with families where there is backdrop of 'medical neglect'.
Objectives
To understand how, and when, paediatric diabetes HCPs develop and manage safeguarding or child protection concerns and associated influencing factors when medical neglect, related to families management of their child's diabetes, is suspected.
Methods
A constructivist grounded theory approach was used to analyse nineteen semi-structured interviews with multi-disciplinary HCPs recruited throughout the national diabetes network.
Results
HCPs perceive families' support needs against multifaceted reasoning and degrees of severity. A grounded theory was inductively constructed comprised of 2 core categories: working above and below thresholds and navigating professional insecurity. Frustrations arise in dealing with the uncertainty associated with contextualising neglect within families diabetes care and balancing relationships with families. 'Grappling personal and systemic thresholds' to access support within a constrained system professionals implement alternative strategies; 'working above and below the lines' of thresholds, supporting families 'over and above the diabetes management,' or 'holding responsibility for families' under thresholds, whilst 'wrangling social care' and 'persevering to gain support'. Poor understanding of the impact of long-term conditions, exacerbated by competing service priorities and a lack of anticipatory family support provision leaves HCPs 'feeling, and fearing, that they are failing the child'. This results in HCPs becoming 'professionally insecure' balancing protecting both the child and themselves.
Conclusions
Diabetes HCPs are uniquely placed to identify medical neglect concerns, however differing thresholds of concern are at cross-purposes. This research highlights multiple recommendations for action pathways that support practice to mitigate absent joint risk comprehension between agencies for this unique patient group. Enhanced, contextual training and support to navigate maltreatment concerns for both systems is also needed. Recommendations for national policy and guidance to expand upon medical neglect recognition are also explored.

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OC9.5

Socioeconomic status influencing the cessation of insulin pump therapy in children with type 1 diabetes: a cohort study

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Objectives
To identify contributing factors for insulin pump cessation in paediatric patients with Type 1 Diabetes Mellitus, together with investigating the role of socio-economic status.
Design
A retrospective population-based paediatric cohort study.
Setting
Royal Hospital for Children, Glasgow. Diabetes Cohort Study.
Patients
72 patients (out of 323) stopped insulin pump therapy. 1 patient was excluded who was being managed for transient neonatal diabetes; 11 were excluded due to insufficient data.
Main outcome measures
Data was collected from electronic clinical records from January 2015-December 2020. HbA1c values before and after pump cessation, reasons for pump cessation and SIMD (measure of deprivation: 1- most deprived, 5- least deprived) values were collected.
Results
40/60 patients stopped pump therapy due to poor blood glucose control; with a median HbA1c before cessation of 72.5 mmol/l. 15 patients stopped insulin pump therapy due to patient preference. More females than males stopped due to patient preference (73.3%). 35 patients (58.3%) that stopped pump therapy were from an area with a SIMD quintile of 1-2, whilst 14 (23.3%) were from an area with a SIMD quintile of 4-5. There was no statistically significant difference in SIMD quintile scores in 251 patients still using insulin pump therapy.
Conclusions
Most patients stopped insulin pump therapy due to poor blood glucose control and patient preference. More patients that stopped insulin pump therapy were from a deprived area with a SIMD quintile score of 1 or 2, suggesting there are factors associated with lower income status that contribute to poor blood glucose control/insulin pump cessation.

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OC9.6

Does admission for stabilisation affect HbA1c? a single trust study

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Background
The impact of HbA1c on the long-term complications of type 1 diabetes (T1DM) is well documented. A strategy to support these patients is an elective admission for diabetes education and stabilisation. However, this strategy has implications

for school attendance, is disruptive for families, and requires valuable medical beds. We therefore sought to evaluate the effectiveness of an elective "admission for stabilisation" on HbA1c levels.
Methods
We reviewed the notes of every child/young person with an elective admission for diabetes education/stabilisation from March 2022 to March 2024 (twelve admissions for nine patients). We reviewed HbA1c measurements before the admission, and at both 2-6 and 12-18 months after the admission. We reviewed the interventions that had taken place during the admission. We also looked for diabetic ketoacidosis (DKA) episodes before and after the elective admission.
Results
Six patients had one admission and three patients were admitted twice. Of the six patients admitted once, all had a significant reduction in HbA1c at 2-6 months (-4 mmol/mol to –29 mmol/mol, mean –18 mmol/mol). After one year (data available for four patients), HbA1c changes ranged from – 22 mmol/mol to + 2 mmol/mol (mean –11 mmol/mol). Of patients admitted twice, two had significant reductions in HbA1c six months after the second admission (-20 mmol/mol, -31 mmol/mol) and one's HbA1c has steadily increased to >130 mmol/mol. Three patients were referred to social services during their admission and two for mental health support. Of two patients subsequently subjected to a Child Protection Plan, one had a significant decrease in HbA1c (-20 mmol/mol) and one an increase (HbA1c >130 mmol/mol). Three patients commenced a hybrid-closed loop system with one sustained decrease in HbA1c (-22 mmol/mol), one unchanged (+2 mmol/mol), and one increase (HbA1c >130 mmol/mol). Of nine patients, five had DKA prior to admission with one to five episodes per patient. Only one patient has so far experienced DKA after admission.
Conclusion
Our local study suggests that admission for education and stabilisation of T1DM patients leads to a sustained reduction in HbA1c and reduces the risk of DKA. These promising findings encourage the continued use of elective admission for education/stabilisation as a management strategy.

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OC9.7

Improving equity of care within a paediatric diabetes service

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Inequalities due to poverty influences access to advanced technology and outcomes. The 2021-22 results of NPDA for our service, demonstrated that only 15% from most deprived families are using insulin pumps compared to 50% of Children and Young People (CYP) from least deprived areas. This improvement work was funded by the HNY ICB and the Children North East team provided the team training, conducted staff and user interviews and produced a comprehensive report which formed the basis for action plan for the team to address inequalities of care within the service. This improvement work was undertaken collaboratively through a programme of training, scoping, staff and user group consultations. The paediatric diabetes team implemented changes in 8 areas relating to access and care provision, including transport, technology, person centred care, appointments, food, prescriptions and additional costs/financing. This project had a positive impact on staff and their understanding of the challenges presented by poverty. It has challenged MDT members' own bias, unconscious or otherwise, towards parents and families living in poverty. The positive impact of this improvement activity, along with other quality improvement initiatives within the paediatric diabetes team, was reflected in the 2022-23 NPDA data as below: 1. Improving equity of access to advanced technology for patients from more deprived and ethnic minority backgrounds. 39% of patients from most deprived background had access to insulin pump for 2022-23, compared to 15% in 2021-22. similarly, 60% of most deprived population is now using Continuous glucose monitoring devices, compared to 38% in 2021-22. 2. Excellent improvement in mean and median HbA1C for the patient cohort. The median HbA1C for our population for 2022-23 was 58 mmol/mol compared with 63 mmol/mol in 2021-22. This has moved our paediatric diabetes team from being a negative outlier on the national audit for past decade, to being one of the positive outliers. It is not easy to address all the inequalities within a system without significant investment. However the focused input by our team has led to a very positive outcome following this quality improvement activity.

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OC9.8

Understanding the lived experiences of the development and maintenance of Disordered Eating Behaviours (DEB) in Type 1 Diabetes (T1D) in paediatric diabetes care

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Introduction
People living with Type 1 Diabetes (T1D) have a lifetime risk of disordered eating behaviours (DEB) and increased psychological distress, morbidity and mortality. Associated complications of DEB are often associated with undernutrition, however obesity is a significant co-morbidity of DEB. Expert opinion and pre-hypothesised understanding informs much of our understanding of the development and maintenance of and DEB in T1D with little input from those with lived experience.
Objectives
To understand perspectives of the lived experiences of the development and maintenance of DEB in T1D in paediatric diabetes care to inform future prevention strategies.
Methods
Participants were recruited via Diabetes UK patient groups and diabetes online community (@preventT1DE). Eligible participants (lived experience of eating disorder/disordered eating and childhood diagnosis of diabetes) were invited to take part in semi-structured interviews exploring their childhood, diabetes journey and disordered eating journey. Interviews were analysed using thematic analysis.
Results
11 interviews completed (1 male, 10 female).
Age of diagnosis 2 - 14 years (mean = 7.7 years).
Connection P29 'My Mum...she didn't really know how to show love'
Shame P14 'because she'd find the wrappers and things were missing. But I still did it'
Limitations of diabetes P12 'I was not allowed... cakes... or sweets.... or biscuits.'
Change ' P33 it was made even worse because I turned up in adult clinic for diabetes. I was, I think, 17 years old when they transferred me over to adult clinic.'
Acceptance P14 'I'm realizing that actually my...my thoughts and and my diabetes are not separate'
Control P27 'I felt like I had no control over anything and that was the easiest thing I could control'
Support P36 ' There was never any kind of support'
Identity P27 'I think back on that [the eating disorder] now and it makes me really sad because that's not the kind of person I am. It's not.
Discussion
The insights of those with lived experience offers potential for prevention and early intervention in clinical practice.
Conclusions
A holistic and psychologically informed approach to patient care alongside family based interventions and peer support are likely to be important clinical adaptations to prevent DEB in children and young people with T1D.

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OC9.9

Young people and parent or carers views on type 2 diabetes mellitus care in england and wales – insights from the PREM survey report

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Background
Type 2 Diabetes Mellitus (T2DM) is increasing in prevalence in children and young people (CYP) in the United Kingdom. There is a paucity of evidence about CYP opinions of T2DM care and how it should be tailored to meet their needs. We have analysed the Parent and Patient Reported Experience Measures (PREM) survey responses specifically from patients with T2DM and their families to inform care.
Methods
The National Paediatric Diabetes Audit (NPDA) PREM survey was available online between August 2021January 2022 for all CYP under the care of paediatric diabetes

services in England and Wales and their families. The data has previously been analysed collectively for all types of diabetes; however we report the analysis of data for T2DM separately.

Results

9.2% (105/1144) of CYP living with T2DM in England and Wales, and 5.7% (65/1144) parents/carers responded to the NPDA PREM survey. The majority were aged 12-16 years (61.9%) and female (67.6%). Most CYP and parents/carers felt they had a positive relationship with their diabetes team and 87% of CYP and 95% of parents/carers would recommend their diabetes team. 76% of CYP felt happy after appointments. 78% of parents/carers felt the diabetes team was respectful of their religious and cultural beliefs. 51% of CYP felt they were given enough information to effectively manage their emotional wellbeing. 55% of CYP and 57% of parents/carers felt well prepared for transition to adult care. 38% of CYP felt that their school or college always had the necessary information to support them with their diabetes, compared to 60% of CYP with all types of diabetes. 71% of parents/carers reported that they are always kept up-to-date with new diabetes technology.

Conclusions

Overall, this analysis demonstrates that CYP and their families were satisfied with T2DM care. However, areas of less satisfaction were identified including being provided with information specific to T2DM, preparing for transition, information being provided for schools and support with emotional well-being. These aspects should be considered when planning services for CYP with T2DM to improve patient experience, which may benefit concordance and therefore long-term health outcomes.

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Endocrine Oral Communications 4

OC10.1

Health-related quality of life in severe obesity: baseline PedsQL scores from two tier 3 paediatric weight management services

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Background

Paediatric Quality of Life Inventory 4.0 (PedsQL) is a 23-item questionnaire completed by children and young people (CYP) and parents/carers, to measure health-related quality of life (HRQoL). It comprises four domains (Physical, Emotional, Social, School Functioning) and is scored 0-100, with higher scores indicating better HRQoL. We report baseline PedsQL scores of CYP living with severe obesity under the care of two, tier 3 Complications of Excess Weight (CEW) services.

Methods

Between March 2022-May 2024, all new patients, and parents/carers, attending two CEW services were asked to complete PedsQL questionnaires. We compared scores for CYP and parents/carers by sex, body mass index (BMI) standard deviation score (SDS) and presence of obesity-related comorbidities.

Results

179 families completed questionnaires (95 female): CYP age range 5.3-17.9 years, mean BMI-SDS 3.58. Mean overall PedsQL scores of CYP (53.4) and parents/carers (49.6) were strongly correlated ($r^2 = 0.70$). CYP rated school functioning lowest (47.1), followed by emotional functioning (50.3), social functioning (56.6) and physical functioning highest (59.1). CYP mean overall scores were lower in females (50.2) than males (57.1). CYP overall score did not correlate with BMI-SDS ($r^2 = 0.01$). Neurodiversity impacted overall scores: autism spectrum disorder (with 45.5; without 56.1) and attention-deficit hyperactivity disorder (with 45.7; without 54.4). CYP living with depression (with 45.9; without 54.0) and anxiety (with 45.0; without 55.7) as expected had lower scores. CYP living with metabolic-dysfunction associated steatotic liver disease (MASLD) overall scores (47.6) were lower than those without (54.8), as were those with obstructive sleep apnoea (OSA) (41.1 vs 54.6). Neither type 2 diabetes mellitus (T2DM), or hypertension affected scores.

Conclusions

Overall, CYP and parent/carers report far lower HRQoL than data from both a healthy population (child-reported 83.9; parent-reported 84.6) and many other chronic conditions (e.g. child-reported type 1 diabetes mellitus 80.4 and cancer 72.0). Females score lower than males, and those living with neurodiversity and mental health conditions had additionally reduced HRQoL. Some obesity related complications (MASLD and OSA) associate with lower PedsQL scores. Quality of life of CYP attending CEW clinics is extremely poor and should be considered in the design of weight management services.

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OC10.2

The effect of lifestyle and pharmacological interventions on body composition in childhood obesity

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Introduction

Children and adolescents with a body mass index (BMI) greater than the 98th centile are at an increased risk of complications including cardiovascular and liver disease and type 2 diabetes mellitus. Currently, lifestyle modification is the first line intervention. Pharmacotherapy, such as liraglutide and semaglutide, has recently been licensed for adolescents greater than 12 years of age. This study aimed to compare the impact of pharmacotherapy and lifestyle modification on body composition.

Methods

Retrospective data was obtained from 103 patients (50F) aged between 6 and 17 years, with a mean age of 14.3 years. Body composition was analysed at baseline and 12 months using a TANITA RD-545HR device, a bioelectrical impedance-based device, providing estimates of weight, percentage fat, fat mass, fat free mass and android fat distribution.

Results

The mean (SD) baseline BMI was 42.05 (8.03) kg/m2 and mean baseline weight was 117 (27.8) kg. The mean % baseline body fat was 50.4 (9.01) and the mean truncal fat was 47.6 (8.8) for the whole cohort ($n = 103$). 21 patients had follow up data at 12 months (Table 1). The results show a mean change in BMI, % body fat, % trunk fat and the mean percentage changes in fat mass and fat free mass over this time. Pharmacotherapy alongside lifestyle modification was more effective than lifestyle alone in reducing body mass index, total body fat percentage and fat mass after 12 months.

Table 1: Change in body composition after 12 months

Intervention	Mean change in BMI	Mean change in body fat %	Mean change in trunk fat %	Mean % change in fat mass	Mean % change in fat free mass
Lifestylemodification	-1.07	-0.10	-1.90	12.7	8.26
Lifestyle + Liraglutide	-1.97	-6.48	-8.27	-16.4	16.74
Lifestyle + Semaglutide	-3.97	-6.03	-	-	-
Lifestyle + Metformin	0.33	-1	0.9	9.68	12.97

Discussion

The study highlights the efficacy of using lifestyle modification and adjuvant pharmacotherapy with GLP-1 agonists in the management of childhood obesity. Most patients receiving pharmacotherapy and lifestyle advice achieved reductions in BMI, total body fat percentage, trunk body fat percentage and fat mass after 12 months. Future research would be beneficial to further comprehend the long-term impact of anti-obesity medications.

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OC10.3

Increased prevalence of hypertension in paediatric turner syndrome

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Introduction

Turner syndrome (TS) is a chromosomal disorder characterised by an abnormality of or a partial or complete absence of one of the X chromosomes in a phenotypic female. The TS population experience aortic dissection at a rate ten times that of the general population, for which hypertension is a modifiable risk factor. Our primary aim was to determine the frequency of hypertension in girls attending a tertiary paediatric dedicated TS clinic in the West of Scotland and to assess its association with clinical characteristics.

Methodology
Clinical data were collected from the medical records of girls attending the dedicated paediatric TS clinic at the Royal Hospital for Children Glasgow, between 1976-2023. The percentage of girls in each group (normotensive, pre-hypertensive and hypertensive) was determined. The proportion of the cohort presenting with a cardiac anomaly, renal anomaly, obesity, and preterm birth was determined for each blood pressure classification. Similarly, patients were grouped by mosaic or 45,X karyotype. Fishers' exact test further determined any statistical significance in the prevalence of hypertension between these groups.
Results
184 girls diagnosed with TS were included in this study with a median (range) age at time of clinic of 12 (1 week, 21 years). Of these, 38 (21%) had an existing cardiac anomaly and 48 (26%) had an existing renal anomaly. The prevalence of hypertension within this cohort was determined to be 50% ($n = 92$), with median age of onset at 12 years of age. Of these, 79/92 (86%) were on hormone replacement therapy with oestrogen and 86 (93%) were on growth hormone therapy. In total, 14 (15%) were prescribed antihypertensive treatment.
Discussion
There is an increased prevalence of hypertension within the paediatric TS population compared to the general paediatric population, unrelated to the other common diagnoses or standard treatments of the TS population. Age of onset in the childhood years suggests a need for the development of paediatric TS specific hypertension guidelines which currently only exist for use in patients aged 16 and above. This early management would reduce cardiovascular disease burden in this cohort.

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OC10.4

Education of sick day management of paediatric adrenal insufficiency: a national survey of paediatric endocrine nurse specialists

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Background and aims
A critical component of adrenal insufficiency (AI) management is education for the family and young person regarding sick day episode management. Deficits in patient education have been identified to contribute to adrenal crisis risk. The aim of this online survey distributed via the British Society for Paediatric Endocrinology (BSPED) paediatric endocrine nurse specialists (PENS) mailing list is to identify current clinical practice regarding education in the United Kingdom.
Methods
An online survey was circulated to BSPED PENS between January-February 2024.
Results
The survey was circulated to eighty-eight PENS;fity-one (58%) responses were received. In relation to the provision and structure of the initial education of sick day management (multiple responses allowed), all provide individual face-to-face education of parents/guardians, eighteen (35%) provide online individual face-to face education, two (4%) provide group face-to-face and group online education, respectively. Twenty-six (51%) have departmental guidance on content of the AI education. All PENS would cover symptoms of adrenal crisis, and management during moderate and severe sick day episodes. Forty-nine (96%) would discuss the underlying pathophysiology of AI of the young person and forty (78%) would discuss management during minor procedures. Fifty (98%) would demonstrate injection of hydrocortisone at the first educational session, with forty-nine (96%) offering a practice injection. Fifty (98%) would provide supplementary written information after the initial education however, provision of a steroid emergency card constituted as written information by some responders. Thirty-two (63%) do not provide any written information to non-English speaking families; seven (14%) do not assess understanding after the initial education. Twenty-five (49%) do not provide routine follow-up after the initial education. Twenty-one (41%) do not provide routine, regular refresher educational sessions. Twenty (39%) PENS do not educate the young person themselves in preparation for transition.
Conclusion
This national survey of PENS identified greater consistency in the initial education of parents/guardians of a young person with AI. However, we identified variability in provision of routine refresher sessions and education of the young person prior to transition. Additionally, non-English speaking families maybe at a disadvantage as written information is not provided in over 60%.

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OC10.5

Single-centre review of use of gonadotrophin-releasing hormone agonists – are we outliers?

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Background
Gonadotrophin-Releasing Hormone agonists (GnRHa) are the mainstay of treatment for central precocious puberty (CPP). The long-acting formulation, Decapeptyl SR (Triptorelin pamoate), is commonly used, given as an 11.25 mg intramuscular injection 12-weekly. Recently, a 24-weekly, 22.5 mg preparation, has been introduced with reduced numbers of injections offering cost and patient benefits. Results of a two-centre UK study demonstrated no significant difference in efficacy between the 12 and 24-weekly preparations, with 24-weekly universally preferred by patients. Concerns about off-licence dosing (reduced dosing intervals) and a perceived lack of efficacy of the 22.5 mg preparation in our centre led to this service evaluation.
Methods
A retrospective casenotes review of patients treated with GnRHa between October 2014-October 2023. Data were collected on: patient demographics; clinical, biochemical and radiological parameters; and GnRHa doses with reasons for dose changes and side effects.
Results
147 patients were prescribed GnRHa, with 48 excluded for incomplete data. Of the remaining 99 (89F and 10M, mean age at presentation 6.7yrs +/-1.68 and 5.8 years +/- 2.20 years respectively), 74 had received only 11.25 mg, 10 only 22.5 mg and 15 both preparations. The 22.5 mg preparation was introduced in 2020. No patients in 2022 or 2023 were started on 22.5 mg. Of patients on 11.25 mg, 90% were started on dosing intervals <12-weekly (67% on 10-weekly, 22% on 8-weekly) and for those on 22.5 mg 58% on <24-weekly (17% on 22-weekly and 42% on 20-weekly). Approximately 50% (same proportion for the two preparations) had their dosing intervals reduced during treatment; common reasons cited were mood swings (25%), continued breast development (24%) and lack of suppression of sex hormones (12%). Side effects were recorded in 22/74 (30%) of patients on 11.25 mg and 6/10 (60%) on 22.5 mg; mood swings and weight gain being the most common.
Discussion
Our centre frequently reduces decapeptyl dosing intervals and very few children are on the more patient-friendly 22.5 mg preparation. This is not the experience reported by two large tertiary UK centres who have collected similar data. There is a need for a review of current variations in GnRHa use, with the introduction of more stringent, evidence-based criteria for GnRHa starting doses and dose changes.

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OC10.6

Audit of pituitary dysfunction post moderate to severe traumatic brain injury and proposed surveillance guidance

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Background
A recent case of a seven-year-old boy developing diabetes insipidus, central hypothyroidism and growth hormone deficiency following a severe traumatic brain injury (TBI) highlighted a lack of surveillance for post-TBI pituitary dysfunction within the tertiary paediatric hospital of Northern Ireland. There are limited paediatric studies into this area, but evidence suggests post-TBI hypopituitarism occurs fairly frequently in children; with prevalence of isolated hormonal deficits 22.5% - 86% and multiple hormonal deficiencies 5.9% -50%. Growth hormone deficiency and disturbances in puberty are the most common in the paediatric population; however, any part of the hypothalamic-pituitary axis can be affected. A NICE Evidence Review in 2023 reported "There is currently no guidance for the screening and detection of hypopituitarism patients with TBI, with significant variation in practice".

Aim

To determine our current practice of surveillance for endocrine abnormalities occurring following moderate to severe TBI in children and young people in order to develop cross-specialty guidance.

Method

Retrospective data collection over a five year period (November 2018-2023) of all patients diagnosed with moderate-severe TBI in our tertiary centre. All electronic records including laboratory results audited using a proforma for monitoring and development of pituitary dysfunction.

Results

Data from all 13 patients meeting inclusion criteria collected, with an age range of 3-13 years. Two patients were diagnosed with central hypothyroidism. One patient was diagnosed with diabetes insipidus and growth hormone deficiency. No patients have been diagnosed with central cortisol deficiency or pubertal dysfunction thus far. 4/13 have never had thyroid function tests, 9/13 have never had Cortisol screening and 6/13 have never had their growth assessed post TBI.

Conclusion

Monitoring of pituitary function in this patient cohort is sporadic, and often minimal or non-existent despite evidence of the risk of developing hypopituitarism within five years post TBI. We developed a guideline in collaboration with our neuro-disability colleagues for the surveillance of pituitary dysfunction in the acute and rehabilitation phases post moderate-severe TBI based on our clinical audit and literature review. We hope this will facilitate early identification, prompt and appropriate endocrine referral and ultimately timely management of post- TBI pituitary dysfunction.

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Poster Presentations

Adrenal 1

P1

CYP11A1 deficiency in a boy with normal genitalia – a rare case report

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Deficiencies in the early stages of steroid production often lead to the development of female external genitalia in individuals with both 46XX and 46XY chromosomal patterns. Consequently, they are frequently overlooked when diagnosing primary adrenal insufficiency in cases where male external genitalia are present. Here, we present the case of a 4-year-old boy born from a third-degree consanguineous marriage, exhibiting normal male external genitalia, who displayed hyperpigmentation from the age of 2. He presented with decompensated shock and hypoglycemia, with noticeable hyperpigmentation on his face, lips, hands, and knuckles. Further investigation confirmed primary adrenal insufficiency, marked by a low cortisol level of 213nmol/l during hypoglycemia and a high ACTH level of 112.5 pmol/l(1.5-13.9 pmol/l), along with low sodium (127nmol/l) and normal potassium (4.7nmol/l). Initially, familial glucocorticoid deficiency was considered due to the absence of salt wasting and normal male external genitalia. The child was treated with hydrocortisone replacement, and plasma renin activity was assessed to evaluate mineralocorticoid activity, revealing elevated levels of 12.2ng/ml/hr(1.9-5.2ng/ml/hr). Subsequent clinical exome sequencing identified a compound heterozygous mutation in exon 1 and exon 5 of the CYP11A1 gene. In the past, it was commonly observed that 46XY children with CYP11A1 deficiency would typically present in the neonatal period with female external genitalia and primary adrenal insufficiency, which includes both glucocorticoid and mineralocorticoid deficiencies. However, recent studies have documented cases where children with CYP11A1 defects displayed normal male external genitalia. In our case, the boy was treated with hydrocortisone (15 mg/m2/day), and during follow-up, fludrocortisone (100 mg/day) was also introduced. 3 months later, we observed a reduction in pigmentation, and the ACTH levels dropped to 140pg/ml. The report underscores the existence of atypical CYP11A1 deficiency, characterised by primary adrenal insufficiency alongside typical male external genitalia in 46,XY individuals. This case emphasises the challenge of diagnosing primary adrenal insufficiency, particularly in scenarios where the presentation deviates from the classical norm, such as in 46XY individuals with CYP11A1 deficiency. This case represents the second documented instance with a similar presentation in India, underscoring the necessity for heightened awareness among healthcare practitioners, to facilitate early identification and appropriate management of such cases.

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P2

Predictive factors for adrenal recovery in paediatric patients following high-dose glucocorticoid therapy: a retrospective cohort study

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Introduction
Glucocorticoids can cause adrenal insufficiency through suppression of the hypothalamic-pituitary adrenal axis. Consensus on optimal glucocorticoid weaning or timing for dynamic function testing is lacking
Objective
To investigate factors affecting short synacthen test (SST) response following high-dose corticosteroid therapy in children.
Methods
This retrospective cohort study reviewed 17 patients referred to Evelina London Children's Hospital's Paediatric Endocrine team for adrenal sufficiency testing between April 2022 and July 2023. Adequate response on SST was defined by peak cortisol levels $\geq$420 nmol/l. Data on demographics, anthropometrics, glucocorticoid treatment, and SST results were analysed on 16 patients, excluding one patient with incomplete documentation.
Results
There were no significant differences in baseline characteristics including age, gender, body surface area, peak dose, and cumulative dose between adequate ($n=7$) and inadequate ($n=9$) initial SSTs.
• Prednisolone was used more commonly at initial SST ($n=12$) compared to hydrocortisone ($n=4$) with no significant difference in inadequate response rate (OR, 0.33, CI 0.03-4.19)
• 50% ($n = 8$) of initial SSTs were performed at supra-physiological hydrocortisone dose equivalents (HDEs) ≥ 10 mg/m^2/day.
• HDEs between 10.1-15.0 mg/m^2/day ($n=7$) could represent prednisolone use where dosage manipulation is less graduated. There was no statistically significant difference in inadequate response rate in this group vs testing at HDEs ≤ 10 mg/m^2/day (OR, 0.45, CI, 0.05-3.57)
• A longer mean time from steroid initiation to initial SST was observed adequate initial SSTs compared to inadequate initial SSTs (364 days vs 168 days, respectively; $P = 0.073$).
Analysing all SSTs performed including repeat tests following inadequate initial SSTs ($n=27$) found:
• SSTs performed $\geq$30 days since reaching <15 mg/m^2/day HDE had a positive predictive value (PPV) of 100% and a negative predictive value (NPV) of 30% for adequate response. The threshold of <15 mg/m^2/day was used to avoid excluding a significant portion of test results.
• SSTs performed $\geq$110 days post-steroid initiation showed a PPV of 93.75% and an NPV of 30% for adequate response.
Conclusion
Slower steroid tapering, with lower doses for extended periods, predicts better adrenal response. Research with larger cohorts is needed to validate these findings.
Keywords
glucocorticoids, adrenal insufficiency, synacthen test, paediatric endocrinology
DOI: 10.1530/endoabs.103.P2

P3

X-linked adrenoleukodystrophy: atypical case of adrenal insufficiency masked by neurodivergence

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Background
X-linked Adrenoleukodystrophy, is a rare genetic neurodegenerative disease with an overall incidence of 1:20,000 males[1]. The disease is characterised by progressive demyelination in the central and peripheral nervous system and adrenal insufficiency as a consequence of the accumulation of very long chain fatty acids [VLCFA] in the myelin of the central nervous system and the adrenal cortex. There is no known genotypic-phenotypic correlation, and the degree of elevation in the VLCFA does not correlate with the onset of adrenal insufficiency or neurologic disease[2,3,4]. Clinical expression of ALD is more severe in males than in females. Specifically, most males develop adrenal insufficiency and require lifelong monitoring[4]. The risk for developing childhood cerebral ALD (CCALD) is highest between 3 and 12 years of age[5]. CCALD can be halted by treatment with hematopoietic cell transplantation (HCT), with better survival and reduced neurologic disability if performed earlier in the disease course[6,7].
Case Report
We present a 12-year-old boy with neurodivergent behavior, diagnosed with ADHD on Methylphenidate, presenting with gastroenteritis in the daycare assessment unit. On inquiry, the child had ongoing intermittent vomiting for a few years which had worsened in the recent past, along with school absenteeism. We noted early morning headaches, poor coordination, skin darkening, and possible sensory ataxia. Other neurological examinations were within normal limits. CT Brain was reported normal. However, his past blood tests revealed ongoing chronic hyponatremia [lowest 119 mEQ/l] and hyperkalemia. Synacthen test was suggestive of adrenal insufficiency, and hence steroid therapy was initiated. ALD was diagnosed based on high VLCFA. A Multidisciplinary Team was involved.
Diagnosis
X-linked ALD with Adrenal Insufficiency with possible Myeloneuropathy.
Outcome
Our patient had good symptom resolution, regained appetite, improved school attendance, and a smooth transition to pubertal onset. He continues on adrenal replacement therapy, high dose Vitamin D, N-Acetylcysteine, Resveratrol.
Conclusion
This disorder requires early diagnosis for an improved prognosis. Screening male children with primary AI for X-ALD using VLCFA panel should be considered, particularly after ruling out the most common causes. Especially when learning difficulties or recent diagnoses with hyperactivity are evident, it is fundamental to rule out cerebral demyelination.

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P4

Parent perspectives to improve home management of childhood adrenal insufficiency

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Background
Adrenal Insufficiency (AI) is associated with higher-than-expected mortality in children and young people (CYP) due to the risk of adrenal crisis. The risk is minimised by effective home management, supplemented by infrequent hospital-based clinical reviews. As CYP spend most time in home and school, it is important to optimise home management to improve long-term AI outcomes.
Methods
A quality improvement study was undertaken in the Manchester Adrenal clinic using a paper-based questionnaire to record parent perspectives of care of AI at home. The questionnaire included a combination of 5-point Likert scales, binary choices and free text.
Results
Parents of 12 CYP with AI of age 1-18 years and diagnosed for a median (range) 6 (0.2, 18.0) years, provided questionnaire responses. Of participants, 9 had congenital adrenal hyperplasia (CAH), 2 had secondary AI and 1 had familial glucocorticoid deficiency with adrenal crisis experienced in 8 (67%). Regular home monitoring was satisfactory with median Likert scores 2.0-3.0, not indicating difficulty with various aspects of home care, including "timely medications", "dose adjustments for intercurrent illnesses", and "training to administer emergency steroid injections". However, free text responses such as "difficult to identify when he is becoming unwell", indicated underlying parental concern. Top priorities for parents, noted in 67% of responses, were "timely medications", "need to keep emergency steroid kit" and "adjust doses for intercurrent illness". Parents noted weakness, fatigue, dizziness and nausea as the commonest symptoms requiring dose adjustment from "stressful experiences" and "intercurrent illnesses" in 10 (83%) participants but no symptom tracking by paper-based/digital tools was used. For a potential tool, parents preferred "need to track symptoms over time" and "assess activity/behaviour associated with symptoms" functionalities in 6 (50%) responses, correlating with the parent quote "anything that gives more immediate information as we wait for 6 months for appointments".
Conclusion
Regular home management of AI is satisfactory, but parents remain concerned over potential escalation without facilities for symptom tracking at home. Our study highlights the need to develop an easy-to-use symptom tracking tool to optimize home care in CYP with AI.

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P5

Advanced bone age and early puberty in an adolescent boy with melanocortin-2-receptor gene mutation

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An 11-year-old boy was diagnosed with adrenal insufficiency during the latter period of the COVID19 pandemic, following three presentations over several years with presumed sepsis requiring IV antibiotics and IV fluid. A cortisol level checked on his third presentation was <2 mmol/l and ACTH >1250 ng/l indicative of ACTH resistance. Adrenal autoantibodies and very long-chain fatty acids were negative. Genetic testing detected a homozygous pathogenic sequence variant in the melanocortin-2-receptor (MC2R) gene. At 11.5 years, pubertal staging suggested slightly early puberty (G3P3, testicular volumes 10mls bilaterally; testicular volumes $+2$SD above mean based on puberty normogram). Height was on the 75th centile (mid-parental height 25th centile) and bone age was advanced by 2 years. Height for bone age was between 9th and 25th centile. His pubertal status was re-assessed at 12.5 years (G5P5, testicular volumes 25mls/20mls). Repeat bone age revealed no change in bone maturity and height velocity was 4.9 cm/year (height velocity for bone age 10th centile). Due to the combination of advanced bone age and early puberty, pubertal suppression was initially discussed. MC2R mutations are responsible for approximately one-quarter of familial glucocorticoid deficiency (FGD) cases, collectively known as FGD type 1. FGD is an autosomal recessive disorder characterised by ACTH resistance, resulting in isolated glucocorticoid deficiency with normal mineralocorticoid secretion. FGD typically presents in childhood with clinical features of glucocorticoid deficiency. Delayed diagnosis may occur due to the lack of characteristic electrolyte abnormalities which occur in other forms of adrenal insufficiency associated with mineralocorticoid deficiency, as is the case in our patient. Tall stature at presentation is recognised in a proportion of individuals with MC2R mutations, along with an advanced or dissociated bone age. It is hypothesised that high concentrations of ACTH may stimulate melanocortin receptors within the bone and cartilaginous growth plate resulting in increased linear growth. Glucocorticoid replacement appears to slow down this excessive growth. Whilst precocious puberty has been described in FGD associated with Nicotinamide Nucleotide Transhydrogenase mutations, to the best of our knowledge, precocious/early puberty have not been described in MC2R mutations. Further studies on pubertal development and management of early puberty in MC2R are needed.

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P6

Adipokine analysis in relation to the glucocorticoid dose and androgen concentrations in the paediatric CAH-UK cohort

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Introduction
Patients with congenital adrenal hyperplasia (CAH) have increased prevalence of obesity and metabolic problems, however, their mechanisms are not clearly known. We aimed to understand the roles of adiponectin and leptin in the development of metabolic problems in CAH.
Methods
In a national multicentre cohort of 102 patients with 21-hydroxylase deficiency (54 females, age 13.0 ± 2.92 years) and 83 sex- and age-matched controls, we analysed plasma adiponectin and leptin in relation to anthropometric parameters, medication doses, and biochemical markers (17-hydroxyprogesterone, androstenedione, testosterone, 11-hydroxyandrostenedione, 11-ketotestosterone, metabolic profiles). Blood samples were collected between 9:00-11:00, after the morning hydrocortisone dose.
Results
Leptin and adiponectin had a significant relationship with the BMI, regression analysis showing that CAH patients with higher BMI had increased leptin (leptin(ng/dl) $=$ 4810 $+$ 3939 x BMI-SDS, $P < 0.01$), and decreased adiponectin (adiponectin(pg/dl) $=$ 98 $-$ 11 x BMI-SDS, $P < 0.01$). Although patients had higher prevalence of overweight (26.4% vs 10.8%) and obesity (22.6% vs 10.8%) compared to controls ($P < 0.001$), there was no significant difference in adiponectin or leptin between groups, except for leptin being higher in male patients ($P = 0.033$). Leptin increased with the insulin level and decreased with the morning relative hydrocortisone dose in patients (regression analysis: leptin(ng/dl) $=$ 11846 $+$ 250 x insulin $-$ 1316 x dose, $P < 0.01$), but had no significant relationship with the daily dose. Adiponectin had negative correlation with all the plasma androgens in patients: 17-hydroxyprogesterone (r_s = -0.34, $P < 0.00$), androstenedione (r_s = -0.34, $P < 0.01$), testosterone (r_s = -0.33, $P < 0.01$), 11-hydroxyandrostenedione (r_s = -0.32, $P < 0.01$) and 11-ketotestosterone (r_s = -0.28, $p = 0.01$), which was not found in controls. Leptin was only found to correlate with testosterone (r_s = -0.29, $p = 0.01$).

Conclusion
Our results indicate that glucocorticoid replacement may inhibit leptin response, which could contribute to the weight gain and the development of metabolic problems in patients with CAH. A high adiponectin was found to be associated with more effective androgen suppression indicating its potential use as a marker of metabolic and androgen control in CAH.

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P7

Prematurity and low birth weight are associated with a low peak cortisol on neonatal short synacthen tests

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Background
There are multiple indications for evaluation of the Hypothalamic-pituitary-adrenal (HPA) axis in neonates e.g. hypoglycaemia, hypotension, conjugated hyperbilirubinemia; however permanent neonatal adrenal insufficiency (AI) is rare. Interpretation of results can be challenging due to a paucity of normative reference data in this population. This risks overdiagnosis and unnecessary treatment with corticosteroids leading to the associated iatrogenic harm, including steroid induced AI.
Methods
We undertook a retrospective case note review of all neonates who underwent random and/or stimulated cortisol measurements at a UK tertiary neonatal department between June 2014 and July 2021. Demographic, clinical and outcome data were collected.
Results
In total, 443 neonates had serum cortisol concentrations measured during the study period. Of these, 119 (72M, 47F; 40% preterm, 60% term; gestational age (GA) range 22+5 to 41+3 weeks; 21% ELBW, 10% VLBW, 19% LBW) underwent stimulation testing with a Short Synacthen Test (SST); 92 (77%) following one or more unstimulated cortisol measurements and 27 (23%) had only an SST. The most common indications for SST were maternal antenatal steroid use (29%) and conjugated hyperbilirubinemia (24%). Overall, 89 (75%) demonstrated a normal SST response, 30 (25%) had a suboptimal response of whom two received a diagnosis of permanent AI, one died before repeat SST and four were lost to follow-up after being transferred back to their local unit. The remaining 23 (14M; 20 preterm; mean GA 29+4; 61% ELBW, 13% VLBW, 17% LBW) subsequently passed on repeat SST. There was a positive correlation between GA and peak cortisol on SST ($r = 0.490$, $P = <0.001$) and peak cortisol on SST and birth weight z-score ($r = 0.216$, $P = 0.020$).
Discussion
In our experience, very few neonates who undergo HPA-axis testing are diagnosed with permanent AI (2/443, 0.45%) and the majority who have a suboptimal response subsequently pass their SST. The clinical relevance of this "transient AI" is unknown and may be due to the lack of neonatal specific reference data leading to false positive results. Our data indicate that prematurity and low birth weight are associated with lower peak cortisol on SST response supporting the need to establish normative neonatal adrenal function data.

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Bone 1

P8

Changes in lean mass and fat mass in children with osteogenesis imperfecta

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Objective
Deficits in skeletal muscle and function is a recognised feature of Osteogenesis Imperfecta (OI). Less is known about longitudinal change in body composition in OI. Our objective was to perform a retrospective analysis of longitudinal change in body with focus on lean mass and fat mass in children with OI.
Methods
Data was collected from 29 children, with a diagnosis of OI, who had at least two DXA scans performed between 2015 and 2022. Assessed variables of height, body mass index (BMI), lean mass index (LMI) and fat mass index (FMI), converted to standard deviation scores (SDS), were compared. Results were reported as median (range).
Results
Median age at baseline and follow-up were 10.7 and 14.2 years, respectively. Median height-SDS at baseline was -1.10 (-3.64, 1.62), which was significantly lower than the normal population ($P < 0.001$). Median height-SDS at latest follow-up was -0.80 (-3.31, 1.57), which was not significantly different from baseline ($P = 0.870$). Median BMI-SDS at baseline was 0.15 (-2.31, 2.95), which was not significantly different than the normal population ($P = 0.804$). Median BMI-SDS at latest follow-up was 0.02 (-2.50, 3.76), which was not significantly different from baseline ($P = 0.730$). Despite normal BMI, abnormalities in body composition were noted. At baseline, median LMI-SDS was -2.43 (-4.05, 0.66), which was significantly lower than the normal population ($P < 0.001$). Median LMI-SDS at follow-up was -1.78 (-4.49, 1.61), which was not significantly different from baseline ($P = 0.080$). At baseline, median FMI-SDS was 0.57 (-0.62, 2.97), which was significantly higher than the normal population ($P = 0.001$). Median FMI-SDS at follow-up was 0.62 (-0.59, 5.876), which was not significantly different from baseline ($P = 0.540$).
Conclusion
Children with OI have abnormal body composition throughout childhood typically with low lean mass and relatively high fat mass. These abnormalities in body composition do not change with follow-up. Strategies to improve lean mass, including physical or medical therapies, should be explored in OI given the close relationship between muscle and bone.

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P9

Congenital hypothyroidism mimicking spondyloepiphyseal dysplasia

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Introduction
The occurrence of apparent epiphyseal dysplasia, which is a manifestation of untreated congenital hypothyroidism, was extensively documented in the 1940s. However, this condition has become rare in the past few decades due to the implementation of neonatal thyroid screening.
Case Description
We present a case report of an 18-year-old adolescent male who presented to the emergency department with fever and altered sensorium. He had signs of meningeal irritation, and cerebrospinal fluid analysis suggested tubercular meningitis. On examination, he had stigmata of hypothyroidism in the form of short stature (height: 128 cms; z score: -6.1), puffiness of the face, skin dryness, and delayed relaxation of the ankle reflex. His sexual maturity rating revealed the absence of pubic hair and a testicular volume of 20 ml bilaterally, suggesting macro-orchidism. The results of his thyroid profile indicated that he had primary hypothyroidism, with a TT3 level of 0.4 nmol/l (1.2-2.8 nmol/l), a TT4 level of 3.8 nmol/l (60-160 nmol/l), and a TSH level of more than 100 mIU/l (0.36–5.4 mIU/l). Ultrasonography of the neck revealed bilateral small lobes of the thyroid (right 0.16 cc and left 0.18 cc). His bone age was six years, according to the Greulich-Pyle method. The skeletal survey showed irregular and fragmented bilateral proximal femoral epiphysis, irregular distal femoral and proximal tibial epiphyses with a stippled appearance, and flattened vertebrae with reduced height suggestive of spondyloepiphyseal dysplasia. Given his long-standing hypothyroidism, he was started on 25 mg of levothyroxine. The dose was gradually increased to keep TSH within the normal reference range. Skeletal surveys performed after six months of levothyroxine treatment demonstrated resolved stippling and the height of the vertebral bodies, especially the thoracic vertebrae, increased.
Conclusion
The skeletal changes observed in hypothyroidism closely resemble and may be mistaken for the skeletal abnormalities characteristic of epiphyseal dysplasias. Although untreated congenital hypothyroidism is rare, it should be considered in the differential diagnosis of children with epiphyseal dysplasia. Treatment with thyroid hormone improves the epiphysis's appearance and the vertebral bodies' height in hypothyroid children.

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P10

Management of osteoporosis in duchenne muscular dystrophy: results of an international clinician survey

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Objectives
Current international Care Considerations for Duchenne Muscular Dystrophy (DMD) recommend initiation of bisphosphonate following first fracture. Given the extent and burden of osteoporosis, some have advocated initiating therapy prior to fracture, although this is not standard practice. Our objective was to investigate the current clinical practice of clinicians managing osteoporosis and their opinion on treatment prior to fracture in DMD.
Methods
An online survey was circulated to paediatric clinicians involved in management of osteoporosis in DMD via patient groups in four countries (UK, USA, Italy, Israel).
Results
A total of 51/105 (48%) responses were received. The commonest indications for starting bisphosphonate were vertebral fracture (VF) of any grade without back pain (44/51,86%) or long bone fracture (34/51,67%). 18% (9/51) would initiate treatment without any fracture. IV Zoledronate was the most common agent (44/51,86%) used following fracture, with 7/51 (14%) responders opting to prescribe oral bisphosphonate. 9/51 (18%) currently use other non-bisphosphonate agents (Denosumab, Teriparatide, Romosozumab) following fracture. Of those who prescribe IV bisphosphonate, 26 (52%) prescribe sick-day steroid with first infusion and 18 (36%) with subsequent infusions; 44 (88%) prescribe oral calcium supplements with first infusion and 39 (78%) with subsequent infusions; 32 (64%) prescribe anti-pyretics with first infusion and 19 (38%) with subsequent infusions. 28 (56%) adjust the dose of subsequent infusions and 30 (60%) alter frequency of subsequent infusions based on bone density. Of those who transitioned patient care to adult bone specialists ($n = 36$), 21 (58%) continue bisphosphonate during this process, 4 (11%) stop treatment and 7 (19%) develop individualised plans in transition review with an adult bone specialist. Of the 51 responders, 20 (39%) are of the opinion that bisphosphonates should be initiated prior to fracture, 24 (47%) feel there may be a role and 7 (14%) do not see a role.
Conclusions
This international clinician survey identified variation in management of osteoporosis in DMD. Expert recommendations on management of side-effects of IV bisphosphonate, the role of non-bisphosphonate therapies, management during transition and longer-term osteoporosis treatment in adulthood is greatly needed. There was no consistent view on initiation of osteoporosis therapy prior to fracture in DMD.

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P11

The use of testosterone for delayed puberty in adolescents with duchenne muscular dystrophy: an international clinician survey

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Objectives
Delayed puberty is very common in glucocorticoid treated boys with Duchenne Muscular Dystrophy (DMD) and is an additional threat to bone health. The current International Care Considerations for DMD recommend consideration of testosterone for treatment of hypogonadism from the age of 12 years, supported by recent studies that show that testosterone treatment in DMD improves bone density. Our objective was to investigate the current clinical practice amongst clinicians who manage testosterone treatment in DMD.
Methods
An online survey was circulated to paediatric clinicians involved in the management of puberty in DMD via patient groups in four countries (UK, USA, Italy, Israel).
Results
A total of 49/105 (47%) responses were received. 45% (22) of clinicians reported initiating testosterone therapy in boys with DMD with delayed puberty from 14 years, 35% (17) from 13 years and 35% (17) from 12 years. The majority of responders (47/49,96%) prescribe intramuscular therapy, 31% (15) topical, 2% (1) oral and 22% (11) reported other methods including subcutaneous testosterone. Regarding duration of therapy, 35% (17) of clinicians used a kick-start period of 4-6 months; 43% (21) prescribed continuous gradual build-up of therapy until either adult replacement dose was achieved, adult virilization was achieved (11,22%), testes were greater than 6-8mls (17,35%) or until LH levels were detectable (4,8%). 14% (7) continue testosterone indefinitely into adulthood. In those that discontinue therapy, testicular function was monitored upon discontinuation most commonly by reviewing testicular volume (31/48,65%), monitoring of morning (25/48,52%) or non-timed (12/48,25%) LH, FSH and testosterone levels or by GnRH stimulation testing (6/48,13%). Regarding thresholds for re-initiating testosterone in DMD upon discontinuation, there was a wide variation in cut-off levels reported and reliance on both non-timed and morning testosterone levels.
Conclusions
This international survey confirms initiation of testosterone in DMD in line with existing International Care Considerations at 12-14 years to address delayed puberty and as adjunctive therapy for bone health. However, there is wide variation in treatment strategies especially in relation to duration of therapy. Further guidance, particularly in regard to optimal regime, monitoring after therapy discontinuation and the need and threshold for re-initiating testosterone therapy is required.

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P12

A case of idiopathic hypoparathyroidism in a teenager

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Introduction
Hypoparathyroidism is a rare paediatric emergency which presents with hypocalcaemia and signs such as tetany, spasticity and in certain cases, confusion, amnesia and high risk of arrhythmias.
Case
We present the case of a 15-year-old boy, who came to the local emergency department with confusion, retrograde amnesia and lacerations due to presumed fall. He was previously fit and well, except a possible seizure witnessed by colleagues a year prior, associated with fall and then generalized tonic-clonic movements. The patient was kept for observations in a different A&E department and subsequently discharged without follow-up. He underwent head CT which was reported to have bilateral basal ganglia, frontotemporal and parietal subcortical and deep white, bilateral cerebellar dentate calcifications suggestive of bilateral striatopallidodentate calcifications, primary familial brain calcifications or Fahr's disease. The initial differential diagnosis included metabolic aetiology, vasculitis, mitochondrial disease or other inherited disorders. His baseline blood investigations showed calcium 1.61 mmol/l, with adjusted calcium of 1.49. His first ECG showed a QTc (Bazett) 468 msec. His TFTs, urinary calcium:creatine ratio, vitamin D were normal. Later in the day, the following results were available: PTH 1.0 pmol/l and phosphate 2.77. Within 24 hours of admission the patient developed significant spasticity, tetany, with positive Chvostek and Trousseau signs. After discussion with the tertiary endocrinology service, the patient was commenced on central IV, as well as oral calcium supplements and alfacalcidol. Within 12 hours his QTc normalized and his ionized calcium, from 0.65 improved to 0.8 and was discharged 5 days later. His R153 Familial hypoparathyroidism panel was negative for a genetic cause. Except positive ANA, the rest of autoantibodies work-up was negative. His subsequent

brain MRI showed symmetrical increased signal within the basal ganglia on the T1-weighted images in keeping with the known calcification identified on the CT.
Conclusion
Acute symptomatic hypocalcaemia is a rare encounter in the general paediatric setting. The management consisted in multidisciplinary approach along the anaesthetics and tertiary endocrinology teams and a good outcome was achieved. Further work-up is required to establish the cause of hypoparathyroidism in this case.

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P13

Bones starving for attention: hungry bone syndrome after treatment for rickets

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Introduction
Breastfed infants are at risk of vitamin D deficiency because breast milk lacks sufficient vitamin D, particularly if the mother also has low vitamin D levels. Prolonged severe vitamin D deficiency leads to abnormal bone mineralization, resulting in rickets. After starting treatment, there is a risk of hungry bone syndrome due to remineralisation of the bones with significant increase in the bone's uptake of calcium, phosphate, and magnesium.
Case
A 16-month-old boy presented with afebrile generalized tonic clonic seizure lasted 4 minutes. His diet consisted mostly of breastmilk with minimal solid diet. His mother was not on vitamin D supplement during pregnancy and lactation. There was no consanguinity in the family. No family history of rickets. Blood results showed adjusted calcium 1.44 mmol/l, ionic calcium 0.8 mmol/l, phosphorus 2.04 mmol/l, magnesium 0.85 mmol/l, alkaline phosphatase 731 U/l, iPTH 12.4 pmol/l and 25-OH vitamin D level 22 nmol/l. Left wrist x-rays showed widening and cupping of metaphyseal ends of radius and ulna. Nutritional rickets was diagnosed. He was given one dose of IV calcium gluconate then commenced on oral calcium carbonate (40 mg/kg/day elemental calcium) and colecalciferol 6000 units once a day. The child's mother was provided with vitamin D supplements. After starting treatment for 5 days, the patient's adjusted calcium level was back to normal. There was a need for dose titration for calcium carbonate up to 124 mg/kg/day or 3.2 mmol/kg/day of elemental calcium. The phosphate, magnesium and alkaline phosphatase levels were reducing in trend but showed an increase in levels on day 10 of treatment. The 25-OH vitamin D level measured on day 17 of treatment was within the normal range at 128 nmol/l.
Conclusion
Hungry bone syndrome is commonly observed after parathyroidectomy in cases of hyperparathyroidism, but it can also occur during the initial phase of rickets treatment due to the high demands of the unmineralized skeleton. Children recovering from rickets may require higher calcium intake than normal children because of "hungry bones." Magnesium and phosphate should also be replenished as necessary. Monitoring calcium, magnesium, and phosphate levels at the beginning of rickets treatment is essential.

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Diabetes 1

P14

Diabetic retinopathy screening in laotian children with diabetes: a collaboration between singapore national eye centre and action4diabetes

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Background
Laos is a LMIC in South-east Asia (SEA) where health coverage does not provide for insulin and blood glucose testing. Before 2016, no person was known to have survived type 1 diabetes (T1D). Action4Diabetes (A4D) has since been providing insulin and blood glucose testing kits for Laotian patients with T1D. As the patients are now surviving and living with T1D, early detection of diabetes-related complications becomes imperative. In March 2024, a diabetic retinopathy (DR) screening session took place for the first time at the National Centre of Ophthalmology in Laos.
Aim
To report the patient demographics and eye screening outcomes in Laos.
Methods
Patients attending Mahosot Hospital, Vientiane, Laos, were identified to undertake DR screening conducted by SNEC ophthalmologists and healthcare professionals from its Global Ophthalmology Office who were on a volunteering mission trip in Laos. Patient demographics, insulin treatment regimen, and HbA1c were collated together with DR screening and other eye-check outcomes.
Results
19 patients (10 male; 53%) diagnosed with T1D between March 2016 and September 2023 at median 11.4 years (range 1−18 years) were DR-screened at median 16.0 years (8.2−21.9 years). At diagnosis, 12 patients (63%) were in diabetic ketoacidosis. From diagnosis, all patients received twice-daily pre-mixed 30/70 insulin. Since September 2023, 10 of the patients (53%) switched to basal-bolus insulin regimen. Most recent median HbA1c was 7.7% or 59 mmol/mol (5.0−14.0%, or 30−128 mmol/l). As at the time of DR screening, median duration of diabetes was 4.0 years (0.5−8.0 years). Using ophthalmic examination, none of the 19 patients was found to have DR. One patient had newly diagnosed refractive deficit and was issued prescription for glasses.
Conclusions
Through mutual aid and collaborations, we plan to conduct subsequent, regular sessions to screen for diabetes-related complications in more patients in Laos and other LMICs in SEA.

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P15

Exploring perspectives of children and young people with type 1 diabetes in laos: moving beyond twice daily insulin to multiple daily regimens"

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Background
In numerous low-income countries (LMICs) across Southeast Asia, the standard insulin therapy for people diagnosed with type 1 diabetes (T1D) is twice-daily premix insulin regimen. In Laos, the national health coverage fdoes not include provisions for insulin or blood glucose testing kits. Prior to 2016, no Laotian individuals were known to have survived with T1D. Intensive insulin therapy utilising a multiple daily insulin (MDI) regimen has now become the recommended standard of care for all individuals with T1D. MDI has demonstrated improvements in glycaemic control and a reduction in the risk of long-term complications compared to the traditional twice-daily insulin regimen.
Methodology
A qualitative approach employing semi-structured, in-depth interviews was used to explore the barriers, and effects on quality of life associated with managing diabetes at home, school, and during leisure activities. Participants were identified and invited to participate within a specified timeframe, and written consent was obtained prior to the interviews. Thematic analysis was employed to analyse the data.
Results
Fifteen participants (4 males) were involved in the study. The mean age at diagnosis was 10.93 years (ranging from 2 to 18 years), and the mean age at the switch to MDI was 14.73 years (ranging from 3 to 20 years). Prior to the transition, concerns related to a lack of confidence in carbohydrate counting and administering injections during school hours were identified as barriers. Following the transition, a majority of respondents viewed the switch to MDI positively, citing benefits such as improved glucose stability, greater dietary flexibility, fewer hypoglycaemic events, and an enhanced overall sense of well-being. Overall satisfaction levels were high post-transition to MDI.
Conclusions
This study is significant because it provides valuable insights that will guide future work in supporting the switch for children and young people with type 1

diabetes from twice daily to multiple daily insulin regimen in LMICs. By understanding their needs and priorities, we can develop strategies to support healthcare professionals, carers and parents to understand the barriers and align with the child's lifestyles and expectations. This will help to improve their well-being and support in managing their diabetes

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P16

Diabetes outcomes and youth engagement: assessing transition readiness interventions in an NHS england transition pilot site

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Background
Transition from paediatric to adult diabetes services is a critical period influencing health outcomes. Ensuring a smooth transition process has been a significant challenge, often associated with a high rates of disengagement and DKA admissions, and clinic non-attendance once the young person is transferred to adult services.
Objectives
This study aims to evaluate impact of transition readiness interventions as part of the NHS England Transition pilot site scheme. The following outcomes after transitioning to adult services were measured- HbA1c, clinic attendance rates and hospital admission at 6 to 12 months following transfer.
Methods
As part of an NHS England Transition pilot site, we implemented the following transition readiness initiatives from the age of 17-18 years such as peer-to-peer transition education evenings, face-to-face psychological assessment for transition readiness, transition readiness checklist and an update of carb counting and exercise management with a specialist dietitian prior to the transition to adult services.
Results
We included 14 patients (6 males) transitioning to adult diabetes services in the year 2023. Outcomes were reviewed in the 6 to 12 months prior to transition compared to 6 to 12 months after transition to adult services. Mean HbA1c was 65 vs 67 mmol/l, did not attend clinic rate was 28% vs 28%, DKA admissions were 21% vs 7% and those going on hybrid closed loop were 30% vs 57%.
Conclusions
The pilot program shows that transition readiness interventions did not improve or worsen HbA1c or clinic attendance among transitioning youths. DKA admission were improved and more young people were ready to accept the offer of hybrid closed loops after transition. Further research should address quality of life measures and how well transition readiness predicts positive health outcomes after the transfer of care.

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P17

The management of intentional insulin overdose in type 1 diabetes: a case presentation

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Intentional insulin overdose is an extremely uncommon but very significant paediatric emergency. <0.1% of all calls to the National Poisons Information Service in the U.K. over a 10-year-period related to insulin poisoning. No systematic studies or randomised controlled trials of the management of insulin poisoning exist. The available evidence consists predominantly of case reports. A a consequence there are no consensus-based guidelines for optimal management. I present the case of a 15-year-old female teenager with type 1 diabetes who presented acutely to the Paediatric Assessment Unit of University Hospital Wishaw in February 2022 following an intentional overdose of Levemir insulin. The presentation describes her clinical presentation and acute management. It includes a review of the available literature and offers learning points with respect to therapeutic options and additional complications of insulin overdose (e.g. hypokalaemia and glycogen hepatopathy) for clinicians who may potentially be faced with patients presenting in similar circumstances in the future. This presentation takes the form of a PowerPoint presentation.

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P18

Technology usage and glycaemic outcomes in an ethnically diverse and socioeconomically deprived cohort of children with type 1 diabetes mellitus

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Background
The UK National Paediatric Diabetes Audit (NPDA) data reports disparities in Haemoglobin A1c (HbA1c) levels among children and young people (CYP) with Type 1 Diabetes (T1D), with higher levels in those of Black ethnic background and lower socioeconomic status who have less access to technology. We investigate HbA1c differences in a T1D cohort with higher than national average technology uptake where > 60% come from an ethnic minority and/or socioeconomically deprived population.
Design & Methods
Retrospective cross-sectional study investigating the influence of demographic factors, technology use, and socioeconomic status (SES) on glycaemic outcomes.
Results
Among 222 CYP, 60% were of ethnic minority (Asian, Black, Mixed and Other were 32%, 12%, 6% and 10% respectively) and 40% of white heritage. 94% used Continuous Glucose Monitoring (CGM) and 60% used Continuous Subcutaneous Insulin Infusion (CSII) via open or closed loop. 6% used Self-Monitoring of Blood Glucose (SMBG) and Multiple Daily Injections (MDI), 34% used CGM and MDI, 38% used CGM and CSII and 22% used Hybrid Closed-Loop (HCL) systems. Significant differences in HbA1c across therapy groups ($P < 0.001$) was noted with lowest HbA1c in HCL group (55 mmol/mol; $P < 0.001$). Despite adjusting for therapy type, the Black group had higher HbA1c than their white and Asian counterparts ($P < 0.001$). CYP from the most deprived tertile had significantly higher HbA1c levels ($P < 0.001$) but the difference was not sustained after adjusting for therapy type.
Conclusion
Advanced diabetes technologies improve glycaemic control. Whilst equalising technology access mitigates socioeconomic disparities in HbA1c, CYP from Black ethnic background continue to display a higher HbA1c.

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P19

Age-related outcomes of hybrid closed-loop systems in children with type 1 diabetes

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Introduction
Hybrid closed-loop (HCL) systems improve time in range (TIR, 3.9-10.0 mmol/l) in children with type 1 diabetes (T1D). However, real-world data across different age groups is lacking.
Objectives
Evaluate glucose metrics in children with T1D using HCL systems, categorised by age groups.
Methods
Retrospective analysis (2019-2024) of children switching from continuous glucose monitoring (CGM) to HCL at a single tertiary centre. Data on demographics, CGM metrics and insulin were collected from databases, in CYP with >50% data capture. 90-day CGM data before and after HCL were compared.

Results
169 CYP (53% male) with mean age of 12.4 (±3.6) years and T1D duration of 6.0 (±3.7) years were included. Categorised by age in years, 6% ($n = 11$) were <5 (G1), 34% ($n = 57$) were 5-11 (G2), and 60% ($n = 101$) were ≥12 (G3). On CGM, time below range (TBR, <3.9 mmol/l) (1.6%, 2.1%, 2.2%, $P = 0.598$), TIR (43%, 46%, 50%, $P = 0.078$), and mean blood glucose (MBG mmol/l) (11.4, 11.0, 10.5, $P = 0.151$) did not show any statistically significant difference between G1, G2 and G3, respectively. On HCL, TBR (3.3%, 2.1%, 1.8%, $P < 0.05$) was different for G1, G2 and G3, respectively, with G1 being higher than G3 ($P < 0.01$). TIR (63%, 65%, 65%, $P = 0.764$), and MBG mmol/l (9.1, 9.2, 9.2, $P = 0.933$) were comparable for G1, G2 and G3, respectively. Following switch to HCL the change in TBR was higher in G1 (1.6%) when compared to G2 (0.2%, $P < 0.05$) and G3 (-0.5%, $P < 0.05$). No differences were found for change in TIR (21%, 19%, 15%, $P = 0.098$), and MBG mmol/l (-2.3, -1.8, -1.4, $P = 0.056$) for G1, G2 and G3, respectively. Over 90-days of HCL; daily meal entries for G3 (3.6) were significantly lower than G1 (5.2, $P < 0.001$) and G2 (4.6, $P < 0.001$). Mean total daily insulin units over 90-days of HCL for G1 (10.2) was significantly lower than G2 (33.2, $P < 0.001$) and ≥12 (54.5, $P < 0.001$).
Conclusions
HCL systems achieve equivalent TIR, TAR and MBG improvements in children of different ages. However, transitioning to HCL results in more hypoglycaemia for children under five years, possibly due to more frequent meals and algorithmic insensitivity to low daily insulin doses.

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P20

Increasing confidence in managing diabetes in the paediatric emergency department

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Confidence of Emergency Department (ED) Clinicians in the management of Paediatric Type 1 Diabetic (T1DM) Emergencies was investigated at Wythenshawe Hospital to gain an understanding of future training needs. A questionnaire assessing the overall confidence of ED clinicians in the recognition and management of Diabetic Ketoacidosis (DKA), management of children with insulin pump therapy and use of the BSPED sick day rules was circulated. Previous training on this topic in the last 12 months, which areas they required more training, and how this should be delivered was also assessed. Furthermore, an educational session about insulin pump therapy and the sick day rules was delivered to 5 ED registrars and understanding was assessed with a pre- and post-session clinical scenario quiz. In total 27 clinicians completed the questionnaire, 70.4% were doctors, 25.9% nurses and 3.7% were ACPs. Experience in ED ranged from 2 months to 25 years. 18.5% of respondents reported no confidence with the management of paediatric T1DM emergencies, 7.4% responded slightly confident, 37% moderately confident and 37% very confident. 77.8% were either confident or very confident with recognition and initiation of treatment for DKA. However, 51.8% either had no or very little confidence with managing children on insulin pumps in ED and 51.9% were not aware of the sick day rules. Two thirds of respondents were not confident managing a patient presenting to ED with high blood glucose and ketones with a normal blood gas. 88.9% had not received training on management of paediatric T1DM emergencies in the last year. Topics requiring further training included the sick day rules, initiating treatment for DKA, managing hypoglycaemia and communication with the diabetes team, and most would prefer these as in-person workshops or simulation training. After the teaching session the results of the quiz improved with 4 out of 5 achieving 75% in comparison to the previous highest pre-session score of 50%. These results have led to the implication of an educational programme from the Paediatric Diabetes team to the clinicians in ED in order to improve the clear lack of confidence of ED staff in managing paediatric T1DM emergencies.

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P21

Real-world performance of the omnipod® 5 automated insulin delivery system in >6,600 children, adolescents, and young adults with type 1 diabetes in the united kingdom

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Background and Aims
The Omnipod® 5 Automated Insulin Delivery (AID) System, which allows for personalised therapy through customisable glucose targets from 6.1-8.3 mmol/l in 0.55 mmol/l increments recently became commercially available for people with type 1 diabetes (T1D) aged 2 years and older in the United Kingdom (UK). This study aimed to evaluate the early real-world performance of the system in the first cohort of paediatric and young adult UK users.
Methods
A retrospective analysis of continuous glucose monitoring (CGM) and insulin data from Omnipod 5 users with T1D aged 2 to <26 years using ≥5 units of insulin per day in the UK who provided consent (guardian provided consent for those aged <18 years) and had ≥90 days of data with sufficient CGM data (≥75% of days with ≥220 readings) available in the cloud-based data management system was conducted.
Results
Data from 6,631 users in the UK were available at the time of analysis with a median 200 days of use and >1.3 million person-days of data. Preliminary results demonstrated a median time in target range (TIR; 3.9-10.0 mmol/l) of 65.5% ($n = 3,471$), 64.0% ($n = 2,027$), and 58.8% ($n = 1,133$) with use of the 6.1 mmol/l, 6.7 mmol/l, and 7.2-8.3 mmol/l targets, respectively. Time below range (TBR; < 3.9 mmol/l) was low (median ≤1.60%) across glucose targets. Use of the lowest target (used by 52.3% of all users) was associated with the highest TIR with some age-related variability (2-5y: 66.2% [$n = 83$]; 6-12y: 67.9% [$n = 1,176$]; 13-17y: 64.3% [$n = 1,596$]; 18-25y: 62.7% [$n = 616$]) and minimal TBR, with 29.6% of these users achieving clinical targets for both >70% TIR and <4% TBR.
Conclusions
Collectively, these early real-world results of Omnipod 5 use in >6,600 children, adolescents, and young adults with T1D in the UK demonstrate that the highly favourable glycaemic outcomes first reported in the United States are achievable across populations. Additionally, these findings highlight the importance of frequent review of user data by clinical care teams to facilitate optimisation of system settings and support the idea that healthcare providers should consider encouraging users seeking to improve their TIR to decrease their glucose target towards the lowest setting whenever possible.

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Diabetes 2

P22

HCL use does not cause increased insulin use or change in BMI z-score

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56 patients under the care of the paediatric diabetes team at Wythenshawe Hospital were identified as current Omnipod® 5 insulin pump users for Type 1 Diabetes Mellitus management in April 2024. We investigated if use of this HCL caused an increase in daily insulin requirements or an increase in BMI z-score. Time in range (TIR), total daily dose (TDD) of insulin, BMI Z-score along with total daily carbohydrate intake (CHO) and insulin boluses (TDB) during the first six months of pump therapy were compared against those of their previous insulin regime. Data was collected from the Manchester Foundation Trust's HIVE EPR system, Dexcom Clarity and Glooko. We found a significant increase in the TDD during the first three months of use with an average increase of 31% in the first month and 24% in the first month. However, after 6 months of therapy there was no significant difference between TDD before and after use. This was correlated with a statistically significant increase in CHO and TDB after 1 month of use, but these increases became insignificant after 3 months for CHO and 6 months for TDB. We found that there was no increase in BMI z-scores after both 3 and 6 months of therapy and furthermore, there was no correlation between increasing TDD and BMI z-score. Although the analysis was limited by incomplete patient records and a small sample size, a statistically significant increase in TIR was observed at 1, 3 and 6 months following transition, with 22 patients achieving a TIR above 60% after 6 months of use. After 6 months average TIR increased from 49.0% to 63.0% ($P < 0.0001$). The most dramatic increase in TIR was observed in the cohort of patients under 5 years of age who previously used multiple daily

injections ($n = 4$), from an average baseline TIR of 31.75% to 61.5% after 6 months of Omnipod® 5 use. In conclusion, this study has shown a clear improvement in overall glycaemic control in our paediatric patients using Omnipod® 5 and no adverse effects regarding increased insulin requirements or BMI z-score.

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P23

Case report of a patient with a biallelic variant in glucokinase (GCK) gene causing maturity onset diabetes of the young

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18 year old male patient with GCK related monogenic diabetes. Biallelic, likely pathogenic variants identified in the GCK gene. Analysis detected two heterozygous missense variants c.693T>A p.(Asn231Lys) and c.1310C>T p.(Thr437Ile). A change on both copies of the GCK gene has been described in literature but not with this particular variant. Therefore there is a challenge in interpreting exactly what this result means. Genetic testing of both parents confirmed that one copy was inherited from each parent. GCK acts as a 'glucose sensor'. Changes in the gene can lead to a mild increase in blood glucose and it may not require treatment. Patient diagnosed with suspected type 1 diabetes at age 4 years. He was started on insulin at diagnosis. Noted to have a very stable HbA1c between 50-60 mmol/mol and a low insulin requirement (0.2units/kg/day) delivered via insulin pump. Despite infrequent bolusing he has steady glucose levels and a time in range of 73%. He is triple antibody negative with a persisting C-peptide of 297 pmol/l. Decision against progression to hybrid closed loop therapy as unclear how patient would react to algorithm. Genetic diagnosis confirmed 8 years after diagnosis. Alternative diagnosis considered earlier but some issues with testing encountered. Family history of type 2 diabetes in Grandparents but no other family history in parents. The family have undergone genetic counselling within the genetics department. Parents have had genetics and blood glucose testing. Planned trial of reducing insulin delivered via insulin pump is ongoing, initially starting with prandial doses then background insulin. We have experienced some difficulties with patient engagement. Patient now in process of transferring to adult services. Potential for very low insulin requirement or no treatment in future. Collaboration with East of Scotland Regional Genetics Service and discussion at virtual Scottish 'Diabetes Diagnosis Advice Clinics'. In conclusion, because the gene variants are quite unique to this patient it is difficult to predict how their diabetes will behave. This patient was initially treated as suspected type 1 diabetes but is triple antibody negative with a low insulin requirement. Currently undergoing trial of reducing insulin delivery via pump to assess response.

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P24

Experience of a 'non type 1/medically complex type 1' patient clinic in a tertiary paediatric diabetes centre

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We initiated a 'Non Type 1/Medically Complex Type 1' Diabetes Clinic in a tertiary paediatric diabetes service in July 2023. Prior to this, patients were seen in the routine clinic which presented some challenges. This clinic has allowed a more focused review of patients with complex diabetes. Our current patient cohort is 25 patients. Monogenic Diabetes accounts for 12 patients with HNF1A, HNF1B, HNF4A, KCNJ11, GCK and RFX6 mutations. Other diagnoses include Wolfram Syndrome, Cystic Fibrosis Diabetes (CFD), post pancreatectomy/pancreatitis diabetes and diabetes in association with transfusion dependent beta thalassemia. Some medically complex patients with type 1 diabetes are also seen in the clinic. These include patients with Chronic Antibody-Mediated Labile Glycaemia, Sensenbrenner syndrome, GLUT1 Transporter Deficiency Syndrome and post Langerhans Histiocytosis X. There is also a metabolic patient with dysglycaemia and no unifying diagnosis. The management of the monogenic patient group has been focused on optimising their current therapy to ensure they are receiving the most appropriate treatment. This has included supporting the weaning of insulin and establishing patients on alternative oral therapies. It has facilitated multi-specialty working, improving communication between professionals and has helped to avoid patients 'having to tell their story all over again'. This has helped give continuity of care to this complex group of patients. We have been able to signpost families to parent support groups/education days and condition specific resources. The clinic has worked collaboratively with the West of Scotland Centre for Genomic Medicine, East of Scotland Regional Genetics Service, Exeter Genomics Laboratory and the Wolfram Syndrome Clinic in Birmingham Children's Hospital. Regular Non Type 1 Diabetes Clinical Meetings were also established to support the clinic. The referral route into clinic is usually via this meeting. Patients have also been discussed at the joint adult/paediatric virtual Scottish 'Diabetes Diagnosis Advice Clinics'. In conclusion, there have been many benefits to both the patients and healthcare professionals attending this clinic. It has allowed us to optimise management in a holistic manner and learn from shared experience for these rarer forms of diabetes.

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P25

Triple autoantibody negative patients in lanarkshire paediatric diabetes service

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Background
There is increasing evidence of the role of diabetes autoantibody testing in the classification of less common types of diabetes. Patients with negative autoantibodies may warrant further investigation to ensure the correct diagnosis is reached.
Objectives
- To identify and characterise the population of patients <16yrs with triple autoantibody (GAD, IA2, ZnT8) negative diabetes in Lanarkshire.
- To develop a new guideline for the management and investigation of these patients.
Methods
SCI Diabetes and Clinical Portal were reviewed for patient identification and data collection. Available literature and clinical guidance regarding autoantibody testing and associated investigations were reviewed and used to develop a local clinical pathway for the management of patients with negative autoantibody results.
Results
15% of the clinic population <16yrs (41/320 patients) had no autoantibody results available. 17 patients (5%) were triple autoantibody negative. 8 patients had only one mildly positive antibody result and a further 15 had no positive antibody results but had not been fully tested. Of those with three negative antibodies, 1 had subsequently been diagnosed with MODY 2 and one had stopped insulin treatment but the diagnosis remained uncertain. There were no clear clinical or biochemical features suggestive of non-type 1 diabetes in these patients. 5 presented in DKA. 13/17 patients had C Peptide tested at diagnosis, with 6 (46%) <100 pmol/l. 3 patients had positive TPO antibodies, but none had other autoimmune diagnoses. 3 patients had a first degree relative with diabetes. Only 2 patients had genetic testing performed. A guideline and pathway was developed and implemented for further investigation of patients identified with triple negative autoantibodies and a single mildly positive antibody, including repeat C peptide testing and consideration of genetic testing. Antibody testing was planned for those without full antibody results available.
Discussion
Implementation of a local pathway for investigation of triple autoantibody negative patients has the potential to identify patients with less common diabetes diagnoses, and subsequently change their prognosis and management. We aim to review the outcome of the pathway and report any subsequent diagnostic change.

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P26

Atypical presentations of new onset diabetes – a possible cause of delayed diagnosis

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Objectives
In the UK, 25 - 38% of children with new onset diabetes present with diabetic ketoacidosis (DKA). The objective of this study is to describe the varying presentations of new onset diabetes and the difficulties in recognising them amongst several undifferentiated children.

Methods
The characteristics of children diagnosed with new onset diabetes from January to December 2023 presenting to a single centre were studied.
Results
A total of 24/45 children presented with new onset diabetes and DKA during the study period. 18/24 presented with polyuria, polydipsia and/or weight loss. However, there were six unusual presentations. Three children aged between 8-10 years presented with chest pain. The first child also presented with coryza, was diagnosed as a viral infection with costochondritis and discharged, returned 5 days later in DKA. Intensive teaching with a timeline of the presentation of this child was completed in the Emergency Department. Subsequently two children presented with chest pain as the main complaint. Parents did not give a history of polyuria or polydipsia in either case until specifically asked. Both were diagnosed with diabetes. One parent had T1DM which prompted investigation. A 16 month old with known history of wheeze, presented with cough and difficulty in breathing. She was diagnosed with influenza A, diabetes and DKA. A 10 year old, known asthmatic presented with wheeze. Her weight was 75 kg blood, pressure 130/90mmhg. Urine was tested to rule out renal disease and showed glucosuria and ketonuria. She was diagnosed with diabetes and DKA.
Conclusions
Children with new onset diabetes may not necessarily display all the classic symptoms of diabetes at the same time. Symptoms of a viral illnesses may overlap or co-exist with diabetes symptoms and prove to be confounding factors. Diagnosing new onset diabetes, especially in children who present atypically, amongst several undifferentiated children is not easy. We found that case based discussions, investigating the timeline from the onset of symptoms to diagnosis and the health care seeking behaviour of parents in the weeks preceding diagnosis keeps awareness high. A low threshold for doing blood glucose in unwell children is recommended in acute care settings.

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P27

New onset diabetes and diabetic ketoacidosis in children – a single centre study

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Objectives
The incidence of new onset diabetes in children has increased since the first year of the COVID-19 pandemic. Our objectives were to investigate the incidence of new onset diabetes in children in the post pandemic era.
Methods
Single centre study in a multi ethnic prevalent population of 425 children with diabetes.
Results
We observed an unusual spike in new onset paediatric diabetes during the first COVID pandemic wave. 54 children presented with new onset diabetes in the first pandemic year (2020) compared to 40–45 in the pre-pandemic years. There have been further high incidence years since, with 53 children with new onset diabetes presenting in 2021 and 60 children in 2022. This is an increase of more than 10% compared to the estimated annual increase of 3–5% in the pre-pandemic era. In 2023, the number of children presenting with new onset diabetes returned to pre-pandemic levels$n = 45$. Seasonal variation of new onset diabetes with peak in winter and trough in summer was noted in this centre in 2023. This seasonal variation was lost in the COVID pandemic years. 90% of children at this centre presented with Type 1 diabetes (T1DM). The median age was 10 years. The ethnicity of children presenting with new onset diabetes showed a shift in 2022. About 75% of children with T1DM presenting to this centre were White, however in 2022, 50% were Asian and African. The same pattern continued in 2023, 55% of children were White, 45% were from ethnic population. The incidence of DKA in this centre was worryingly high (24/45 of children with new onset diabetes in 2023 presented in DKA, 9/45 presented with severe DKA)
Conclusions
The incidence of new onset diabetes in this centre has returned to pre-pandemic levels. Year to year fluctuations occur with diabetes, we are therefore monitoring the trends. We are also monitoring the apparent increase in T1DM in children of ethnic minority. A service evaluation project of children presenting with new onset diabetes is being done to evaluate the clinician, patient and disease factors contributing to the high incidence of DKA in the centre.

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P28

How was your experience! diabetes transition survey

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Introduction
The transition of a young person from child to adult services should be a purposeful and planned person-centred process that starts before the formal transfer of care occurs. In chronic long-term disorders such as Diabetes, this becomes more challenging and demanding. The period of transition coincides with a critical time of biopsychosocial change for a young person as they mature from a child to young adult. It is important to ensure the transition planning is developmentally appropriate and considers each young person's capabilities, needs and hopes for the future. During the process of transition, young people should feel empowered to take responsibility for their health through adequate health education, health promotion and manage their underlying condition individually. In young people with Diabetes, this includes making them confident in looking after themselves with the aim of maintaining the best glycaemic control independently. To make this transition successful, Paediatric and Adult Diabetes services should be co-ordinated to support the young person and their family to provide a transition that will establish life-long healthy behaviours for all young people with Diabetes and prevent their disengagement from services that can result in detrimental long-term outcomes. We designed a Survey to look at our Transition services in Chesterfield Royal Hospital from patients' perspective and to obtain their feedback to improve the transition process further and identify any challenges faced by the patients during their transition from Paediatric Diabetes to Young adult services.
Methods
Total 40 patients were invited to fill the survey form, involving questions about transition services in general, Dietitian support and psychological support provided during the transition process. We also asked for any additional feedback from the patients who had transitioned from Paediatric to Young adult Diabetes services that would make the whole process better.
Results and Recommendations
We received 8 responses. Majority (83-50%) of patients were satisfied with Dietician and Psychology services and Transition services in general. 57% patients described the continuity of care as excellent, with suggestions to improve communication, waiting times and early meetings with their adult nurse and doctor. We recommended further surveys in coming years and an audit on communication.

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P29

A review of screening tools for disordered eating in type 1 diabetes to inform the development of children and young peoples diabetes (CYPD) network guidelines

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Introduction
The Type 1 Diabetes and Eating Difficulties/Disorders of Eating Network (T1DDEN) Task and Finish Group: Identification and Screening was established in December 2023 as part of an over-arching workstream to tackle eating difficulties and eating disorders in paediatric diabetes care. Pursey *et al*., 2020, revealed a wide variety of screening tools ($n = 48$), but a paucity of validated screening tools($n = 5$) for Type 1 Diabetes.
The purpose of this professional groups rapid literature review was
1. Identify current screening tools available for use in paediatric diabetes care
2. Consider the practicality of use in clinical care, risks and cost for commonly used screening tools in clinical care.

Abstract P29

	Validated for diabetes	Cost	Practicality	Age	Risks	Who can screen
DEPS-R	Yes	Free	Short	13+	Leading questions around insulin restriction	All
EDI - 3RC	Modified and original version show good internal reliability	£126	Short	13+		Trained Health Professionals
SEEDS	Yes	Free	Short	12+	Does not include weight control behaviours	All
EDE-QS	Modified and original version show good internal reliability	Free	High sensitivity, easy to use	14+ (12+ available)		All
mSCOFF	Not against gold standard	Free	Very short but requires follow up interview	12+	High false positive	All (with training)
EAT-26	No but often used	Free (with permission)	Short	Adolescents +	Not validated for diabetes	Health Professionals only

Methods
A search of the literature up to February 2024 (CINAHL, Medline, Embase, Scopus) included three broad categories (Type 1 Diabetes, Eating, or feeding disorders and screening tools). Screening tool titles were extracted and the most frequently used screening tools identified for review.
Results
The search returned 263 papers (17 excluded). These were scanned for relevant screening tools. 102 screening tools had been used across all papers. There were no new published screening tools (since 2020). A summary of the most relevant and commonly used screening tools within the literature is shared in the below table. Translations were available for most screening tools.
Discussion
There are a range of published screening tools that can be used in paediatric care. This will inform the development of CYPD Network guidelines. Further considerations younger people and cultural sensitivities are needed.

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Diabetes 3

P30

Understanding staff views on current variation in provision of diabetes technology for children and young people with diabetes: a qualitative service evaluation

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Background
Poverty and deprivation are associated with poorer diabetes health outcomes and lower uptake of diabetes technology in paediatric populations. This qualitative service evaluation explores staff perspectives on current variation in provision of diabetes technology prescribed to children and young people from high deprivation areas. Challenges and ideas for reducing variation are discussed.
Methods
Semi-structured interviews were conducted with 16 multidisciplinary professionals from a Paediatric Diabetes service about their experiences of diabetes technology provision. Interviews were analysed using thematic analysis with a critical realist approach.
Results
Four main themes were found: 1) **Communication and Dialogue** with families who are less proactive in seeking diabetes technology, or are unfamiliar with healthcare systems, and difficulties with interpreters were identified as barriers to prescribing technology. Flexible approaches like home visits and adaptable job roles helped facilitate prescription. 2) **Service Capacity** - Perceived overwhelm on the service and the need for more staff resources for families from deprived areas hindered technology provision. Having a dedicated health inequalities team helped bridge gaps. 3) **Staff Beliefs about Technology** – While some viewed technology as risky and overwhelming in certain contexts, others believed it would improve quality of life when appropriately matched. Beliefs about technology were also found to influence when tech was discussed with families felt to be managing well on other regimens. 4) **Understanding and Addressing Barriers** – Social barriers such as lack of parental supervision, work inflexibility and limited access to technology were seen as safety risks. Some staff struggled to connect with families due to cultural, societal or class divides, and identified open communication and self-reflection on biases as crucial.
Conclusions
Several areas were felt to contribute to the variation in the prescribing and uptake of diabetes technology, including communication gaps, staffing constraints, perceptions about technology risks/benefits, and difficulties understanding families' circumstances. Initiatives like dedicated health inequalities teams, cultural awareness training, co-production with families, varied resources, and diversifying staff roles may enhance access. Understanding and overcoming unconscious biases through open dialogue is key to services improving equity. Future research should explore the acceptability and feasibility of staff recommendations to address health inequalities in paediatric diabetes care.

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P31

'Hybrid closed loop pathway'– a quality improvement project utilising existing resources whilst meeting the demands of a merged service

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Background
The Paediatric Diabetes pump service at UHDB saw a wait list time of three months expand to 18 months following Covid, staffing issues and the merging of services. A lack of equity in access to diabetes technology between the two sites was also an issue Additional funding was not available, so existing resources needed to be utilised effectively whilst also providing adequate training for all members of the MDT. Initial group starts highlighted difficulties in assessing understanding, the impact of mixing of ages, dominant personalities and education fatigue. They were not time effective for staff or patients.
Methods
Utilising the PDSA cycle, we have moved our existing pump start pathway from a single patient start over multiple days, to a group start of 10 patient-s/families/carers, finally delivering a 20 patient pump start in 1 day. Working through this process, we capitalized on feedback and experience, implementing a 6 workstation approach, allowing one to one delivery and assessment. We utilised external resources from the company representative.
Results
This format was well received by staff and service users. It allowed an individualised and structured approach. By achieving a large group start the waiting time reduced to 9 months from 18 months.
Conclusion
The workstation approach allowed a structured and safe environment for a large group of patients to complete their pump start. The embedded quality improvement approach within the team allowed for timely reviews and changes to be made to the pathway, meeting the increasing demand of diabetes technology.

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P32

'Organisational change'– a quality improvement project to utilise existing budget to provide a nursing service and equitable care across 2 sites

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Background
The merging of hospital trusts resulted in 2 Paediatric Diabetes services within one Trust, but within separate networks. Care was not equitable between the 2,

with inequitable staffing, difficulty in recruitment and low use of diabetes technology. An organisational change process in December 2022, highlighted the need for one merged diabetes service, with the Paediatric Diabetes Nursing and Administration Service working cross-site. The combined patient caseload was approximately 450. There were no additional finances available.
Methods
Professionals from the MDT on both sites held organisational meetings to agree a joint purpose, pathways and workforce. This required a change in the structure of the nursing and administration team, with the addition of a band 4 educator and band 8 paediatric diabetes nurse practitioner. Improving access to diabetes technology at one site was identified as a priority.
Results
Following the service restructure, staff retention improved and vacancies were quickly filled. Services were aligned across site including clinics and escalation processes. Pathways and Guidelines were merged. Access to technology has improved. Derby insulin pump use is up to 63% from 49% (95% of these pump patients are on Hybrid closed loop HCL). Burton pump use is up to 50% from 21% (87% of these are HCL). The 2 services are now within the same diabetes network.
Conclusion
Utilising best practice from each site and implementing this through a new staffing model capitalised on the high standards of each service and successfully delivered this through cross site working. A quality improvement approach enabled decisions to be made and changes implemented quickly.

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P33

The digibete patient support app; implementation and evaluation outcomes of the scottish pilot

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Introduction
DigiBete is a patient support app with educational and peer support video vignettes, translated into several languages and accessible to those with low literacy. It can be personalised by diabetes teams for patient communication. The app is widely used in England and Wales. In 2021, the Scottish Government funded DigiBete app licenses for all T1D families in Scotland for a 12-month pilot.
Methods
A primary health board led the pilot, establishing template documents for information governance (IG) approval, and launching in November 2022. A Digibete champions network, including representatives from secondary boards, was established. IG templates and implementation approaches were shared through regular online meetings. An evaluation subgroup used "contribution analysis" to assess the app's impact. Evaluation included collation of app usage statistics, user feedback through online questionnaires, healthcare professional (HCP) questionnaires, and structured interviews with stakeholders from different health boards. The time HCPs spent creating and maintaining local online resources was also modelled and translated into NHS costs.
Results
• DigiBete is now used in 12 of 14 Scottish health boards, with 1,075 families and 98 HCPs registered.
• Each user views an average of four videos, with "sick day rules" being the most popular.
• 20 families responded to the questionnaire, 19 of whom appreciated having resources available on their phone.
• 22 HCPs responded, 18 of whom liked having standardised Scotland-wide resources, and all 22 wanted to continue using the app.
• The 9 Scottish boards using alternative digital resources spent approx £62,043 in the first year and £41,628 annually to maintain them, with 5 boards not having any access to these. The cost of DigiBete for the whole Scottish community is less than 50% of this.
Conclusions
Central funding provides an efficient, unified approach for Scotland. The positive evaluation, especially regarding cost savings, secured an additional two years of funding for continued app roll-out, with a future focus on the young adult population. DigiBete registration status is now included in SCI diabetes, our national shared electronic patient record. This will allow future evaluation to focus on app user demographics and whether DigiBete use has any impact on clinical outcomes.

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P34

Onboarding and beyond - the quantitative and qualitative benefits of skill mix in a diabetes team

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Following approval of NHS England Equitable Funding we recruited one WTE Family Support Worker and 0.2 WTE Specialist Dietitian, from April 2023 to March 2024. These resources were utilised to support advanced diabetes technology use in Rotherham's most deprived population and support best outcomes. Additionally our focus was to maintain the improvements in glucose management, beyond onboarding. The workforce standards for children and young people's diabetes services were published in February 2024, 10 months into the project, which recommended the minimum staffing levels based on caseload numbers, and supports the requirement for one WTE Support worker and additional Dietitian time for the Rotherham caseload. Key FSW roles included: planning and initiation of the technology start pathways; signposting/demonstrating technology resources and equipment; supporting families and CYP to connect technologies to data platforms and provide ongoing technology trouble shooting advice; reviewing 'Time in Range' (TIR) data to highlight those CYP requiring earlier intervention than their planned appointments; providing individual support to struggling CYP and their families and those not engaging with the service; preparing data and information for clinic reviews. The FSW continues to allow capacity for the PDSNs to focus on new technology starts, clinical support and reviews. The additional Specialist Dietitian role included: contact with all CYP and families prior to HCL starts with a full dietary and carbohydrate counting review; production of a simple leaflet 'Getting the Most out of Your HCL'; additional dietetic appointments for those with deteriorating TIR or requiring additional advice; support and guidance to FSW and data collection/report updates.
Results
70 CYP have started HCL since July 2023. HbA1c data available for 49 of the CYP before starting HCL: Mean 59.3 mmol/mol. and median 59 mmol/mol and 3 months after starting HCL: Mean 51.4 mmol/mol. and median 51 mmol/mol. 29 CYP with HbA1c data at 6-10 months after HCL: Mean 50.9 mmol/mol.; Median 48 mmol/mol. This project demonstrates the value and importance of skill mix in a CYP Diabetes Team and the quantitative and qualitative benefits of ongoing support for CYP and their families, in high deprivation, to implement advanced technology.

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P35

Looping forward in diabetes

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Introduction
The availability of Hybrid Closed Loop (HCL) automation in diabetes is a fast emerging technology. This technology is not freely available in our centre but a small number of our patients are self-funding it. We analysed data from the current cohort of our patients using HCL (up to 31st December 2023), to assess improvements in glycaemic control and quality of life for the patients and their families.
Objectives
To assess quantitative improvements in glycaemic control and qualitative improvement in diabetes burden in our current patients using HCL.
Methods
We retrospectively collected clinical data prior to the patient commencing on HCL and at a minimum of 3 months post HCL treatment. Prospective patient/parent questionnaires have also been collated.
Results
42 children and young people (12% of our clinic population) aged between 2 and 18 years were using HCL at the time of study. Results showed:
- a reduction in median HbA1c of 8 mmol/mol;
- a reduction of median average glucose of 1.8 mmol/l;
- an increase of median time in range of 22%

- giving them over 5 hours more each day in target;
- a reduction of median time in hypoglycaemia (0.75%) and time spent very high (9.1%). These improvements are noted across all age groups (pre-school; primary age and post-primary). There is also a huge improvement in perceived quality of life with a significant reduction in diabetes burden and this has been universal for all patients and their families.

Conclusions

HCL technology has made a remarkable improvement to both glycaemic control and quality of life in all our patients using this modality. This highlights the case for it be funded in our centre.

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P36

Use of a hybrid closed loop system in a child with end stage renal disease, GAD positive diabetes and recurrent pancreatitis – a game changer!

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Achieving optimal glycaemic management in children with diabetes and end stage renal disease (ESRD) on dialysis is challenging. Specific factors include dietary and fluid restrictions and variable insulin requirements owing to idiosyncratic glucose disposal during dialysis. We present a case where a hybrid closed loop system was trialled to enable tighter glycaemic management and improve quality of life. An 8-year-old female with microcephalic osteodysplastic primordial dwarfism, global developmental delay and chronic kidney disease presented to GOSH in 2021 with acute kidney injury. Peritoneal dialysis was complicated by episodes of acute pancreatitis with hyperglycaemia requiring insulin therapy. She was switched to haemodialysis (HD) and commenced on a flash glucose monitoring sensor (Libre 2). Over 2 months her HbA1c increased from 33 mmol/mol to 56 mmol/mol. GAD antibodies were positive. Glycaemic management was challenging with changing restrictions in the nature and volume of feeds, and variations in insulin requirements on HD vs non-HD days. Optimising long-acting insulin increased the risk of hypoglycaemia. Managing glucose excursions with rapid acting insulin for carbohydrate intake and corrections was a significant burden for the child and carer. Inaccuracies in the Libre 2 sensor prompted a move to continuous glucose monitoring (Dexcom G6). To make insulin delivery more effective, an off-licence trial of a hybrid closed loop (HCL) system (Tandem T-Slim pump) was initiated. This led to significant improvement in glycaemic management. Time in range increased from 40% - 83% with a reduction in average glucose from 10.4 mmol/l to 7.4 mmol/l and standard deviation from 5.3 mmol/l to 2.8 mmol/l. The family also reported substantial improvement in quality of life. Oral feeds were changed to improve palatability which provided higher fat and lower carbohydrate content. The delayed glucose spike likely caused by the higher fat load was tackled using the extended bolus feature. Pump settings were regularly reviewed and adjusted in line with glucose variability, noting variance in feed times on HD and non-HD days.

Conclusion

The use of a HCL system and dietary modifications in a child with diabetes and ESRD on dialysis led to significant improvement in glycaemic management and quality of life reported by her family.

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P37

'Sick day ketones in childhood diabetes' an audit reviewing and comparing inpatient management of children presenting unwell to oxford university hospital 2022-2023, with ISPAD guidelines

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ISPAD's revised 'sick day guidelines 2022' highlighted the necessity to review Oxford University Hospital Guidelines. Prevention and correct management of ketosis is essential when children with Diabetes are unwell and involves confident management of advanced and increasingly common Diabetes Technologies. Inpatient admissions were reviewed over 1 year. Medical records were studied to assess monitoring of blood glucose levels and ketones. In the presence of ketosis, insulin dose accuracy and efficacy were evaluated and compared between guidelines. 22 children were admitted from 23 months to 17 years old. 21 children had Type 1 Diabetes, 1 child had Tacrolimus induced Diabetes. Illnesses varied, most commonly gastroenteritis (60%), but included upper respiratory tract infections, pneumonia, viral induced wheeze, febrile convulsions, appendicitis and joint involvement. Diabetes management regimes differed – 8 children on hybrid closed loop systems, 3 children on pump therapy with continuous glucose monitoring and 11 children on multiple daily injections. Blood Glucose monitoring was performed 1-2 hourly in 77% of children during admission. Ketones were checked regularly in 50% of children. 9 children were checked only when hyperglycaemic and 2 children had no recorded documentation. 8 children had ketosis (75% gastroenteritis). 5 children were on MDI, 2 children had T-slim pump with Libre and 1 child using Android APS. Only 4 children had clear documentation of ketosis management. Case 1 demonstrated same correction doses when comparing guidelines, however ISPAD emphasises intake of sugary fluids and extra carbohydrates. Insulin boluses are administered for extra carbohydrates only once blood glucose is stable (>5-6 mmol/l) to prevent hypoglycaemia, which was seen post correction in this child. Case 2 demonstrated that gastroenteritis with hypoglycaemia may need a reduction of total insulin, and ketones can be starvation ketones which needs treatment with extra carbohydrate (ISPAD). A further case highlighted the importance of changing pump sets to ensure adequate insulin administration. The final case established ISPAD guidance of 0.15U/kg which was higher than OUH recommendations, can correct ketosis quicker. This audit verified that OUH guidelines need updating. It also determined the need for improved education regarding regular blood glucose and ketones monitoring during acute admissions, to ensure optimal management.

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Gonadal, DSD and Reproduction 1

P38

Psychology provision is the mainstay of care for mayer-rokitansky-kuster-hauser syndrome presenting in childhood

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Introduction

Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome is a 46,XX DSD condition associated with typical pubertal development, primary amenorrhea (absent uterus) associated with agenesis of the cervix and upper third of the vagina. Following diagnosis, optimal care strategy is unclear.

Objective

Evaluate i) input required from the DSD MDT ii) establish main care requirements iii) review interventions typically accessed via the specialist DSD clinic iv) understand the medical and psychosocial needs, to develop support pathways.

Method

Review of patients presenting with MRKH between 2020-2024. The following were assessed: MDT input, psychology interventions, endocrine assessment, and time accessing each speciality. The patient and/or caregiver(s) identified whether their priority needs were medical or psychosocial.

Results

Eight patients were referred, (25% (2/8) age < 15 y, 75% (6/8) 15-17y); 88% (7/8) were newly diagnosed. At diagnosis, 63% (5/8) had a joint appointment with the consultant endocrinologist and clinical psychologist. In total, 8 patients accessed 7 endocrine clinics, 8 DSD clinics, 13 psychology sessions and 5 joint appointments. Following diagnosis, the primary needs for all (100%, 8/8) were psychological not medical. Psychology intervention focused on: adjustment to diagnosis, understanding MRKH, future fertility and sexual function, self-image/identity support and navigating conversations with peers. Mean total time per patient for psychology support was 248 minutes vs 95 minutes for endocrinology. 1 patient declined further support, 1 has ongoing support, 2 are newly referred. 50% (4/8) were supported by psychology for referral to gynaecology to explore future sexual function, 12% (1/8) requested/needed dilatation. Endocrine appointments focussed on the same themes covered by psychology support. 50% (4/8) patients stated no further support was needed at present after 1-3 psychology sessions and reported reduced distress around diagnosis, increased understanding and adjustment to their diagnosis.

Conclusion

Following diagnosis of MRKH, psychology care rather than endocrine care, was the cornerstone of management. Care delivered by psychology was diverse, holistic and beyond targeted psychology interventions. We speculate that a joint appointment at the time of diagnosis, with psychology and endocrinology, was key to patients engaging with ongoing psychology care. Psychology care provision should be incorporated into standard care for patients with MRKH.

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P39

Validation of a new short parent reported outcomes (PRO) questionnaire for boys with a condition affecting sex development

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Background
To aid assessment of parent-reported outcomes (PRO) in the routine clinical setting in young children with any condition affecting sex development, a short questionnaire (PRO-CSD) that includes a parent-proxy report (PPR) and a parent-self-report measure (PSR) has been recently developed and requires further validation.
Methods
Parents of 98 boys with a median age of 2.9 yrs (range, 0.2,6.5) and a median external masculinisation score (EMS) of 11 out of a maximum of 12 (4,12) were recruited. Group-construct validity factors included surgical status, age, an integrated measure of multiple deprivation in Scotland (SIMD), EMS, reporting parent (mother vs father) and parental education. In a subset of 41 parents, test/re-test validity was also assessed by calculating intra-class coefficients (ICC).
Results
On the PSR measure, the parents of boys with an EMS <10.5 were more concerned about the 'appearance of their child's genitalia' compared to those with a score $>$ 10.5 ($P = 0.01$). An association with EMS was also observed in the questions on 'future social concerns' ($P < 0.01$), 'future relationships' ($P < 0.01$) and 'stress on receiving the diagnosis' ($P = 0.03$). A lower proportion of parents who had completed tertiary education (14/56 (25%)) reported 'feeling stress fitting their child's condition into the usual routines' and 4/56 (7%) reported that the condition affected 'how often they go out socially' compared to the non-tertiary educated parents, with 20/42 (48%), $P = 0.03$ and 11/42 (26%), $P = 0.02$, respectively. Amongst parents of boys below 2 yrs old, 11/33 (33%) reported 'feeling stressed managing the child's behaviour during the clinic visit' compared to 43/65 (66%) parents of boys older than 2 yrs ($P < 0.01$). No differences were observed for individual items in the PPR questionnaire. The median ICC for all 28 questions in the PSR and PPR was 0.7 (0.4, 0.9) with only one question in the domain of 'gender concerns' having an ICC below 0.5.
Conclusion
The current validation study of the PRO-CSD questionnaire confirms its utility for assessing health-related quality of life outcomes in young boys with any condition affecting sex development. Further studies are required to explore the use of this questionnaire in girls and in other languages.

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P40

A systematic review of core outcomes reported in boys and men with klinefelter syndrome

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Objectives
Klinefelter syndrome (XXY) has a wide range of presentations and health consequences. The aim of this systematic review was to identify the core outcomes reported in males with XXY.
Methods
Systematic searches of PubMed, Science Direct, and Cochrane were performed to source studies. The inclusion criteria were studies involving KS males with any intervention, comparison, or outcome, with separate searches for studies reporting on children <16 years of age and for adults $\geq$ years of age.
Results
For children <16 years of age, 47 studies met the eligibility criteria. Thirty (64%) studies reported anthropometric measurements and physical characteristics. Behavioural, cognitive, developmental and psychiatric outcomes were also commonly reported (26, 55%) as were biochemical results in 19 (40%) studies. Other outcomes included presence of co-morbidities (7, 15%) and fertility outcomes (5, 11%). In the studies focusing on individuals ≥ 16 years of age, 186 studies met the eligibility criteria. Outcomes relating to biochemistry, fertility and occurrence of co-morbidities were reported in 119 (62%), 65 (36%) and 65 (36%) studies respectively. Quality of life was reported least frequently in only 2 (4%) paediatric studies and 5 (3%) of adult studies.
Conclusions
As well as demonstrating an imbalance in the number of research studies in children compared to adults, the present study highlights the variety of outcomes studied in boys and men with KS. These results can support the development of age-specific core outcome sets for clinical research to promote homogeneity and to aid standardised data collection.

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P41

Pseudo-precocious puberty in children exposed to exogenous sex hormone: case report series

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Introduction
Accidental exposure to transdermal hormone-containing products can cause significant adverse effects in children. Hormone replacement therapy (HRT) is widely used in both women and men. Transdermal administration of oestrogen- or testosterone-containing products via transdermal patch, gel, sprays or creams are increasingly used. The MHRA (2023) and FDA (2009) warned of the risk of harm to children following accidental exposure to topical testosterone gel. We report 3 recent cases from South Wales.
Case 1
A 3-year-old girl presented with features of virilisation: clitoromegaly (2 cm), pubarche (B1P2A1), tall stature (99.8th centile, height velocity 11 cm/year), and recent aggression. Investigations revealed a testosterone level (3.4nmol/l) with no features of pituitary gonadal axis activation. Urine processed at Drug Control Centre from King's College London confirmed exogenous testosterone which was from the contact exposure of paternal testosterone gel. After avoidance of exposure, virilisation did not progress and testosterone levels normalised.
Case 2
A 3-year-old girl was reviewed for recent growth acceleration (height velocity 8.4 cm/year), thelarche (B2), adrenarche and mood swings. Investigations revealed oestradiol levels at 194 pmol/l with a prepubertal response on GnRH stimulation test. Her bone age was advanced by 2years and uterine volume was 2.4ml with ovarian volumes 3.9mm and 3.1mm. Unintentional exposure to maternal oestradiol gel (HRT), once removed no clinical progression and the oestradiol levels are undetectable.
Case 3
A 7-year-old boy presented with gynaecomastia and pubarche: Tanner stage B2P2A1 and G1, testicular volume 3ml bilaterally. He also had acceleration in growth (9 cm/year). Oestradiol level was raised at 186 pmol/l, with prepubertal LH and FSH levels. He had a normal karyotype 46XY with no mullerian structures on ultrasound. Findings were secondary to exogenous exposure to maternal transdermal oestradiol spray (HRT). After exposure eliminated, the oestradiol levels became undetectable.
Conclusion
This report aims to emphasise the risk of unintentional sex steroid exposure during childhood. These cases highlight physical changes but there is also a psychological effect on the child and parents who often have feelings of guilt. Prescribers of topical HRT often GPs have a responsibility to highlight risk and mitigation measures. Where exposure has occurred, early recognition and removal of exposure is critical.

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P42

Illustrating the genomic complexity of DSDs – series from a regional DSD service

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Advances in DNA sequencing technology have provided insights into the genomic architecture of rare disorders, including DSDs. Genomic testing in clinical setting is now accessible for NHS patients, and we present a series of examples from our regional DSD service of patients and families highlighting the complexity in this field and the role of a clinical geneticist in the diagnostic pathway. A 3.5-year-old girl with clinical diagnosis and family history of CAIS had analysis of the R146 DSD gene panel, which did not identify an AR variant. Clinical suspicion of an unusual AR variant was confirmed on bespoke genome sequencing which showed a 6kb deletion involving the promoter sequence and part of exon1 of AR, likely causing loss of expression of the androgen receptor. This is a novel molecular mechanism causing androgen insensitivity. Three brothers with variable degree of hypospadias, and history of suggestive problems in maternal relatives, were shown to have a loss-of-function variant in MAMLD1, an X-linked cause of hypospadias. Prospective follow-up of these siblings has provided unique insights into the natural history of this rare disorder. A 14-year-old girl presented with signs of virilisation from a testosterone secreting left-sided gonadoblastoma. Urgent analysis of the DSD gene panel showed a pathogenic variant in MAP3K1, which causes gonadal dysgenesis. This facilitated appropriate management, including contralateral gonadectomy. We will also present the clinical and genomic data on patients with less common DSDs including Leydig cell hypoplasia, true isolated 17,20 lyase deficiency, and sex-reversal from WT1-related Frasier syndrome. Genital anomalies might be a clue to the diagnosis of a rare multisystem syndrome. We will illustrate this through patients who have been diagnosed with KAT6B-related Lin-Gettig syndrome, 17q12 deletion related Mayer-Rokitansky-Kuster-Hauser, ARX-related epileptic encephalopathy, and PAGOD (pulmonary hypoplasia, agonadism, omphalocele, diaphragmatic defect and dextrocardia) syndrome. Lastly, we have seen two children with 46,XY DSD manifesting as sex reversal have been seen in the context of a rare genomic disorder which is not associated with DSD. One is a 4.5-year-old 46,XY girl with WDR73-related Galloway-Mowat syndrome and the second patient is a 2.5-year-old 46,XY girl a1.3Mb deletion at 19p13.3, including the ZBTB7A gene.

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P43

Clinical presentation according to genotype in 5α-reductase 2 deficiency

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Introduction
Biallelic loss of function of the 5α-reductase 2 enzyme, with impaired conversion of testosterone to dihydrotestosterone, is associated with undervirilisation in 46 XY DSD. We identified 5 individuals with 5α-reductase 2 deficiency (5ARD), disease varying from mild to severe.
Patients
1. 2 Turkish siblings, with microphallus and coronal/glanular hypospadias (External masculinisation score (EMS) 8) had 3-day HCG and urine steroid profiles (USP) consistent with 5ARD. They harbour a homozygous variant p.Gly196 Ser, a noted *SRD5A2* hotspot, interfering with the enzyme's NADPH domain.
2. A third individual, Bangladeshi, with coronal hypospadias, microphallus (EMS 8) and indicative biochemistry was compound heterozygous for variants p.Arg227Ter (affects enzymatic activity) and p.Ala52Thr (of uncertain significance).
3. For one Asian individual with penoscrotal hypospadias, chordee and bilateral undescended testes (EMS 7) investigations were less conclusive. USP ratio of 5A/5B reduced tetrahydrocortisone was not as low as expected with 5ARD, but inferred a mild phenotype/carrier status. He is heterozygous for p.Phe234Leu (affects enzymatic activity); no other cause for his DSD has been identified.
4. An infant (Australian/New Zealand ethnicity) had predominatly female typic genitalia, however testes were palpable bilaterally in the labioscrotal folds (EMS 3). USP tetrahydrocortisols, which are used as best markers of 5ARD can appear paradoxically later in the condition and genetic testing has instead been invaluable in early diagnosis for this infant. He is compound heterozygous for p.Gln126Arg and p.His231Arg (associated with reduced enzymatic activity and testosterone affinity respectively). There is generally no genotype-phenotype correlation described, but some variants including p.Gln126Arg, are consistently associated with severe undervirilisation. He has been assigned male sex, with due consideration given to prenatal androgen exposure, scope for virilisation in puberty and preserving fertility. Support in managing the sex difference is important and carefully timed surgery in adulthood, with phalloplasty potentially required. Virilisation in puberty is evident in our patients of age, a phenomenon that can mark 5ARD out from other causes of 46XY DSD.
Conclusion
This small series exemplifies the phenotypic variability of 5ARD and annotation of the natural history with associated genotypes continues to play a role in our understanding of this rare disease.

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Miscellaneous/Other 1

P44

Establishing a nurse-led transition clinic for young people with congenital adrenal hyperplasia (CAH): quality improvement project

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Background
A robust and meaningful transition pathway helps to prepare young people (YP) for the move from children and YP's services to the adult setting. This can prevent YP from being lost to follow-up and improve long-term health outcomes. Healthcare "transition" describes the process of preparing, planning and moving YP from paediatric to adult services. This should be a gradual process, to enable the YP, and those involved in their care, to feel adequately prepared, and successfully move to adult services. Transition planning should allow time to consider what their healthcare needs as an adult might be and help set realistic expectations of adult services (NICE, 2016). University College London Hospital (UCLH) offers unique Adolescent inpatient and outpatient services (13-19 years). We are continually working to improve young people's focused care.
Aim
This project describes a newly established monthly nurse-led transition clinic. The aim of this project was to better understand the needs of our patients regarding preparation for transition to adult services.
Method
In this pilot clinic, we limited the cohort to patients who had a diagnosis of Congenital Adrenal Hyperplasia (CAH), aged 12-17 years. This was to allow time to have repeated transition reviews every 6-12 months to complete the different stages of the programme. The clinic model followed the "Ready, Steady, Go (RSG) " transition programme. This aims to support YP to gain the skills, knowledge and confidence to manage their conditions. This allows time to have repeated transition reviews every 6-12 months to complete the different stages of the programme.
Evaluation
QR code to gain feedback and ensure PPIE
Challenges
The pilot encountered several problems including:
Clinic and nursing capacity Young people engagement Clinician engagement Age of transition into UCLH
Successes
Preliminary findings PPIE response
Conclusion and next steps Overall positive response from young people, their families and staff. We are now looking to expand the pilot further and improve the method of evaluation.

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P45

Evaluating transition in osteogenesis imperfecta in the west of scotland

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Objectives
Osteogenesis Imperfecta (OI) is a genetic disorder characterised by bone fragility and predisposition to fracture. The increased risk of fracture and skeletal morbidity in this patient cohort is lifelong. Long-term follow-up is important in addressing health needs. The aim of this retrospective clinic review was to evaluate the success of transition in OI and to determine factors influencing long-term follow-up in adult services.
Methods
Young people attending the Complex Bone Clinic at Glasgow's Royal Hospital for Children between 2014-2020 were identified. Attendance data was obtained

from patient records and an electronic appointment system. Success of transition in OI was determined by the proportion of young people in established follow-up, defined as those young people still attending an adult clinic 3 years after transfer. Good late attendance was measured as attending $\geq 50\%$ of offered appointments at the paediatric Complex Bone Clinic in the 3 years prior to transfer. Good early attendance was measured as those attending $\geq 50\%$ of offered appointments at any adult bone clinic in the 3 years following transfer.

Results

23 young people (median age 17.5yrs) were identified who had care transferred to an adult service between 2014-2020. 10 (43.5%) of which were in established follow-up at 3 years. 16 (66.7%) young people were offered an initial appointment at an adult service. 18 (78.3%) young people were good late attenders. 12 (52.2%) young people were good early attenders. Good late attenders were significantly more likely to be offered an initial appointment with an adult service ($P = 0.017$). Those offered an initial appointment for an adult service were significantly more likely to be in established follow-up at 3 years than those not ($P = 0.007$). Good early attendance did not have a significant impact on established follow-up ($P = 0.118$).

Conclusion

A significant proportion of patients with OI are currently lost to follow-up following transfer to adult clinics. Good late attendance to paediatric clinic has a significant impact on the likelihood of being offered an initial appointment with an adult service, which appears to predict established long-term follow-up. Strategies to improve attendance pre-transition, and long-term, are required to ensure lifelong health needs are addressed.

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P46

A novel mutation in the AVPR2 gene causing congenital nephrogenic diabetes insipidus

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X-linked nephrogenic diabetes insipidus (NDI) is a rare hereditary condition characterised by renal resistance to arginine vasopressin (AVP). Diagnosis can pose clinical challenges, but molecular genetic analysis can offer a swift and conclusive diagnosis. Herein, we present the case of a 13-year-old boy born from a non-consanguineous marriage, underwent appendicitis surgery at our hospital. Post-procedure, on the first day, the child was found to have severe hypernatremia (180 mmol/l). Subsequent assessment revealed that the child had been experiencing polyuria and polydipsia since the age of two, although no medical consultation had been sought for these symptoms. Further assessment revealed elevated serum osmolarity (370 mosm/kg) accompanied by decreased urine osmolarity (218 mosm/kg). Despite vasopressin stimulation, there was no improvement in urine osmolarity, supporting the diagnosis of nephrogenic diabetes insipidus. Clinical exome sequencing confirmed a hemizygous 28-base pair duplication in exon 3 of the AVPR2 gene, resulting in a frameshift and premature truncation of the protein 182 amino acids downstream from codon 19 (p.Leu19ArgfsTer182). This mutation, located on the X chromosome, can lead to X-linked recessive NDI. Notably, the p.Leu19ArgfsTer182 mutation of the AVPR2 gene has not been previously documented in the literature. The child was discharged while on a combination of thiazide and amiloride, which led to significant improvement in his clinical condition. This case report underscores the clinical and molecular features of a newly identified mutation in AVPR2, resulting in congenital nephrogenic diabetes insipidus (CNDI). It highlights the crucial role of achieving a definitive diagnosis in patients with CNDI.

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P47

Hypoketotic hypoglycemia and hypoparathyroidism in medium chain Acyl-CoA dehydrogenase deficiency (MCADD) caused by ACADM mutation-rare

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MCAD deficiency, the most prevalent disorder in fatty acid β-oxidation, typically presents with hypoketotic hypoglycemia, neuromuscular issues, and arrhythmias. This report details the case of a one-year and nine-month-old boy with normal development and no significant medical history, who experienced a generalized tonic-clonic seizure linked to hypoglycemia (random blood sugar 2.1 mmol/l). Further inquiry revealed the seizure occurred after prolonged fasting upon waking from sleep, accompanied by fever, upper respiratory symptoms, and poor oral intake for two days. The child's evaluation suggested hypoketotic hypoglycemia, elevated triglycerides (385), and increased levels of specific acids in the urine, indicative of MCAD deficiency. Additionally, the child displayed hypocalcemia (ionised calcium-0.97 mmol/l)and elevated phosphorus(1.9 mmol/l) levels, with low intact parathyroid hormone (9 pmol/l) levels, implying a connection between MCAD deficiency and primary hypoparathyroidism. Despite negative results for adrenal and parathyroid autoantibodies, and the absence of autoimmune diseases or mucocutaneous candidiasis, primary hypoparathyroidism was suspected to be related to MCAD deficiency. Treatment included calcium carbonate supplements, calcitriol, and carnitine. Subsequent clinical evaluation revealed a defect in the ACADM gene, further supporting the diagnosis of MCAD deficiency. The *ACADM* gene is on chromosome 1, and MCAD deficiency is inherited as a recessive trait. The vast majority of patients with MCAD deficiency have a single common missense mutation which changes a lysine residue to glutamate. The mutated amino acid is far removed from the catalytic site of the enzyme but appears to make the protein unstable by interfering with intramitochondrial folding and assembly of the nascent peptide. Preventing this misfolding offers an opportunity for development of new therapeutic agents for MCAD deficiency. This case underscores the rare association between MCAD deficiency and primary hypoparathyroidism, emphasizing the importance of regular monitoring of calcium and phosphorus levels due to the potentially life-threatening nature of hypoparathyroidism. Further research is crucial to fully understand this complex association and its implications for patient management and treatment strategies.

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P48

Caught before a crisis, but is there more to come?

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A 14-year-old girl presented with 11 months' history of secondary amenorrhoea and autonomic symptoms on a background of significant anxiety and lethargy. She had been taking fluoxetine 20 mg daily for 6 months to treat anxiety and low mood. Menarche occurred had aged 12 years and 5 months and her menstrual cycle had been regular prior to its cessation one year earlier. She had no significant past medical history. There was a family history of hypothyroidism. On examination, the patient had reached Tanner staging B4, P3-4, A2. She had no skin lesions, oral candidiasis, hyperpigmentation, or hirsutism. Her growth was normal for mid-parental height, along the 50th centile for height and the 25th centile for weight. Transabdominal pelvic ultrasound was normal. Oestradiol was $<$19 pmol/l (NR 45-1400), FSH 72.3units/l (NR 1.8-22.5), LH 44.4units/l (NR 1-104). This, combined with the patient's history led to a diagnosis of primary ovarian failure (POI). Treatment with oestrogen and progesterone replacement was commenced and counselling was given regarding fertility. Random serum cortisol was 78nmol/l, leading to a synacthen test, within which the patient showed a low baseline morning serum cortisol of 28 and an absent response to synacthen (peak level 30nmol/l at 30 minutes). ACTH was 129 ng/l (NR $<$50). Adrenal cortex antibody was positive. The patient was therefore diagnosed with primary adrenal insufficiency and urgently commenced on maintenance hydrocortisone treatment and counselled about sick day and emergency hydrocortisone dosing. Due to the timely and full investigation of this patient's symptoms, Addisonian crisis was fortuitously avoided. Interestingly, the patient additionally had positive anti-thyroid peroxidase (Anti-TPO) antibodies with normal thyroid function tests. It is therefore possible that this patient presents as an incomplete presentation of autoimmune polyendocrinopathy syndrome type II, with her chances of developing future thyroid disease thought to be 50%, which would complete her diagnostic profile. This case illustrates the importance of holding a broad differential for POI and illustrates the difference between the known types of autoimmune polyendocrinopathy. AIRE gene sequencing may hold diagnostic benefit in such patients, and the pathways around this are being further researched.

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P49

Don't just correct for the glucose: the electrolyte exclusion effect

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An 8-year-old girl presented with a new diagnosis of diabetes mellitus in severe diabetic ketoacidosis (DKA) (pH 6.8, BE -31.5 mmol/l, glucose 25 mmol/l, ketones 4 mmol/l). She had abdominal pain, vomiting, and Kussmaul breathing on a background of osmotic symptoms for a few months. She was treated with fluid resuscitation, replacement fluids and intravenous insulin in the high dependency setting. Initial laboratory sodium levels were low, 122 mmol/l (corrected for glucose 17.1 mmol/l) and plasma reported to have a milky appearance due to severe hypertriglyceridaemia (HTG) 187.5 mmol/l (0.55-1.9 mmol/l). Haemoglobin A1c was 131 mmol/ mmol. Correction of the perceived hyponatraemia with hypertonic saline was avoided as parallel blood gas sampling sodium was 152 mmol/l. Adjusting the laboratory sodium of 122 mmol/l for the triglyceride level of 187.5 mmol/l, would have given a value of 155 mmol/L, a 33 mmol/L difference. Acute pancreatitis was suspected as she developed worsening abdominal pain requiring morphine. Serial amylase rose from 234 IU/l to 375 IU/l (25-125 IU/l) and lipase was elevated 545 IU/l (8-78 IU/l). The visualised portions of the pancreas were not inflamed on ultrasound. Severe HTG is a rare but serious complication of DKA, where insulin deficiency results in lipolysis and release of free fatty acids. Very low-density lipoprotein production is increased in response to free fatty acid uptake by the liver, resulting in HTG. HTG-induced acute pancreatitis is well reported in adults, but less established in the paediatric population. Pancreatitis can lead to septic shock and multiorgan failure. In this case, a higher rate of intravenous insulin infusion (0.1units/kg/hour) was sufficient to treat HTG, however refractory cases may require plasmapheresis. Probable pancreatitis was successfully treated with conservative management (piperacillin/tazobactam, proton pump inhibitor and low-molecular-weight heparin) and correction of HTG. This case highlights the potential for lipaemia to interfere with indirect laboratory electrolyte assays, a phenomenon known as the electrolyte exclusion effect, describing falsely low electrolyte concentrations in the presence of severe lipaemia. It is important that lipaemia is recognised quickly, due to the risk of HTG-induced acute pancreatitis, and the interpretation of laboratory assays which should be adjusted for lipaemia. If in doubt, direct blood gas assays should be used.

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P50

Safety and efficacy of 18F-DOPA PET/CT scan under oral sedation in children with congenital hyperinsulinism

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Background
Congenital hyperinsulinism (CHI) is the most common cause of persistent hypoglycemia in infancy. The two main histological types, diffuse and focal, are clinically identical but differ in underlying genetic mechanisms, histopathology, and management. Fluorine-18 L-3,4-dihydroxyphenylalanine positron emission tomography/computed tomography (18F-DOPA PET/CT) can help differentiate focal from diffuse CHI and consequently aid in patient management. At our institution, a protocol has been developed to perform 18F-DOPA PET/CT under oral sedation with chloral hydrate in children with CHI, to avoid the use of general anaesthesia (GA).
Objective
To assess the safety and efficacy of oral sedation in children undergoing 18F-DOPA PET/CT to differentiate focal and diffuse disease.
Design
A retrospective case note review was conducted to determine whether oral sedation for 18F-DOPA PET/CT resulted in sufficient image quality for interpretation and to identify any adverse effects associated with the procedure.
Results
Between 2010 and 2023, seventy-eight patients aged 0.07 to 18.2 years underwent 18F-DOPA PET/CT. Oral sedation was used in 71 patients (90%), with weights ranging from 3.65 to 56.75 kg at the time of the scan. All scans performed under oral sedation produced images of sufficient quality for interpretation. No patients required a subsequent scan under general anaesthesia, though one patient underwent elective GA due to concerns about potential airway obstruction. Six patients (8%), all older than 10.5 years, tolerated the procedure without sedation. No post-procedure complications were documented.
Conclusion
Oral sedation can be considered as an alternative to general anaesthesia for children undergoing 18F-DOPA PET/CT for the investigation of CHI, provided there are no contraindications in the patient's history or examination findings. 18F-DOPA PET/CT can be effectively performed using oral chloral hydrate sedation in these cases.

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P51

Central hypoventilation syndrome with hyperinsulinism in infancy - management challenges

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Background
Congenital central hypoventilation syndrome [CCHS] is a rare autosomal dominant condition due to mutations in the transcription factor *PHOX2B*. It is characterized by alveolar hypoventilation with symptoms of autonomic nervous system dysfunction. Hyperinsulinaemic hypoglycaemia (HH) due to glucose dysregulation caused by anomalous insulin secretion has been reported as a feature of CCHS. However, HH and glycaemic outcomes in the context of CCHS have not been characterised in longitudinal follow-up.
Aim
To describe the variable phenotype of glucose dysregulation and glycaemic outcomes in children with CCHS.
Methods
We report 5 children with mutation-positive CCHS diagnosed with HH over a 15 year period in a cohort from one out of two Congenital Hyperinsulinism Highly Specialised Services in the UK. We describe the initial presentation, the challenges in management and glycaemic outcomes in longitudinal follow-up.
Results
All patients were term infants diagnosed with CCHS in the neonatal period, due to *PHOX2B* mutations and required long-term ventilation by tracheostomy. HH was diagnosed at median age 204 days (range 36-594) with post-prandial hypoglycaemia (3/5 patients) and fasting hypoglycaemia (2/5 patients). One patient was treated with diazoxide monotherapy; one with diazoxide and overnight gastrostomy feeds; one with acarbose and two with gastrostomy/NGT feeds. Two patients who presented earlier in the 15-year observation period demonstrated a reduction in the severity of HH over time, leading to hypoglycaemia resolution at a median age of 4.97 years (range 4.45-5.5 years), while patients presenting later and younger at follow up continued to require treatment for hypoglycaemia. No *PHOX2B* genotype to glycaemic phenotype correlation was noted.
Conclusion
It is important to recognise that both fasting and post-prandial hypoglycaemia may occur in patients with CCHS due to *PHOX2B* mutations requiring treatment for HH. These children must be monitored closely for symptoms of hypoglycaemia and investigated for HH. Our case series highlights that diazoxide can be effective treatment. Hypoglycaemia tends to reduce in severity over time and glycaemic resolution may be achieved over several years.

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P52

Outcomes of children presenting with signs of early puberty to a tertiary paediatric endocrinology service

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Introduction
Concerns around puberty are a common cause of paediatric endocrinology referrals. This study reviews outcomes of children referred with possible signs of puberty and then provides longitudinal follow up to ascertain the final diagnosis (e.g. premature adrenarche, thelarche, congenital adrenal hyperplasia, or central precocious puberty (CPP))
Aims and Objective
The aim was to document the number of children who had a variation of normal puberty, or pathological conditions and the types of investigations undertaken. A

secondary objective was to evaluate common themes that may allow investigations to be streamlined.
Methods
This retrospective cohort analytic study at Bradford Teaching Hospitals reviewed males (0-9 years) and females (0-8 years) referred with signs of puberty from Jan 2015 to Dec 2019. Data from electronic records included patient demographics, blood tests, radiology results, and final diagnoses.
Results
37 children were referred with concerns about early puberty. Of these, 30 (81%) were females and 7 (19%) were males. The median age of referral was 7.4 years (range 1.1 to 8.8 years). 26 (70%) had normal pubertal variants, while 11 (30%) showed signs consistent with CPP. For the 11 cases with CPP, 8 (70%) were idiopathic, and 3 (30%) revealed structural brain abnormalities on MRI scans. Out of the 30 girls presenting with early pubertal signs, 15 (75%) had premature adrenarche, 5 (25%) had isolated thelarche, and 10 (33%) were diagnosed with CPP. Among the 7 males showing early signs of puberty, 6 (86%) displayed adrenarche, whereas one was diagnosed with central precocious puberty (CPP). All males presented with secondary sexual hair development and 5 (71%) had tall stature.
Conclusion
This study provides a contemporary update on the range of presentations and final diagnoses in children presenting with concerns about early / precocious puberty. Premature adrenarche accounts for around two-thirds of the referrals, and CPP for the other third. Ongoing research is extending these findings.

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Obesity 1

P53

Comparison of insulin sensitivity measures between overweight and obese children and adolescents of south asian and white caucasian ethnicity

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Background
Studies have shown that body mass index (BMI) thresholds for defining overweight and obesity among South Asian (SA) adults should be lower than those for White Caucasians (WC) due to increased risk of type 2 diabetes (T2D). Although children and adolescents of SA ethnicity are known to be at increased risk of insulin resistance and T2DM at lower BMI threshold, there are no guidelines to define adjusted overweight/obesity thresholds for SA children compared to WC children in UK based on equivalent insulin sensitivity markers (HOMA-IR, fasting glucose, HbA1c).
Aim
To evaluate ethnic differences in measures of insulin sensitivity amongst children and adolescents classed as overweight or obese of either SA or WC ethnicity and compare to BMI threshold.
Method
Data on 235 children and adolescents were analysed with their background weight parameters and their insulin sensitivity measures were analysed and compared using SPSS version 29.
Results
Summarised in tables below:
Comparing subgroups based on sex, SA were significantly insulin resistant at lower BMI compared to WC subgroups.

Total $n = 235$	WC $n = 116$	SA $n = 119$	P value
Age (y)	13.50(3.8-18.1)	13.75(3.3-18)	0.45
Sex MF	4274	4772	0.604
Acanthosis nigricans	38%	87%	<0.001
Weight SDS	3.68(1.1 - 6.7)	3.02(0.3-6.2)	<0.001
BMI SDS	3.54(1.44-6.0)	2.96(1.6-5.2)	<0.001

Total $n = 235$	WC $n = 116$	SA $n = 119$	P value
HOMA-IR index	5.19(0.7-40.0)	6.55(0.5-29.4)	0.013
HbA1c	5.50(4.5-7.1)	5.70(4.6-10.9)	<0.001
Blood sugar 120 mins	6.0 (3.2-13.2)	6.2 (3.7-18.7)	0.293
Fasting blood sugar	4.7(3.1-7.6)	4.8 (3.8-13.8)	<0.001

Conclusion
Our study reveals that obese and overweight children and adolescents of SA ethnicity had significant abnormality of insulin sensitivity markers at a lower BMI compared to WC. The results of our study highlights a need for larger multicentre study in UK to identify BMI threshold based on ethnicity to risk stratify those who need insulin sensitivity checks early and promptly to improve long-term outcomes.

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P54

Diagnostic yield of a genetic testing pathway for severe early-onset obesity

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Background
Obtaining a genetic diagnosis for obesity offers various benefits; it enables screening of associated pathology, reduces stigma by demonstrating an organic cause, and guides potential access to emerging novel medications. The number of genes recognised as causative of severe obesity has significantly increased in recent years. With obesity prevalence rising, stratifying patients for genetic testing becomes challenging. Our obesity service genetic testing pathway comprises offering the R149 NHS genomic panel (or pre-2020 the Cambridge Genetics of Obesity Study (GOOS) from which the R149 panel evolved) for children presenting with severe obesity <5 years old and/or hyperphagia, and additional array CGH for those with co-existing autism spectrum disorder (ASD), learning difficulties (LD) or developmental delay (DD).
Aims/Methods
Through electronic case-note review, we assessed the diagnostic yield of this testing pathway and patient characteristics for the first 80 patients in our service with known obesity genetic results from 2014-2023.
Results
80 patients underwent GOOS/R149 testing. 24/80 also had array CGH. 64/80 had documented obesity onset <5 years and 58/80 had hyperphagia. 21/80 had congenital abnormalities/syndromic features. 38/80 had ASD. 43/80 had LD/DD. 10/80 patients had a positive R149 result (9 MC4R mutation, 1 leptin receptor deficiency). All (10/10) had obesity onset <5 years and hyperphagia. 9/10 had family history (FH) of obesity. 4/10 had ASD and a further 3/10 had mild LD/DD. Of the 24/80 patients who had array CGH, 21/24 had documented obesity onset $<$ 5 years. 19/24 had hyperphagia. 4/24 had congenital abnormalities/syndromic features. 16/24 had FH of obesity. 15/24 had ASD. 15/24 had LD/DD. 5/24 patients had a positive array CGH result, of whom 3 had incidental findings of no/unknown/unrelated significance to obesity, while 2 had an abnormality associated with severe early-onset obesity (19p13.3 duplication, 1q21.1-21.2 duplication). Both had obesity onset <5 years and hyperphagia. Neither had congenital abnormalities/syndromic features. One had FH of obesity. Both had ASD with LD/DD.
Conclusions
Genetic testing for children with severe obesity with onset <5 years old and/or hyperphagia appears to have high diagnostic yield. Additional array CGH for those with co-existing ASD or LD/DD may yield obesity-associated genetic diagnoses.

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P55

Assessment of glucose homeostasis and insulin sensitivity in young people with duchenne muscular dystrophy

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Background
Obesity is common in young people with Duchenne Muscular Dystrophy (DMD) and may lead to abnormalities of glucose homeostasis and insulin resistance. Annual measurement of HbA1c and sex hormone binding globulin (SHBG), shown to be inversely related to insulin levels, was introduced as local clinical monitoring in 2022. This report is an audit against our local guidance and service evaluation.

Methods
Based on the American Academy Paediatrics definition, HbA1c 39-46 mmol/mol was considered to be indicative of impaired glucose tolerance and HbA1c ≥47 mmol/mol was indicative of diabetes. SHBG was converted to Z scores based on published literature. Results were reported as median (range).
Results
There were 64 and 62 young people undergoing clinical review in paediatric services (neuromuscular and/or endocrine) in 2022 and 2023, respectively. Thirty-four out of 64 (53%) and 37/62 (60%) had HbA1c measured in 2022 and 2023, respectively. Thirty-seven out of 64 (58%) and 36/62 (58%) had SHBG measured in 2022 and 2023, respectively. A total of 30/64 (47%) and 36/62 (58%) had both HbA1c and SHBG measurements in 2022 and 2023, respectively. Of the 37 boys with HbA1c measured in 2023, 33/37 (89%) were <39 mmol/mol, 4/37 (11%) were 39-46 mmol/mol and none were ≥47 mmol/mol. The four boys with impaired results had a median age of 15.6 years (6.5, 18.5), each took daily glucocorticoid, three out of four were ambulant and two were white Caucasian. Two of these boys had oral glucose tolerance test confirming impaired glucose tolerance: two-hour glucose of 8.0 mmol/l (HbA1c 44 mmol/mol) and 9.6 mmol/l (HbA1c 40 mmol/mol), respectively. Median SHBG Z-scores was -0.6 (-1.5, +0.9) in the group with HbA1c 39-46 mmol/mol and was -1.1 (-2.0, +2.5) in the group with HbA1C ≤38 mmol/mol.
Conclusion
Routine HbA1c monitoring identified 11% of boys with DMD in ranges that could be indicative of impaired glucose tolerance. Overall, SHBG was low reflective of insulin resistance but was not discriminatory between those with HbA1c indicative of impaired glucose tolerance and those with normal HbA1c. National consensus guidance in this area is now needed and being developed.

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P56

Piloting a new nursing and psychology led group session for patients starting wegovy (Semaglutide) in a specialist endocrine weight management service

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Childhood obesity rates continue to rise, with 1/5 primary aged (Year 6) children now obese (NCMP 2022). Since 2023, Semaglutide, a GLP-1 receptor agonist, has been licenced for use in children with severe obesity, aged 12-18 years, with licencing allowing prescription for two years. Semaglutide acts on central satiety pathways to reduce hunger signals, reduce gastric emptying and stimulate insulin secretion.
Objectives
1) Pilot a group session for patients in a specialist weight management service, to commence Semaglutide; 2) assess experience of this group.
Method
The group protocol was developed by the Clinical Psychologist and Lead PENS, delivered in a face-to-face setting over two hours, once a month, with support from the Consultant Endocrinologist. Topics discussed include patient information leaflet, practical demonstration, side effects, lifestyle advice, behaviour change, SMART goals, and signposting to additional support. Patients and caregivers complete the PedsQL and a shared SMART goal. Patient-s/caregivers also complete an anonymous feedback questionnaire. The group delivers all medical information needed to start treatment, whilst emphasising the need for continued lifestyle changes, activity increase and healthy choices. Families are encouraged to incorporate behaviour change and goal-setting tasks into routine to make sustainable lifestyle changes whilst on Semaglutide.
Results
25 patients attended the first 4 groups. 88% (22/25) were starting Semaglutide for the first time. 17 caregivers and 16 YPs completed the feedback questionnaire. The groups were well received (8.97/10 score, 10 = very helpful), and participants were highly likely to recommend to family/friends (9.15/10 score, 10 = extremely likely). 97% reported the session covered what was expected. 97% (32/33) respondents rated long term behaviour change alongside Semaglutide as 'extremely' or 'somewhat important'.
Conclusion
Running group sessions has enabled more patients to start Semaglutide within a shorter time frame than nurse-led clinic availability allowed, and patients access specialist MDT support in a more cost effective way than individual clinic appointments. This group is a valuable, time/cost efficient resource to provide holistic care to patients starting Semaglutide, emphasising the ongoing need for lifestyle and activity changes. The group is well received and enables access to additional support services and signposting.

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P57

Socioeconomic inequalities in severe childhood obesity: findings from a tier-3 paediatric weight management service

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Introduction
Rates of obesity in children are rising and the cause is multifactorial. Previous studies have shown a higher prevalence of childhood obesity in areas with high socioeconomic deprivation and that the gap is increasing gap between the obesity prevalence in the most and least deprived areas. We report data on the Index of Multiple Deprivation (IMD), specific Domains of Deprivation and E-food desert index (EFDI) data for children and young people (CYP) in the complications of excess weight (CEW) clinic in Southwest London.
Methods
We collected IMD decile data for 49 CYP with severe obesity (BMI SDS > 3.33 or obesity-related co-morbidities). We collected data on 7 Domains of Deprivation and the EFDI rating. We looked at the indices of deprivation across the hospital catchment area.
Results
64% of CYP live in the lowest 5 IMD deciles, with 14% in the lowest 2 deciles, the median IMD decile was 4. 37% of areas in the hospital catchment are ranked in the lowest 5 IMD deciles. 72% of CYP live in the most 5 deprived deciles for income, 22% live in the 2 most deprived deciles. 60% of CYP live in the 5 most deprived deciles for employment. 76% of CYP live in the 5 most deprived deciles for Income Deprivation affecting children index (IDACI), with 22% of CYP living in the 2 most deprived deciles. 48% of areas in the hospital catchment are ranked in the lowest 5 deciles for IDACI. Only 4% of CYP live in the 5 worst deciles for EFDI.
Conclusion
The majority of CYP in our CEW clinic live in the 5 most deprived deciles for IMD, income, employment and IDACI. Most areas in the hospital catchment are ranked in the highest 5 deciles for IMD, income, employment and IDACI. Most CYP live in areas with good access to groceries based on EFDI deciles which reflects the hospital catchment area. It is important to recognise how socio-economic inequalities impact the health needs of these CYP and tailor interventions appropriately. Further studies are needed to understand the drivers of socioeconomic inequalities and how to address them.

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Body composition, complications, and quality of life outcomes from a tier-3 paediatric weight management service

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Background
Children and young people (CYP) living with obesity are at increased risk of developing various physical and mental health comorbidities. Multidisciplinary (MDT) approach for the early detection and management of comorbidities is important. We report the outcomes of the first 100 patients enrolled in the tier-3 MDT Complications from Excess Weight (CEW) service.
Methods
100 new CYP (F=53) enrolled in the CEW service from March 2022-February 2023 were included. Baseline and the follow up data including body composition (TANITA: RD-545-SV device) and fasting metabolic profile data were analysed. Quality of life (QoL) was assessed at baseline and at follow up visits using PedsQL-4.0 questionnaires.
Results
CYP with a mean age at enrolment of 14.11 years (range 3.33-17.95 years) were followed up for a mean duration of 18.9 months (range 3-27 months). At enrolment, mean BMI-SDS was +3.68 SDS (±0.64 SD) and the mean body fat% was 51.37% (±8.42 SD). Dyslipidaemia (43%) was the most common complication. Hypertension (17%), idiopathic intracranial hypertension (8%), type 2 diabetes mellitus (8%), pre-diabetes (4%) and obstructive sleep apnoea (3%) were some of the other complications. The other comorbidities included autistic spectrum disorder (37%), ADHD (9%), learning difficulties (9%), anxiety (34%) and depression (12%). 53% of the adolescent females had menstrual concerns (oligomenorrhea/amenorrhea/menorrhagia). BMI stability was achieved in most patients and the mean BMI SDS during follow up was +3.63 SDS (± 0.66 SD) and 10.3% of the CYP were able to achieve >5% weight loss. The mean

body fat% reduced to 48% (±8.03 SD) [$P = 0.008$]. All CYP received lifestyle intervention and 59% were also on medical therapy. Parent reported total QoL scores improved from 47.35/100 to 56.04/100 ($P = 0.033$).
Conclusions
There is a high prevalence of comorbidities in CYP with severe obesity. BMI stabilised following MDT input and positive changes in body composition were observed. A multidisciplinary approach could help improve the health outcomes in the complex group of CYP with excessive weight.

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Retrospective review of sleep disordered breathing in children with prader-willi syndrome

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Aim
Longitudinal study of the prevalence of sleep-disordered breathing in children with Prader-Will Syndrome (PWS) on Growth hormone (GH) therapy.
Background
Growth Hormone (GH) therapy is routinely used in the management of children with Prader-Willi Syndrome (PWS) to improve growth and body composition. However, sleep disordered breathing (SDB) may be a consequence of GH use. The aim of this study was to determine the prevalence of SDB in children with PWS.
Methods
A retrospective study was undertaken of children with PWS aged 0–18 years who had sleep studies between September 2011 – May 2024. Data was collated on patient demographics, IGF-1 levels, GH doses, Non-Invasive Ventilation (NIV), and previous tonsillectomy and adenectomy (T&A) surgery.
Results
A total of 166 sleep studies (full polysomnography (CRSS)/overnight oxygen saturations/transcutaneous CO2 monitoring) were reviewed, for 53 children with PWS (26 males (49%)). The median age at the time of study was 3.9 (range 0.0-18.8) years. Overall, 48 (91%) of patients were on GH at time of study and 8 (15%) had previous/current NIV therapy. Univariate analysis showed BMI SDS to be significantly associated with all sleep study parameters with the exception of mean SpO2 (mixed + obstructive + hypopnoea (M/O/H) Apnoea Hypopnea Index (AHI)/hr $R^2=0.1$, $P = 0.0002$; central AHI $R^2=0.03$, $P = 0.03$; total AHI $R^2=0.04$, $P = 0.02$, mean CO2kpa $R^2=0.1$, $P = 0.0001$). Absolute IGF-1 was significantly associated with central AHI ($R^2=0.05$, $P = 0.01$). Multivariate regression analysis showed an association between total AHI with central AHI and (M/O/H) AHI/hr ($P < 0.0001$), and GH use with IGF-1 ($P = 0.0025$). Patient sex correlated with mean CO2kpa ($P < 0.0001$).
Conclusions
SDB may be a consequence of GH therapy in children with PWS. BMI and IGF-1 are particularly associated with central AHI and other sleep parameters. Current guidance for monitoring of SDB in PWS is not clear and regular sleep screening is therefore recommended.

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Pituitary and Growth

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Pituitary stalk interruption syndrome (PSIS) in a newborn with PROP1 mutation

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Pituitary stalk interruption syndrome presents with a combination of a thin or disrupted pituitary stalk, underdeveloped or absent anterior pituitary, and a missing or ectopic posterior pituitary (EPP) as observed on magnetic resonance imaging (MRI). This condition, a congenital pituitary anomaly, lacks a precise prevalence estimate. In certain instances, the anomaly manifests solely as EPP or pituitary stalk interruption. We report a 5-day-old newborn was admitted due to poor feeding, lethargy, and hypoglycemic seizure. Upon examination, he was found to have undescended testes on one side with a micropenis (SPL 0.8 cm). Laboratory investigations revealed low cortisol levels at 13.4nmol/l (normal range: 82-579nmol/l) alongside decreased growth hormone levels (0.94ng/ml) during hypoglycemia. Additionally, on day 10 of life, serum LH was 0.100IU/l (normal range: 0.3-4.9IU/l), testosterone was 0.00086nmol/l (normal range:2.6-13.8nmol/l), Free T4 was 7.81 pmol/l(normal range: 11.6-29.6 pmol/l), TSH was 5.24U/l (normal range: 0.58-5.57U/l), and Prolactin was significantly elevated at 4293.6microU/l (normal range:less than 212microU/l). Given the markedly high prolactin levels, the possibility of Pituitary stalk interruption syndrome was considered, which was subsequently confirmed by MRI imaging. Clinical exome sequencing was done which revealed PROP 1 gene mutation. Treatment commenced with hydrocortisone replacement initially, followed by thyroid and testosterone replacement. Proposed mechanisms of PSIS encompass mutations in genes implicated in anterior pituitary development, including PIT1, PROP1, LHX3/lHX4, PROKR2, OTX2, TGIF, HESX1, ROBO1, and GPR161. In our instance, genetic assessment revealed a defect in the PROP1 gene. Given the relatively rare occurrence of pituitary stalk interruption syndrome, it is advisable to include magnetic resonance imaging (MRI) of the pituitary when evaluating especially in a newborn with suspected pituitary deficiency to ensure timely diagnosis and treatment. This case report underscores the importance of recognising PROP1 mutations as a potential aetiology for pituitary stalk interruption syndrome, particularly in cases with atypical presentations. Increased awareness of such genetic variations can lead to early diagnosis and appropriate management, thereby improving patient outcomes and guiding genetic counselling for affected families.

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P61

Pubertal development and bone growth following discontinuation of testosterone therapy for management of delayed puberty in glucocorticoid treated young adults with duchenne muscular dystrophy

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Background
A recent study suggests that growth continues into the 20s in young men with Duchenne Muscular Dystrophy (DMD) following discontinuation of testosterone. There remains limited information on height and pubertal development in DMD following discontinuation of testosterone.
Aims
The aim of this retrospective study is to evaluate puberty and growth following discontinuation of testosteronein DMD.
Methods
A single observer (RS) measured the 19 tubular bones of the hand on radiographs performed for bone age assessment using the digital ruler. For each individual, mean for the 19 bones was calculated, referred to as the composite bone length. Descriptive data are expressed as median (range).
Results
Ten males had received testosterone for >12 months and had discontinued treatment. Two out of 10 reinitiated testosterone within 6 months of discontinuation due to identification of adult hypogonadism. In the remaining eight, hand radiographs were available prior to initiation of testosterone, whilst receiving and following discontinuation of treatment. All were on daily glucocorticoid. All eight were prepubertal (50% non-ambulant) prior to initiation of testosterone at median of 14.6 years (13.8, 15.3). At median of 16.7 years (15.8, 17.9) whilst still receiving testosterone (63% non-ambulant), 5/8 were at genital stage 3 and 3/8 were at genital stage 4 or 5. At median 18.9 years (18.3, 23.6) following discontinuation of testosterone for approximately 12 months (88% non-ambulant), all were at genital stage 4 or 5. A further two in these 8, had evidence of adult hypogonadism with follow-up, which is a total of 4 out of the ten in our cohort. Median composite bone length was 27.6mm (23.7, 31.9) prior to initiation of testosterone and was significantly lower than median composite bone length of 28.4 mm (23.8, 32.6) at last visit whilst on testosterone [$P < 0.01$] and median composite bone length of 28.2 mm (24.9, 33.0) following discontinuation [$P < 0.001$]. There was no significant difference between median composite bone length at last visit whilst on testosterone and following discontinuation.
Conclusion
Whilst testosterone therapy lead to satisfactory external virilization in DMD, adult hypogonadism was noted in 40% of young men in our cohort. Bone lengths

on hand radiographs increased with testosterone therapy but showed no further increase following discontinuation of therapy.

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Spectrum of endocrinopathies in children with ectopic posterior pituitary correlates with severity of associated hypothalamo-pituitary abnormalities on imaging: decade long experience from two tertiary centres

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Introduction
Ectopic posterior pituitary (EPP) is a neuroimaging diagnosis frequently identified together with other hypothalamo-pituitary (H-P) abnormalities [hypoplastic anterior pituitary and thin interrupted stalk -Pituitary Stalk Interruption Syndrome (PSIS)] and associated with variable endocrine phenotypes evolving over time. We aim to describe the spectrum of hormonal deficiencies and neuroimaging abnormalities in a large cohort of children with EPP.
Method
Longitudinal data collection at two tertiary centers (1993-2023). 171 patients with EPP were identified (99 M, 58%). Three cohorts based on MRI 1) C1: PSIS [n = 121, 70.8%] 2) C2: PSIS-variant (PSIS-V; 2/3 criteria met) [n = 37, 21.6%] 3) C3: Isolated EPP (i-EPP) [n = 13, 7.6 %]. Long term growth data were also collected.
Results

Conclusion
In EPP, presence of additional H-P abnormalities is associated with increased number and earlier onset endocrinopathies. Patients with complete PSIS triad have severe phenotypes.

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P63

Accuracy of arginine testing as first test for diagnosing growth hormone deficiency in children

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Introduction
Growth hormone stimulation test (GST) is pivotal in diagnosing Growth Hormone Deficiency (GHD). Two abnormal GSTs are usually required to diagnose GHD (NICE and BSPED guidelines). Our centre moved from Insulin Tolerance Test (ITT) as a first-line GST to Arginine stimulation test (AGT) considering the significant risks associated with ITT and the need for close medical supervision for a longer period.
Aim
To assess the specificity of AGT compared to ITT as a first-line GST in diagnosing GHD.
Methodology
Retrospective case notes review of 118 children who underwent AGT or ITT as the first GST (2019-2022) in diagnosing GHD. End of growth GST and patients with other pituitary hormone deficiencies or structural pituitary abnormalities and brain tumours were excluded. Peak GH level $>$ 6.7 µg/l was considered normal response.
Results
88 children (males-63, females-25) with a mean age of 9.26 years (range 2.94-16.71) and a mean baseline height SDS of -2.7 (-4.7-+0.6) had AGT as the first GST. 22 received sex steroid priming. 24 patients had a peak GH level $<$6.7µg/l. 16 had a second test (ITT or glucagon) to confirm GHD of which five were non-GH deficient (false positive 5.6%). Patients with false positives had a mean peak GH of 3.74µg/l (range 2.1-6.2) and all had normal IGF-1. 30 children with a mean age of 11.04 years (range 6.4-16.4) and a mean baseline height SD of -2.5 (-4.1-1) had ITT as the first GST. 14 were GH deficient on ITT of which 9 were confirmed as non-GH deficient with AGT (false positive 30%). The mean peak GH on false positives were 4.39µg/l (range 0.9-6) and 89%(n = 8) had normal IGF-1. In this cohort, the specificity of AGT is 92.75% (84.13%- 96.87%) with a positive predictive value (PPV) of 79.17% (95% CI- 59.53-90.76%) in contrast to specificity of 64% (95% CI 44.52-79.75) and PPV of 35.71% (95% CI 16.34-61.24) in ITT. AGT has a superior specificity in diagnosing GST in children compared to ITT(P = 0.0138)
Conclusion
We suggest AGT is a more specific test to diagnose GHD compared to ITT and is also less expensive in terms of resources.

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Clinical assessment for and response to growth hormone in a tertiary paediatric endocrine service: social and gender factors

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Table 1. Spectrum of endocrinopathies.

	Total	C1	C2	C3	P
Age at presentation (years), *median (1st; 3rd quartile)*		1.9 (0.3; 5.1)	3.1 (0.4; 7.1)	7.4 (3.8; 9.9)	0.003
Neonatal Hypoglycaemia	57	49/109 (44.9 %)	7/30 (23.3 %)	1/9 (11.1 %)	0.02
Short stature	79	53 (43.8 %)	16 (43.2 %)	10 (76.9 %)	0.03
Follow-Up length (y), *median (1st; 3rd quartile)*		9.6 (5;14.2)[n = 112]	7.2 (2.7;10.8)[n = 35]	3.4 (1.1; 7.8)[n = 24]	0.003
GHD					
Age of presentation (y), Median (1st – 3rd quartile)	2.83(1.44; 5.9) [n = 146]	2.31(1.36; 4.7) [n = 113]	3.56(1.82; 6.8) [n = 26]	8.5(7.38; 9.66) [n = 7]	0.008
Reversal at Transition: Yes	13/54(24.1 %)	6/36(16.7 %)	5/12(41.7 %)	2/3(66.7 %)	0.048
No		30/36(83.3 %)	7/12(58.3 %)	1/3(58.3 %)	
TSHD					
Age of presentation (y) Median (1st – 3rd quartile)	1.12(0.12; 5.13)[n = 99]	1.12(0.14; 4.5)[n = 82]	0.45(0.08; 6.36)[n = 15]	11.65 (10.7; 12.6) [n = 2]	0.13
ACTHD					
Age of presentation (y), Median (1st – 3rd quartile)	1.48(0.12; 6.36) [n = 94]	1.07 (0.12; 6.09) [n = 81]	2.23 (0.13; 6.36) [n = 11]	14.37 (13.99; 14.74) [n = 2]	0.07
ACTH DEFICIENCY:					
Complete	87 (91.6 %)	78 (95.1 %)	8 (72.7 %)	1 (50.0 %)	0.017
Partial	8 (8.4 %)	4 (4.9 %)	3 (27.3 %)	1 (50.0 %)	
Subjects in Pubertal age group HH: yes	45	41 (55.4 %)	4 (22.2 %)	0 (0.0%)	$<$ 0.0001

Introduction
Delayed detection of short stature can lead to missed opportunities to optimise adult height and failure to diagnose important underlying pathologies. We speculated that children from more deprived communities may be less likely to be diagnosed with growth hormone (GH) deficiency, and that growth outcomes may be poorer in children treated with GH from deprived communities, in light of outcome data from other chronic childhood conditions. We compared the demographics of patients receiving GH for isolated GHD (IGHD) and small-for-gestational-age (SGA) without catch-up growth with the background population and described demographic factors affecting outcomes after one year of treatment.
Methods
Retrospective cohort study of children treated for ≥ 1 year. Exclusion criteria: (1) additional diagnoses associated with short stature; (2) could not be measured accurately; (3) medications that may affect growth. Routine clinical data were collected for 86 IGHD patients and 46 SGA patients.
Results
Data are reported for 81 IGHD and 42 SGA patients. Both cohorts showed a male predominance: 76.5% ($n = 62$) in IGHD and 76.2%($n = 32$) in SGA. Most patients were White British (IGHD: 90.1%, SGA: 87.2%), consistent with the background population (89.4%). The median Index-of-Multiple-Deprivation (IMD) decile was 5.0 (IQR 7.0) for IGDH and 2.0 (IQR 6.0) for SGA (Table 1).

Table 1: IMD Decile compared to background population

Decile	2019 Census, %	IGHD, %($n = 81$)	SGA, %($n = 42$)
1-to-3	43.4	45.7(37)	52.4(22)
4-to-7	29.6	19.8(16)	26.2(11)
8-to-10	27.0	34.5(28)	21.4(9)

Factors that may represent differences in accessibility to GH treatment (average age reviewed, height and BMI SDS prior to GH, age commencing GH) did not differ between boys and girls, or by IMD. A significant positive correlation existed between IMD decile and height SDS gain after one year in the SGA cohort (Spearman's rho 0.442, $P = 0.003$), but not in the IGHD cohort.
Conclusion
Girls are likely under-referred, investigated and treated for short stature. Once diagnosed, treatment outcomes for GH are similar to boys. In this small cohort, there was no evidence of bias in favour of diagnosis of IGHD or treatment of SGA by IMD; however, deprivation is associated with poorer outcomes in SGA patients.

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P65

A single-centre retrospective study looking at copeptin levels in children and young people who underwent water deprivation test

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Introduction
Polyuria polydipsia is a common paediatric presentation. The water deprivation test (WDT) is the gold standard to differentiate arginine vasopressin (AVP) deficiency (central diabetes insipidus, CDI), from habitual drinking. However, it burdens patients, families, and clinical staff significantly. Copeptin, which is co-secreted in equimolar amounts with AVP, can be easily measured by a simple blood test. There have been advances in using copeptin in diagnosing AVP deficiency (CDI) in adults, but data in children remain limited.
Methods
We performed a single-centre, retrospective study of children and young people (CYP) who underwent WDT between December 2019 and February 2024. Copeptin levels were obtained at baseline and every 2 to 3 hours during WDTs.
Results
17 patients were included (11 males and 6 females). The median age was 7 years (age range between 2 to 15 years). In >95% of these patients, the primary reason for referral was a history of polyuria and polydipsia. Three patients were diagnosed with AVP deficiency based on their plasma and urine osmolality values. It was excluded in 13 patients, while the results were inconclusive in 1 patient. Copeptin levels in those diagnosed with AVP deficiency were <2.0 pmol/l at baseline and with an average maximum of 2.5 pmol/l by the end of the test. CYP with normal response to WDT had an average copeptin level of 5.3 pmol/l at the baseline and an average maximum of 10 pmol/l at the end of the test.
Conclusions
Basal copeptin levels ≥ 5 pmol/l could be used to exclude AVP deficiency (CDI) in CYP, whilst basal copeptin <2 pmol/l are highly suggestive of AVP deficiency (CDI). We suggest WDT can be safely avoided in these instances. Copeptin levels between 2-5 pmol/l would necessitate a WDT to rule out AVP deficiency (CDI). We suggest the above cutoffs would help reduce the burden of WDTs. However, a large, prospective multi-centre study is needed to confirm our observation and cutoff values.

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Effect of recombinant growth hormone therapy in chromosome 15q26.3 deletion encompassing the IGF1R

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Background
Insulin-like growth factor-1 (IGF-1) acts via the type 1 IGF receptor (IGF1R), located on chromosome 15q26.3, and plays a crucial role in normal intrauterine and postnatal growth. Heterozygous 15q26.3 deletions can cause intrauterine and postnatal growth retardation, microcephaly, and developmental delay. Very few cases have been reported in the literature with a variable response to recombinant human growth hormone (rhGH) treatment. We report the effect of rhGH treatment in a child with 15q26.3 deletion encompassing the *IGF1R*.
Case
The patient was delivered at 36 weeks of gestation and was small for gestational age with a birth weight of 1.95 kg (<3rd percentile). Postnatally, the patient exhibited mild hypotonia and required feeding support. He also has microcephaly, dysmorphic features, and motor developmental delay. Chromosomal microarray analysis revealed a 1.89 Mb interstitial deletion of the long arm of chromosome 15 at band 15q26.3, encompassing the *IGF1R* gene. At 30 months, the patient's length was at the 0.4th percentile, while the mid-parental height was at the 9th percentile. Mother was also on the shorter side and subsequent genetic analysis indicated the deletion was maternally inherited. The patient's IGF1 level was 6 nmol/l, with IGF-BP3 at 2.7 mg/dL. Initially, rhGH was initiated at 1 mg/m^2/day. However, the height velocity in the first year was 3.1 cm/year despite good compliance and an IGF1 level of 31.6 nmol/l. Subsequently, the dose was increased to 1.2 mg/m^2/day, resulting in satisfactory growth. At four years of age, the patient's growth velocity increased to 10 cm/year, placing his height at the 9th percentile. Following commencement of rhGH, a mean height of 0.57 SDS improved over 15 months of time.
Conclusion
This case demonstrates a good response to rhGH therapy, suggesting that GH resistance caused by heterozygous *IGFIR* deletions can be potentially overcome by GH therapy at higher dose. The long-term treatment improved height SDS, the final adult height will need to be monitored. An individual trial of GH therapy may be appropriate in these patients.

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To evaluate how a dose of 0.10units/kg vs 0.15units/kg of insulin affects the success rate of the ITT in pubertal children

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Background
The insulin tolerance test (ITT) is regarded as the gold standard in growth hormone stimulation testing. However, it is known that children and adolescents in puberty often exhibit physiological insulin resistance, and therefore theoretically require more insulin to induce the level of hypoglycaemia required in the ITT. Based on this, in 2021 we changed from using 0.10units/kg to 0.15units/kg insulin.
Aim
To evaluate how a dose of 0.10units/kg (Group 1) vs 0.15units/kg of insulin (Group 2) affects the success rate of the ITT in pubertal children considering growth hormone (GH) and glucose responses, and to use the results to inform future dosing in our ITT protocol.
Objectives
1. To compare the nadir blood glucose (NBG) levels between patients who received a dose of 0.10units/kg vs 0.15units/kg insulin.
2. To evaluate growth hormone responses in the two groups.

Method
A retrospective service evaluation (SE) was conducted of the ITTs done over four years (2019-2023 inclusive) within a tertiary paediatric endocrine unit. 80 patients were selected via stratified probability sampling. Inclusion criteria were pubertal patients who had undergone an ITT at a dose of 0.10units/kg or 0.15units/kg of insulin. Data collected included the insulin dose administered, glucose baseline and nadir and the timing to assess whether the ITT had been successful, as well as peak GH levels. Statistical analysis was conducted using the paired T-test.
Results
There were 40 patients selected in each group. Group1: 9.74-18.88 years; (mean 14.79+/-2.5 years); and Group 2: 10.67-18.99 years (mean 15+/-2.37 years). Results showed that the 0.10units/kg insulin dose produced comparable results to 0.15units/kg insulin for both NBG (mean= 2 mmols vs 1.74 mmols; pValue= 0.920) and GH (mean=8.38micrograms/l vs 10.79; pValue=0.454). Relatively few patients required on-demand glucose rescue and there were no adverse events.
Conclusion
Both doses of 0.10units/kg insulin and 0.15units/kg insulin provided appropriate hypoglycaemia for a successful ITT. Given the potential risk of severe hypoglycaemia in ITT it is reassuring that a smaller dose of insulin can be used in pubertal patients to elicit sufficient hypoglycemia to support an interpretable ITT. This SE also supports the overall safety of the ITT.

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explore variations in GC doses between centres, controlling for age and sex, we used a mixed effects random intercept model
Results
Most patients (98%) were treated with hydrocortisone three or four times daily, prednisolone being used in 2 patients. The mean daily GC dose was 12.07 (±3.8 SD) HC-equivalent mg/m^2/day, with broad variations between centres ranging from 7.7 (±1.2) to 19.1 (±7.7) mg/m^2/day. Modelling showed dose in centres decreased with age by 0.18 mg/m^2/day per year and varied with sex. This equated to 10-year-old boys on an average dose of 12.4 mg/m^2/day ranging between 10.3-19.3 mg/m^2/day dependent upon centre. In girls, doses were 1.1 mg/m^2/day lower than boys. Fludrocortisone was used in 76% of cases, total daily doses ranging between 50 and 300 mμ/day, with significant variation between centres (R^2= 0.44, $P < 0.01$). The most used biomarkers for monitoring GC replacement were 17-hydroxyprogesterone and androstenedione, recorded in 32% and 25% visits, respectively. Generalised additive model fit showed height SDS fluctuated with age, starting from -0.6 in infancy increasing to 0.7 at 10 years and then decreasing to -1.0 at 17.5 years.
Conclusion
Our findings indicate marked differences between UK centres in the relative doses and times of administration of GC replacement in children with CAH. Moreover, there was variation in the growth trajectory in patients with CAH compared to WHO standards which warrants further investigation. Improved data collection and robust analysis of different treatment approaches at a national level will better inform optimal management strategies in CAH.

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Adrenal 2

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Analysis of real-world data on the care provision of children with congenital adrenal hyperplasia (CAH) in the united kingdom

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Background
Following a national survey indicating variations across the United Kingdom in the management of children and young persons with CAH, we aimed to explore the current practice of CAH clinical management.
Methods
As part of an ongoing project, we collected data on 96 UK patients under 18 with 21-hydroxylase deficiency (48 females), 649 clinic visits from 15 centres, recorded in the I-CAH registry since 01/01/2016. We analysed information related to medication, biochemical markers and height standard deviation scores (SDS) for age and sex (WHO reference) in *RStudio*. Glucocorticoid (GC) doses were expressed as hydrocortisone (HC) equivalent per body surface area. To

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An audit of the treatment needs and outcomes against patient population demographics of children with congenital adrenal hyperplasia in greater manchester

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Introduction
Congenital Adrenal Hyperplasia (CAH) is an autosomal recessive condition that causes reduced cortisol, reduced aldosterone, and increased testosterone production. Hydrocortisone is used to manage CAH in children. Current literature suggests children with CAH often have abnormal growth patterns.
Aims and Methods
Data from 103 children was extracted from our centre. We investigated the effects of age, sex, ethnicity, Index of Multiple Deprivation (IMD), and type of CAH on hydrocortisone dosing using regression modelling. Individual height velocity (HV) standard deviation scores (SDS) and BMI SDS were calculated for age groups 5-8.5yrs, 8.5-12, and post-12yrs to create cohort means. Pearson's Correlation was performed to assess the effects of hydrocortisone dosing on HV and BMI. Bone age X-rays and 17 OHP results were recorded.
Results
Hydrocortisone dose per surface area increased with age ($P = 0.044$) and type of CAH ($P < 0.001$). There was no significant effect of sex, ethnicity, or IMD on hydrocortisone dose. The average hydrocortisone dose for 5-8.5yrs = 11.6 mg/m^2, 8.5-12yrs = 11.7 mg/m^2, and post-12yrs = 13 mg/m^2. Average BMI SDS for 5-8.5yrs = 1.12 (Range: -1.48- 3.69), 8.5-12yrs = 1.30 (Range: -0.73-3.20), and post-12yrs = 1.20 (Range: -0.28- 3.07). Pearson's Correlation showed no significant association between hydrocortisone dose and HV or BMI. Average HV SDS demonstrated above-normal linear growth in the 5-8.5yrs cohort (HV SDS= +1.28), normal HV in the 8.5-12yrs cohort (HV SDS= -0.13), and significantly reduced HV in the post-12yrs cohort (HV SDS= -3.61) in contrast to normal growth patterns. 17-hydroxyprogesterone (17 OHP) levels were elevated in 79% of 5-year-olds and 92% of 12-year-olds. Of the 28 patients with bone age X-rays, 22 (71%) had an advanced bone age (mean bone age advancement was +1.7yrs).
Conclusion
Monitoring HV to identify children deviating from the population mean is important in CAH. Accelerated HV at 5-8.5yrs is likely driven by suboptimal disease control and may lead to reduced HV in older patients, and advancement of bone age. Hydrocortisone doses ~13 mg/m^2 are not associated with significant excess weight. Hence, higher hydrocortisone doses may be required to manage accelerating HV in younger children to prevent the significantly reduced HV post-12yrs.

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A quality improvement project to improve the management of paediatric patients at risk of adrenal crisis in a district general hospital

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Introduction
Adrenal insufficiency can arise from a variety of conditions that disrupt endogenous steroid synthesis [(1)]. Those with adrenal insufficiency are at risk of developing adrenal crisis, which is often precipitated by acute illness. It can be underdiagnosed and undermanaged in the paediatric population[(1)]. This quality improvement project (QIP) aims to review the confidence of staff and parents/carers, in a district general hospital, in recognising increased risk of adrenal crisis and ensuring its prompt and effective management.
Methods
Two questionnaires were distributed to two distinct groups: carers of paediatric patients regularly monitored for adrenal insufficiency, and paediatricians and emergency department staff who assess acutely admitted patients. The questionnaires included a mix of closed and open-ended questions designed to evaluate confidence in identifying individuals at risk of adrenal crisis, making appropriate adjustments to steroid medications, and managing adrenal crisis effectively.
Results
Out of the 10 questionnaires sent to parents/carers, 7 were completed and returned. All respondents had three in-date emergency hydrocortisone kits stored in appropriate locations. However, only 43% felt very confident in administering emergency intramuscular hydrocortisone, while 28% indicated a need for more frequent reminders on how to administer it. Among the 16 clinicians from the paediatric emergency department and the main paediatric department who responded, none felt very confident in identifying and managing patients at risk of adrenal crisis. Additionally, 15% of the clinicians were unaware of any existing guidelines to aid in the management of adrenal crisis.
Conclusion
The questionnaires revealed two key areas for potential improvement in managing paediatric patients at risk of adrenal crisis: (1) empowering clinicians to feel confident in managing these patients, and (2) providing regular education to parents/carers on administering emergency medications. Based on these findings, we have developed a QIP aimed at addressing both areas.
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Pseudohyperkalaemia in congenital adrenal hyperplasia – a challenge for clinicians

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Background
Hyperkalaemia, defined as potassium levels above 5.5 mmol/l, is a potentially life-threatening condition commonly seen in congenital adrenal hyperplasia (CAH). Pseudohyperkalaemia is a false elevation of potassium observed *in vitro*, caused by potassium moving out of cells (erythrocytes, leukocytes, or platelets) during or after blood sampling. This is often linked to high platelet counts (> 450×10^9/l), due to potassium release from activated platelets during clotting. Confirmation involves elevated serum potassium with normal plasma potassium levels. We report two cases of infants with CAH diagnosed with pseudohyperkalaemia due to thrombocytosis.
Case 1
A term female neonate diagnosed with salt-wasting CAH due to 21-hydroxylase deficiency (compound heterozygosity for two pathogenic CYP21A2 variants) began hormone replacement therapy and sodium supplements. Persistent hyperkalaemia, peaking at 6.9 mmol/l, necessitated increased medication doses and a prolonged hospital stay. Despite maximum doses of hydrocortisone (20 mg/m^2/day), fludrocortisone (150 mg/day), and sodium chloride supplements (11 mmol/kg/day), hyperkalaemia persisted. Suspecting pseudohyperkalaemia due to an elevated platelet count (671× 10^9/l), this was confirmed with serum potassium at 6.5 mmol/l and normal plasma potassium at 5.1 mmol/l. She was stabilized on lower doses of sodium supplements (12 mmol/kg/day) and fludrocortisone (100 mg/day) based on plasma electrolyte levels.
Case 2
An 18-month-old girl with classic salt-wasting CAH due to 21-hydroxylase deficiency (homozygous for a pathogenic CYP21A2 deletion) had elevated potassium levels (6.4 mmol/l) and thrombocytosis (663 × 10^9/l) during a routine visit. Clinically well, her CAH was controlled with hydrocortisone (16.3 mg/m^2/day), fludrocortisone (175 mg/day), and sodium supplements (4.3 mmol/kg/day). Repeat serum potassium testing showed elevated levels (5.8 mmol/l), while plasma potassium was normal (5 mmol/l), confirming pseudohyperkalaemia. She remained on the same treatment. Haematology attributed her thrombocytosis to frequent viral infections and iron deficiency anaemia.
Conclusion
Pseudohyperkalaemia should be considered in patients with CAH and thrombocytosis. To distinguish it from true hyperkalaemia, both plasma and serum potassium levels should be checked. Accurate diagnosis is crucial to avoid unnecessary interventions and hormonal dose adjustments, preventing adverse outcomes and prolonged hospital stays.
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A challenging case of a teenager with metastatic neuroendorine tumor

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Background
Neuroendocrine tumours (NETs) are extremely rare in children and adolescents (incidence approximately 2.8 cases per million). Around 10-20% of paediatric NETs present with metastatic disease at diagnosis.
Aim
We present a case of metastatic poorly differentiated NET in a teenager with a suspected right lung primary as a rare cause of ACTH-dependent ectopic Cushing's syndrome (CS).
Case presentation
A 15-year-old self-identified as male presented with non-specific symptoms of malaise and anxiety followed by generalised lymphadenopathy and rapid weight gain. On examination, he had a palpable abdominal mass, hypertension (150/101mmHg) and hyperglycaemia.
Investigations
Revealed elevated ACTH (143 ng/l), serum cortisol level (1516nmol/), urine cortisol (927nmol), hypokalaemia and hypophosphatemia. Whole-body imaging revealed a metastatic tumour (right adrenal, liver, pulmonary and pleura, bones and pelvis). Histopathology showed a high-grade, poorly differentiated carcinoma with a high KI-67 of 50%.
Management
A multidisciplinary team approach was engaged. Hypertension and steroid-induced hyperglycaemia were managed as per local guidelines. Given the neoplasm's metastatic and poorly differentiated nature, he was started on carboplatin and etoposide chemotherapy and on Metyrapone, a potent inhibitor of the enzyme 11β-hydroxylase, which is crucial in cortisol biosynthesis. Metyrapone doses were titrated based on fortnightly and later monthly 24-hour cortisol profiles, aiming for cortisol levels of 300- 500 nmol/l. Maintenance hydrocortisone was added 48- hours after commencing Metyrapone to prevent adrenal crisis. Ten days after commencing Metyrapone, antihypertensives and insulin were discontinued. Denosumab was used for the metastatic bone lesions, and he was started on thromboprophylaxis, given the hypercoagulable nature of the disease. Ketoconazole was added 4 months later, however it was not well tolerated, so discontinued. Clinical symptoms improved, but there was no significant impact on tumour burden.
Discussion
Ectopic ACTH secretion is a very rare cause of CS in children and teenagers. Non-specific early symptoms make early diagnosis difficult. The mainstay of treatment is surgery in non-metastasised disease. Somatostatin analogues and peptide-related radionucleotide therapy (PRRT) are first-line medical therapy in well-differentiated tumours, but in our case, due to the poorly differentiated nature of the tumour, Metyrapone and chemotherapy were the preferred treatment options. The prognosis is guarded.
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A case report of a secreting benign adrenal tumour in a patient with congenital adrenal hyperplasia

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Congenital adrenal hyperplasia (CAH) is a group of inherited disorders, characterised by impaired cortisol synthesis. 21-hydroxylase deficiency (21OHD) accounts for >95% of CAH cases. Lack of negative feedback on the hypothalamic–pituitary–adrenal (HPA) axis results in increased adrenal androgen production due to elevated steroid precursors, such as 17-hydroxyprogesterone, that are shifted towards androgen synthesis. Long term sequelae of poor CAH control include development of testicular adrenal rest tumours (TART) and adrenocortical tumours, with high ACTH concentrations likely contributing to their development. Up to one third of adults with 21OHD may harbour an adrenal tumour. Although there is no evidence that adrenocortical carcinoma (ACC) is more prevalent in 21OHD, urine steroid profiling (USP) has been shown to be a powerful tool to discriminate ACC from benign adrenocortical adenoma (ACA). Here we present the case of an 8 year old boy with salt wasting 21OHD, originally presenting in the neonatal period. There had been long standing challenges with management of his condition and he had known bilateral TART. On ultrasound and subsequent MRI he was also found to have a non-specific left adrenal nodule. To investigate this further, USP was performed which showed high levels of 17-hydroxyprogesterone and 21-deoxycortisol metabolites, consistent with poorly controlled 21OHD, but unexpectedly showed highly elevated 11-oxo-pregnanediol, a corticosterone metabolite. This metabolite is not a feature of the 21OHD metabolome, but has previously been seen in association with ACC. AFP, plasma metanephrines and total hCG were normal. To determine whether the 11-oxo-pregnanediol production was under HPA axis control, a long low dose dexamethasone test in conjunction with USP was performed. The 11-oxo-pregnanetriol suppressed in response to the dexamethasone, establishing that it was under HPA axis control and so ruling out autonomous production/ACC. Following excision of the tumour, histological features were compatible with an ACA. Subsequent USP showed barely detectable 11-oxo-pregnanediol, confirming the suspicion this was an adrenal tumour product. This case highlights that USP can be used alongside a long dexamethasone suppression test in 21OHD patients with adrenal tumours, to assess potential tumour metabolites, and post-resection can be used to assess recurrence or completeness of resection.

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Fluconazole induced 11β-hydroxylase inhibition

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Background
Patients receiving triazole antifungals can present with hypertension and hypokalaemia. These drugs are reported to cause variable inhibition of the steroidogenic enzymes 11β hydroxylase and 11β hydroxysteroid dehydrogenase type 2 (11βHSD2). The ensuing clinical picture is similar to congenital adrenal hyperplasia (CAH) due to 11β-hydroxylase deficiency or apparent mineralocorticoid excess (11βHSD2 deficiency), with posaconazole and itraconazole being most implicated. Another triazole antifungal, fluconazole, has only been associated with hypocortisolaemia to date.
Case
A 4 year-old boy presented with acute liver failure of indeterminant aetiology. Clinical deterioration was managed with intubation, Continuous Veno-Venous Hemofiltration, and 3 weeks of intravenous fluconazole for presumed fungal infection. Three days after commencing fluconazole, he developed hypoglycaemia (glucose 2.3 mmol/l) with low serum cortisol (95 nmol/l). He had suboptimal cortisol response to short synacthen tests (SST) (Table 1). He also developed hypokalaemia (nadir serum K 2.4 mmol/l), and labile blood pressure, whilst on fluconazole. The hypokalaemia was managed with multiple intravenous potassium corrections and spironolactone. A urine steroid profile (USP) following the failed SST was suggestive of 11β-hydroxylase deficiency CAH, with relative increases of 11-deoxycortisol and 11-deoxycorticosterone metabolites. CAH gene panel was normal. He underwent successful liver transplant with stress hydrocortisone cover and immunosuppressive methylprednisolone, followed by oral prednisolone 1 mg mane and hydrocortisone 2.5 mg nocte. Repeat SST and USP, performed 3 and 5 months respectively after ceasing fluconazole showed normalisation (table 1).
Table 1. Short Synacthen Tests

Fluconazole treatment	0min cortisol nmol/l	30min cortisol nmol/l	60min cortisol nmol/l	Omin ACTH ng/l
Day 5	127	245	Insufficient	
Day 8	141	261	380	9
3 months post-cessation	286	444	473	58

Normal peak cortisol >420nmol/L.
Conclusion
Normalisation of USP, hypokalaemia and cortisol response following cessation of fluconazole treatment suggests that the drug caused these abnormalities. Although the triazole antifungals posaconazole and itraconazole have been described to cause dose-dependent mineralocorticoid hypertension, this is the first documented case associated with fluconazole. As fluconazole is a widely used treatment for fungal infections, it is important to consider its possible impact on steroid synthesis and consider monitoring for off-target hypokalaemia, hypertension and hypocortisolaemia.

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Outcome of random cortisol measurement in infants <30 days old

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Background
Adrenal insufficiency is a life-threatening condition, which may present in the neonatal period with an array of symptoms, one of which includes conjugated hyperbilirubinaemia. The aim of this study was to review the cortisol tests performed across 2 tertiary neonatal centres and to determine how many were undertaken due to conjugated hyperbilirubinaemia and the outcomes of the babies they were performed on.
Methodology
All cortisol tests taken in infants under 30 days old at the time of testing in Glasgow from 01/01/2021 - 31/12/22 were reviewed. Data on gestational age, birth-weight, biochemistry, outcome of Short Synacthen Test (SST) (if applicable: normal cut-off ≥430nmol/l), prior use of steroids and overall outcome were gathered from hospital electronic networks. A random cortisol ≥250nmol/l was accepted as satisfactory.
Results
In total, 184 cortisol tests were undertaken on 97 neonates at a median (range) age of 3 days (1, 27), approximating 4 tests per month. The median gestational age for the infants was 37 (26, 42) weeks. The most common indications for testing were hypoglycaemia (51%) and conjugated hyperbilirubinaemia (18%). Random cortisol levels were <250 nmol/l in 50 (52%). Of these, 26 (50%) remained low on repeat testing. SST was undertaken in 22 (23%) infants and 5 (23%) children had abnormal results. Four of these neonates went onto regular oral hydrocortisone therapy, with 3 remaining on treatment at 18 months' follow up due to differing, conclusive diagnoses of adrenal insufficiency. One patient required sick day dosing hydrocortisone for 6 months only prior to a normal SST thereafter. Of the 17 babies with conjugated hyperbilirubinaemia, 7 (41%) went on to have an SST with 2 (28%) subsequently starting oral steroids. Only 1 (6%) of these children continues on steroids with a diagnosis of primary adrenal insufficiency. None of the infants who did not have a repeat cortisol or SST have developed adrenal insufficiency.
Conclusion
Low random cortisol levels are not uncommon in the immediate neonatal period, with adrenal insufficiency being confirmed in around 5% of infants tested. Guidance should be followed regarding investigation and management of these abnormal results, as inappropriate management could be potentially life-threatening.

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Bone 2

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The acceptability of preventative bisphosphonate therapy prior to fracture: perspectives of young people with duchenne muscular dystrophy, parents/carers and health professionals

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Background
Osteoporosis and vertebral fracture development are common in young people with Duchenne muscular dystrophy (DMD) and can lead to chronic back pain and reduced quality of life. The current standards of care recommend initiation of bisphosphonate treatment following identification of fractures. Given the extent of fractures in these young people, initiation of treatment prior to fractures seems logical. This study aimed to explore the opinions of young people with DMD, parents/carers and healthcare professionals on the acceptability of bisphosphonates prior to first fracture.
Methods
Young people with DMD (aged 7-18 years) could choose how to share their views including; activity booklets, semi-structured interviews and arts-based augmented interviews. Parents/carers were involved in semi-structured interviews and healthcare professionals participated in online focus groups. Data were analysed using a framework analysis approach.
Results
Fifty-one participants shared their views, including 4 young people (4 male, mean age 15.8 years, range 15-17 years), 20 parents/carers and 27 healthcare professionals. Three themes were identified representing a continuum of opinions towards the endorsement of preventative treatment: 1) Endorsement of preventative bisphosphonate treatments, 2) Uncertainty about preventative bisphosphonate treatments and 3) Reluctance to use bisphosphonate treatments preventatively. Generally, young people and parents were keen to be offered treatments that could protect their child's bone health and delay or prevent fractures. Professionals commented that preventative treatment 'made sense'. Young people, parents and professionals were uncertain whether treatments would benefit all young people with DMD (e.g. depending on clinical status). Parents and healthcare professionals felt that further evidence on the risks, benefits and efficacy of preventative bisphosphonates would address uncertainties about using this approach. Some parents and healthcare professionals expressed concerns about side effects and recommended a holistic approach to bone protection (e.g. managing nutrition, puberty and mobility).
Discussion
Findings highlight a continuum of opinions regarding provision of bisphosphonate treatment prior to fracture. Acceptance of preventative bisphosphonate treatment is a personal decision influenced by the individual circumstances of each family. However, there was a consistent call for further research into the risk, benefits and efficacy of using preventative bisphosphonates in this population to inform clinical practice.

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Parathyroidectomy in paediatric sporadic primary hyperparathyroidism

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Introduction
Sporadic primary hyperparathyroidism (sPHPT) is rare in children. There are few large cohorts characterising presentation, investigations and outcomes. Surgical practice is also changing; minimally invasive parathyroidectomy (MIP) and intraoperative parathyroid hormone (IOPTH) monitoring are being performed more frequently.
Method
Retrospective casenote review of children with sPHPT who had parathyroidectomy between 1977-2022 at a single tertiary endocrine centre.
Results
A total of 30 children had parathyroidectomy for sPHPT, aged 7 to 17 years; 17 (56%) female. Patients presented with (data available,$n = 26$): abdominal symptoms (14/26, 54%); bone pain, deformity or fracture (7/26, 27%); mood change or lethargy (5/26, 19%); renal stones or haematuria (5/26, 19%); polydipsia and polyuria (3/26, 12%). Incidental hypercalcaemia was reported in 3/26 (12%). Presenting corrected calcium was 3.12 +/- 0.47 mmol/l (mean +/- SD). Pre-surgical treatment included (data available,$n = 19$): hyperhydration (9/19, 47%); bisphosphonates (5/19, 26%); furosemide (2/19, 11%); cinacalcet (3/19, 16%); calcitonin (1/19, 5%). Data were available for parathyroid ultrasounds in 23/30 patients, for Technetium 99m Sestamibi scans in 18/30, and for both in 17/30. Ultrasound identified abnormal parathyroid in 21/23 (91%); Sestamibi was abnormal in 15/17 (89%); both were abnormal in 13/17 (76%). Of those with discordant imaging, 2/4 had abnormal ultrasound and normal Sestamibi, and 2/4 had abnormal Sestamibi and normal ultrasound. 21/30 (70%) children had MIP, including all operations in the last 15 years (bar one). IOPTH monitoring was used since 2016. One parathyroid gland was removed for 27/30 (90%). Histopathology showed solitary adenoma in 27/30 (3/30 were indeterminate or missing data). Post-operative treatment for hypocalcaemia was oral in 9/30 (30%) patients, intravenous in 3/30 (9%), and not needed in 18/30 (61%). No recorded use of alfacalcidol or calcitriol. There was no recurrence or surgical complications.
Conclusion
We have characterised a large cohort of sPHPT in children. Most patients (88%) present symptomatic of hypercalcaemia. Ultrasound was 91% sensitive for identifying an abnormality. We suggest ultrasound for first line imaging, using Sestimibi when this is reported normal. Performing MIP with IOPTH, we report no surgical complications and no recurrence, and believe it should be considered the operation of choice for children with sPHPT.

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P78

Safety and efficacy of long-term continuous subcutaneous PTH (1-34) infusion therapy (CSPI) for severe autosomal dominant hypocalcaemia type 1 (ADH1) in children and young people

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Introduction
ADH1, caused by gain of function (GoF) variants in the Calcium Sensing Receptor (*CASR*), leads to hypoparathyroidism, hypocalcaemia, seizures, hyperphosphatemia, hypomagnesaemia, and severe hypercalciuria. Conventional treatment (alphacalcidol and calcium) can cause nephrocalcinosis, renal impairment and may not reduce seizures. Our previous data on six patients showed that CSPI via insulin pump increases serum calcium and reduces seizures, hospital admissions, and calcium excretion (mean CSPI duration = 3.2 ± 0.6 years). This retrospective observational study provides long-term data on CSPI's safety and efficacy.
Methods
Five ADH1 patients, aged 6-30years, treated with CSPI for 8.22 ± 1.26 years, were included. The sixth patient stopped CSPI after renal and parathyroid transplantation. All had GoF *CASR* variants and recurrent hypocalcaemic seizures requiring hospital admission before CSPI. Data on serum calcium, calciuria, seizures, growth, bone mineral density (BMD), and hospital admissions were collected semi-annually from January 2018.
Results
Results of CSPI treatment (duration 5.99-9.01 years):
Patient(P)1 (8.77yo*): CSPI:8.67years, corrected calcium(cCa):1.98 ±

0.31(1.55,2.71) mmol/l**, UCa/Cr***:1.12±0.61(0.48,2.50)**.
P2 (9.43yo*): CSPI:8.58years, cCa:1.94±0.36(1.49,2.57) mmol/l**, UCa/Cr***:0.74±0.29(0.27,1.19)**.
P3 (30.86yo*): CSPI:8.86years, cCa:1.90±0.20(1.7,2.35) mmol/l**, UCa/Cr***:0.58±0.23(0.21,0.87)**.
P4 (9.15yo*): CSPI:9.01years, cCa:2.06±0.28(1.41,2.48) mmol/l**, UCa/Cr***:0.49±0.21(0.13,0.74)**.
P5 (6.23yo*): CSPI:5.99years, cCa:2.27±0.22(1.89,2.6) mmol/l**, UCa/Cr***:0.45±0.31(0.14, 1.00)**.
*yo=years old
**Mean±SD(Minimum, Maximum)
***Urine Calcium/Creatinine Ratio
Mean total hospital admission duration was 6.8±8.3(0,21)**days/patient. P2 and P3 had one seizure. Four patients had stable/no nephrocalcinosis, P1 developed mild nephrocalcinosis. Four patients developed other conditions (autoimmune hypothyroidism, frequent vomiting, anxiety/depression, dental issues, central precocious puberty); the relationship between these and CSPI/ADH1 is unclear. Intellectual development, height, weight and BMD remained normal for patients initiating CSPI before age 1 year. P3 has short stature and learning difficulties.
Conclusion
CSPI remains a safe and effective long-term treatment for children and young people with ADH1, maintaining serum calcium and normal calcium excretion. Our patients had a small number of seizures and only a few days of admission despite severe ADH1. CSPI is a viable option for severe ADH1 in the absence of other effective treatment.

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P79

A case of intractable infant hypocalcaemia due to GCM2-mutation linked hypoparathyroidism

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Introduction
We present a case of severe hypocalcaemia in a 6-week-old baby, secondary to genetic hypoparathyroidism.
Case report
A 6-week-old female presented with seizures. She is the first child to non-consanguineous parents of Asian-Pakistani ethnic origin. She was delivered at term and had an uneventful neonatal period. There was no family history of calcium disorders. Blood investigations showed low serum adjusted calcium of 1.26 mmol/l (2.2-2.6 mmol/l), low ionised calcium (0.65nmol/l), elevated inorganic phosphate 3.70 mmol/l (1.3-2.5 mmol/l). Further evaluation for hypocalcaemia showed low serum parathormone (PTH) 0.2 pmol/l (1.6-7.2 pmol/l). Vitamin D levels were sufficient, 57.4nmol/l (50-150). Spot urine calcium:creatinine ratio was 0.92. Serum magnesium was normal 0.72 mmol/l (0.7-1). Renal USS was normal. Genetics were sent to evaluate the cause of hypoparathyroidism and showed autosomal recessive GCM2 related hypoparathyroidism.
Management challenges
Intravenous calcium gluconate boluses only marginally improved the ionised calcium; hence she was started on continuous calcium infusion and alfacalcidol. In view of ongoing seizures, she was intubated and ventilated. EEG showed ongoing electrical seizure activity even in the absence of clinical seizures. MRI brain was normal. Adjusted calcium improved to 1.71- 1.94mmo/l (ionised calcium 0.83 – 0.94). Alfacalcidol doses were optimised to 150ng/kg/day. The high phosphate and low calcium remained challenging, and as she transitioned onto oral medication, she was commenced on calcium carbonate, which doubles as a phosphate binder, requiring doses up to 10 mmol/kg/day, given in 3-hourly divided doses. She was also placed on a high calcium milk feed. Adjusted calcium levels have remained static at around 1.9nmol/ls, however there are no clinical seizures, and the child is clinically well. Therefore, a clinical decision has been taken to accept the lower serum levels of calcium. There is a robust rescue plan for emergency attendances to ED, and for times of illness. Discussions are on-going for pre-emptive central i.v. access as well in case of emergencies.
Conclusion
GCM2 is a parathyroid-specific transcription factor and inactivating germline mutations (found on chromosome 6p24.2) can result in profound hypoparathyroidism. Resultant hypocalcaemia can be very challenging to manage, requiring tertiary and often multidisciplinary team input.

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P80

A late presentation of autosomal dominant hypocalcemia type 1 (ADH1)

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Background
The calcium sensing receptor (CaSR) plays a pivotal role in systemic calcium metabolism by regulating parathyroid hormone (PTH) secretion and urinary calcium excretion. Autosomal dominant hypocalcaemia type 1 (ADH1) is a disorder of extracellular calcium homeostasis caused by activating germline gain-of-function mutations of the CaSR.
Case
A 13-year-old girl was referred from primary care with hypocalcaemia. She was under CAMHS for eating disorder and anxiety. Baseline serum adjusted calcium was (1.81 mmol/l). This was felt to be nutritional due to low vitamin D. She was started on vitamin D and calcium supplements. Repeat bloods after two weeks showed normal vitamin D (67 nmol/l) and magnesium (0.7 mmol/l), low calcium (1.86 mmol/l) and inappropriately "normal" PTH (1.5 pmol/l). Renal function was normal and urinary Ca/creatinine ratio was 0.5 mmol/ mmol(range <0.6). She was born at 30/40 gestation due to maternal jaundice and is one of identical twins. There was no reported history of neonatal hypocalcaemia, her iCa on the blood gases was low normal (1.06 mmol/l) during her NICU admission. She had been fit and well until recently – but after more questioning her mother reported stridor during sleep. On examination, she had positive Chvostek sign. Calcium levels improved on supplements (Ca, Mg, alfacalcidol) but urinary calcium/-creatinine ratio increased to 0.9. She had a normal renal and thyroid ultrasound. CT brain showed bilateral basal ganglia calcifications. Genetic testing showed heterozygosity for a CASR variant, confirming ADH1. Her twin sister was tested and had the same diagnosis. She was asymptomatic but also had mild hypocalcaemia.
Discussion
Patients with ADH1 can have no (asymptomatic), mild or severe symptoms (in similar proportions) and there is lack of phenotype correlation. Although this could explain the different presentation in these identical twins, it is also possible that the higher levels of anxiety in our index case and hyperventilation induced alkalosis exacerbated the existing hypocalcaemia. Although recombinant PTH (injectable or via subcutaneous infusion) has been used to treat patients where standard therapy with Ca and alfacalcidol/calcitriol supplementation is not practical or ineffective, novel therapies using allosteric modulators (calcilytics) are showing very promising results in trials.

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P81

Management of prolonged refractory hypercalcaemia secondary to denosumab cessation: a case presentation

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Introduction
We present the case of a 14-year-old boy with refractory hypercalcaemia secondary to Denosumab cessation. This case is unique due to his extensive treatment course and relapse during therapy.
Background
Denosumab is a monoclonal antibody used in the treatment of osteoporosis, skeletal metastasis, and giant cell tumour of bone. In skeletally immature patients, studies have proven its effectiveness in suppressing bone resorption and alleviating symptoms, however refractory hypercalcemia often follows the discontinuation of Denosumab treatment.
Case
Our patient, who also has Noonan syndrome, was commenced on Denosumab for bilateral giant cell granuloma of the jaw. He completed two years of 120 mg monthly subcutaneous injections, followed by a four month wean. Prophylactic Zoledronic acid was given during weaning. Unfortunately, despite this, he developed hypercalcaemia four months post cessation of Denosumab. He was initially managed with hyperhydration at $3L/m^2$/day and Pamidronate. He developed an acute kidney injury (AKI) three weeks into treatment and Pamidronate was no longer effective. Calcitonin was commenced at 4units/kg subcutaneously with a good response. Further doses given intramuscularly were briefly effective but very painful, so treatment was switched to intravenous administration. Creatinine peaked at 144umol/l (AKI stage 3, baseline 40umol/l) and Corrected Ca (cCa) peaked at 4.02 mmol/l. He required Calcitonin every 24-48 hours and due to tachyphylaxis he required weekly 1unit/kg dose increases. Hyperhydration was weaned to maintenance intravenous fluids to achieve a neutral fluid balance and renal function slowly improved.

Progress
Throughout his admission he remained symptomatic of hypercalcaemia at cCa > 3.0 mmol/l, a level he reached almost daily. Nausea was the predominant symptom and unfortunately after four weeks he had lost 12% of his admission weight and required nasogastric feeding for supplementation. Eight weeks into treatment he contracted Norovirus and shortly after, rebound hypercalcaemia appeared to resolve; facilitating discharge. Unfortunately, within two weeks, he became symptomatic of hypercalcaemia again requiring readmission for treatment. In total, he completed ten weeks of progressively increasing Calcitonin dosing to a maximum 10units/kg with a final dose of Pamidronate at 1 mg/kg before cCa remained consistently <3.0 mmol/l. Six months following onset of his hypercalcaemia his cCa is finally within range at 2.59 mmol/l.

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P82

Cardiovascular risk and achondroplasia: a systematic review

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Irene Lo and Shraddha Meti are joint first authors of this work

Introduction
Achondroplasia, caused by a variant in the fibroblast growth factor receptor 3 (FGFR3) gene is the most common form of disproportionate short stature. It is associated with reduced life expectancy, but it is not clear to what extent cardiovascular disease (CVD) is responsible for this. As such, the primary aim of this systematic review was to identify the prevalence of cardiovascular disease in individuals with this condition.
Methods
A systematic review of the literature was conducted by 2 independent reviewers using PUBMED and Science Direct. There were no language or date restrictions on the search and the search was completed in March 2024. The search strategy consisted of the following terms: "achondroplasia" AND "vascular" OR "cardiovascular" OR "metabolic". Studies had to meet the following criteria for inclusion: report on population with achondroplasia and consider at least one assessment of clinical or laboratory measurement of cardiovascular risk or vascular phenotype. Quality assessment was undertaken using the Critical Appraisal Skills Programme checklists according to study type.
Results
In total 300 articles which met the inclusion criteria were screened. Of these, 31 (10%) were included for analysis with publication dates ranging from 1972-2023, encompassing >5,000 individuals with achondroplasia. Techniques of cardiovascular assessment included measures of adiposity in 11 (35% of included studies), metabolic parameters in 10 (32%), blood pressure in 8 (26%), physical activity in 5 (16%) and mortality secondary to CVD in 3 (10%) demonstrating increased rates of obesity, impaired glucose regulation and hypertension. Five (16%) studies considered the effects of sleep disordered breathing on CVD risk.
Discussion
There is significant heterogeneity in the outcomes measured to assess CVD risk in people with achondroplasia. As a result, there remains significant gaps in the literature regarding the development of CVD in individuals with this condition. Longitudinal studies offering detailed cardiovascular phenotyping should be considered in people with achondroplasia in order to mitigate the risks of CVD-related morbidity and mortality.

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Diabetes 4

P83

Audit of management of diabetic ketoacidosis in children and young people at the noah's ark children's hospital for wales

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Introduction
Diabetic Ketoacidosis (DKA) is a potentially life-threatening complication of type 1 diabetes mellitus (T1DM) in children and young people (CYP). A 5th edition Integrated Care Pathway (ICP) for the management of DKA was published in 2022 in Wales based on updated guidance from BSPED, NICE, and the UK resuscitation council.
Objective
To audit the management of DKA in CYP at Noah's Ark Children's Hospital for Wales following the introduction of the 5th edition ICP, and compare to management using the 4th edition ICP, to determine areas of change and potential improvement.
Methods
Retrospective case note review of CYP admitted in DKA, managed on current guidance between 01/04/2022 and 31/03/2024 and compared with the previous audit based on interim guidelines between 01/04/2020 and 31/03/2022.
Results
In the current audit, 21 episodes occurred in 20 CYP (13 male). The median age was 12 years (range 8 months to 15 years). All patients were appropriately diagnosed and 7 CYP presented in severe DKA, 5 moderate DKA and 9 mild DKA. This data was consistent with the previous audit. However, there has been an increase in presentations from CYP with an established diagnosis, 38% (8/21) vs 15% (3/20). In both audits, all had appropriate fluid boluses and maintenance intravenous fluids prescribed. In the current audit, initiation of fluids was delayed in 52% (11/21) episodes compared to 35% (7/20) previously and intravenous insulin was delayed in 67% (14/21) episodes compared to 50% (10/20). Hypokalaemia was noted in 48% (10/21) of episodes and hypoglycaemia was noted in 24% (5/21) whilst on the pathway, consistent with the previous audit.
Conclusion
The updated ICP was generally followed accurately, and all patients were diagnosed appropriately with no adverse outcomes identified. The commencement of intravenous fluids and insulin was delayed on over half of the patients, an increase from the previous audit. Additionally, half of CYP experienced hypokalaemia which needs to be compared with other centres and closely monitored. The increase in number of established CYP presenting in DKA is being reviewed and staff education is planned to improve the timeliness of DKA management.

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P84

Aniridia and glucose intolerance associated with PAX6 mutation; MODY, T1D or both?

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Introduction
Heterozygous mutations of PAX6 gene are known to cause congenital eye abnormalities including aniridia. The gene is also required for islet cell development and mutations are associated with glucose intolerance. We report the case of a boy with known PAX6 mutation and aniridia who developed hyperglycaemia.
Case
A 15 year old boy presented to the emergency department with hyperglycaemia after reporting intermittent testicular discomfort to his GP. Hyperglycaemia had been noted several months previously on routine dermatology bloods and HbA1c taken a month before presentation was 66 mmol/mol. The patient denied any weight loss, but described several weeks of polyuria, polydipsia and tiredness. He had a background of bilateral aniridia, Peter's anomaly and visual impairment. A de novo heterozygous nonsense PAX6 gene mutation c.607C>T p.(Arg203Ter) was identified soon after birth. He also has ADHD, ASD, acne and sleep disturbance. His medications include methylphenidate, aciclovir, isotretinoin and melatonin. There is a family history of thyroid disease and coeliac disease in maternal relatives. He was clinically well with blood glucose 12.2 mmol/l, pH 7.41 and ketones 0.2 mmol/l. His BMI was 30 kg/m^2 and he had bilateral aniridia but examination was otherwise unremarkable. He was commenced on multiple daily insulin and CGM. Subsequent results showed raised GAD (>250 units/ml) and IA-2 antibodies (25 IU/ml), normal ZnT8 (<10 U/ml), and raised C peptide (1,761 pmol/l). TPO antibodies were high (33.84 IU/ml) with normal TFTs and –ve TTG IgA antibodies. He was switched to Omnipod 5 and Dexcom, which aided his visual impairment. Three months post diagnosis he has a low insulin requirement (0.16 units/kg/day) with TIR around 70-80%.
Conclusion
This case describes new onset diabetes in a boy with a rare genetic mutation associated with monogenic diabetes, and positive type 1 diabetes autoantibodies. The PAX6 gene mutation may partly explain his glucose intolerance, which has been compounded by the development of type 1 diabetes. Further research is required to understand the clinical impact of PAX6 mutation on glucose tolerance and management options. Blood glucose levels should be monitored in patients with known PAX6 mutations.

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P85

A clinical audit exploring the relationship between HbA1c control and appointment adherence among young adult diabetes clinic patients

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HbA1c is a critical marker of long-term glycaemic control and is pivotal in managing diabetes-related complications. Appointment adherence plays a crucial role in diabetes management, enabling healthcare providers to monitor and address patient needs effectively. This audit investigates the correlation between appointment adherence and HbA1c levels in Young Adult Diabetes Clinic patients while also identifying patient characteristics associated with high DNA (Did Not Attend) rates. A retrospective analysis was conducted on 63 patients who attended the Young Adult Diabetes Clinic at a teaching hospital, from age 19 until November 2023. Data was retrieved from the Trust surgery database, encompassing a comprehensive range of potential influencing factors such as the presence of underlying comorbidities, blood pressure (BP), total cholesterol to HDL ratio, and body mass index (BMI). The study population had a mean age of 21.6 years and was predominantly diagnosed with Type 1 diabetes, with most patients on insulin therapy. Analysis revealed a significant correlation between high DNA rates and poor HbA1c control. Patients missing 81-100% of appointments exhibited the highest HbA1c levels (>76 mmol/l), indicating suboptimal glycaemic control. Conversely, patients with 0-20% DNA rates demonstrated better glycaemic control. Key factors influencing appointment adherence included educational attainment, employment status, and distance to the clinic. Higher non-adherence rates were observed among patients from lower educational backgrounds and those with substantial work-related commitments. This audit underscores the importance of regular clinic attendance in managing diabetes effectively, highlighting the need for targeted interventions to improve adherence. Effective glycaemic control is vital to mitigate the risk of diabetes-associated cardiovascular disease (CVD). The 'SEARCH' study has emphasised the higher CVD risk in young patients with diabetes, underlining the necessity of regular monitoring to maintain optimal HbA1c control (Hamman *et al.*). Practical solutions proposed include tailoring clinic appointments to patients' schedules, introducing psychosocial support for patients over 19 years old, and promoting multidisciplinary approaches. Implementing a gamified application could engage the younger demographic by incentivising attendance at medical appointments. Such applications could allocate points for each attended appointment, redeemable for rewards, thereby promoting adherence to regular healthcare visits.

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P86

High rate of initial presentation in severe DKA: is obesity a risk factor for presentation in severe DKA in young people

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Introduction
Type 1 diabetes is an Autoimmune disease which usually presents in metabolic decompensation with absolute insulin deficiency. Presentation can vary from mild osmotic symptoms to severe Diabetes ketoacidosis (DKA). We have observed a recent increase of incidence of severe DKA. The aim of this audit was to assess the relationship between severity of presentation and body mass index.
Methodology
A descriptive cohort study was undertaken in 55 children (male = 23, female = 27) who presented to our emergency department between Jan 1st -Dec 1st 2023 with the first episode of Diabetes and were clinically diagnosed as Type 1 Diabetes.
Results
38.18% ($n = 21$) presented with severe DKA (pH < 7.1) whilst 10.3%($n = 6$) had mild to moderate DKA. Seven required intensive care treatment with one death due to tonsillar herniation. Other associated complications were peripheral neuropathy with nerve conduction abnormalities ($n = 2$), persistent myopathy with electromyography abnormalities ($n = 1$), cerebral haemorrhages and new onset epilepsy($n = 1$). Four patients who presented with severe DKA had been assessed in primary care for the same complaints. Of those presenting with severe DKA, seven (36.8%) even had a family history of type 1 diabetes. Median BMI centile was 52.3 (IQR 38.6- 91). 40.4%($n = 17$) were overweight or obese. Median presenting HbA1c was 105 mmol/mol (IQR 91-125). There was no significant association between severity of DKA and body mass index (BMI), ($P = 0.5668$). 81.5%($n = 44$) belonged to the two most deprived quintiles (1-2) and 63.6% were of non-white ethnicity.
Conclusion
Rate of initial presentation in DKA in our centre is twice as high as the UK average of 1 in 4 This might reflect high levels of socio-economic deprivation and additional challenges through ethnic diversity. We were unable to demonstrate an association between Obesity and presentation in DKA, but this might be related to levels of Obesity and overweight in the general population. Our data demonstrate the urgent need for developing novel strategies to raise awareness of symptoms of type 1 diabetes tailored for ethnic diverse and socioeconomic deprived communities.

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P87

Insulin oedema in paediatrics diabetes: a case report and clinical reflection

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Introduction
Insulin oedema is an uncommon consequence of insulin therapy and may be overlooked in the differential diagnosis of bilateral limb swelling in paediatric patients. We report two cases of insulin oedema.
Case 1
An 11-year-old female with Type 1 Diabetes Mellitus (T1DM) and mild Diabetic Ketoacidosis (DKA) presented with blood glucose of 31.3 mmol/l, H of 51nmol/l, HCO3 of 14 mmol/l, and HbA1c of 130 mmol/mol. She received IV fluids and insulin as per local protocol. Three days later, she was re-admitted with progressive bilateral pitting oedema in the lower limbs. Clinical, bloods, and imaging investigations, including CT abdomen, revealed no evidence of underlying medical pathology. Initially managed with full maintenance fluid due to suspected diabetes-associated hypercoagulability, she was subsequently placed on fluid and salt restriction. The oedema improved spontaneously within two days, with complete resolution observed at a three-week follow-up.
Case 2
A 15-year-old boy presented with severe DKA (blood glucose of 30.6 mmol/l, H of 159nmol/l, HCO3 of 0, ketones of 3.4 mmol/l, and HbA1c of 128 mmol/mol) required intensive care. Weighing 37 kg (second centile), his renal function and other blood parameters were initially satisfactory. Following resolution of DKA, he was switched to an insulin sliding scale. A week into admission, he developed pedal oedema up to mid-thigh and gained 8 kg. This was accompanied by low serum albumin (25gm/dl) and mild renal impairment (urea of 8.9 mmol/l, creatinine of 87 mmol/l, urine protein/creatinine ratio of 51 mg/ mmol), which normalized within nine days as oedema resolved. Doppler and abdominal ultrasound results were normal. He was treated with enoxaparin and antibiotics due to the risk of deep vein thrombosis and a positive urine culture.
Conclusion
While insulin oedema is a diagnosis of exclusion, clinicians should maintain a high suspicion for it in patients newly initiated on insulin or after rapidly glucose correction. The first case was typical presentation of this condition, while the second was unusual due to renal impairment and low albumin with proteinuria after ketoacidosis resolution. Insulin oedema usually has a favourable prognosis, characterized by spontaneous resolution. However, some cases require diuretics. Clinicians should reassure patients to ensure insulin compliance.

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P88

Initial results of effectiveness of a hybrid closed loop system via omnipod 5 and dexcom g6 system on glycaemic control

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Introduction
Glucose monitoring and administration of insulin are critical components of type 1 diabetes management in children. Increasingly, technology such as continuous glucose monitors (CGMs) and insulin pumps are being used in a 'closed loop' system to effectively manage diabetes in children.
Aim
To evaluate the impact of a closed loop system via the Omnipod 5 pump and Dexcom G6 CGM system on glycaemic control in a cohort of children at South Tees Hospitals NHS trust.

Methods
A review of electronic patient records was undertaken. 108 children aged 0-18 years in the paediatric diabetes service within South Tees Hospitals had commenced a closed-loop system with Omnipod 5 and Dexcom G6 between July 2023 and March 2024, with an average duration from diagnosis of 46 months (IQR 17-67 months). HbA1c and time-in-range (TIR) was recorded at introduction of the closed loop system as well as 3-month and 6-month intervals.
Results
Mean HbA1c and TIR at commencement were 59 mmols/mol (IQR 51-65) and 54% (IQR 41%-65%) respectively. At 3 months these had improved to 55 mmols/mol (IQR 51-60) and 64% (IQR 58%-70%). At 6 months, 94 patients had recorded data showing a mean HbA1c of 56 mmols/mol (IQR 50-60) and TIR of 64% (IQR 57%-71%). Only one child had to stop using the pump due to local skin reaction. Prior to this switch, 77 (71%) of the children were already using an Omnipod pump, 28 patients (26%) were using multiple daily injections, and 2 patients were on other closed loop systems (2 on Medtronic and 1 child on T-slim) . For monitoring, 104 children were already using Dexcom G6, 2 were using a Guardian sensor, 1 patient was using Libre 2 and 1 patient was on Dexcom G7.
Discussion
Initiation of a closed loop system via Omnipod and Dexcom G6 was associated with a mean improvement in HbA1c and TIR within a 3-month period for our patients which has been maintained at their 6-month review. Subgroup analysis is underway to evaluate cohorts of interest, including those with a high Hba1c. We also aim to collect patient feedback about their views on the closed loop system.

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P89

Using existing data to support the CYP diabetes healthcare community to fully understand their patient population and tackle health inequalities in line with NHSE CORE20PLUS5

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For 19 years the National Paediatric Diabetes Audit (NPDA) has worked with hospitals across England and Wales to measure the health outcomes and experiences of children and young people living with diabetes. The data collected and the published reports have become a staple resource for paediatric diabetes units (PDUs) and networks to get an overview of their population. Alongside the NPDA annual reports, PDUs have access to unit level reports, an online extraction tool and the raw data – the data can be used to drive service improvements and share areas of challenge and of best practice, but the broad spectrum and sheer volume of data can be overwhelming, difficult to navigate and has limited extraction options. In 2022 the NHSE CORE20PLUS5 for Children and Young People was published and diabetes was highlighted as one of the 5 key clinical areas of health inequality specifically in relation to deprivation and ethnicity, creating increased pressure on PDUs to tackle the specific inequalities in their locality. The current limitations on data extraction options available to PDUs in relation to inequalities presented an opportunity to develop a comprehensive and user-friendly tool to support diabetes healthcare professional colleagues to fully understand their population in terms of deprivation and ethnicity. Using the raw data available through the NPDA, an interactive, user-friendly, and comprehensive excel platform was developed focussing on the 3 key audit findings of HbA1c, Key Health Check Completion (T1 and T2) and Technology-use and then broke them down by ICS level and PDU level, and by ethnicity and deprivation. The platform was designed to enable ease of use and smooth extraction for presentations and business cases, seamlessly creating self-explanatory graphs and charts whilst easily comparing units, networks and ICBs. Having access to, and understanding the data related to your paediatric diabetes population is key to identifying and targeting quality improvement work to close the inequalities gap. This interactive data tool is providing diabetes healthcare professionals, healthcare providers and commissioners the most relevant data in a user-friendly and convenient format to support local and ICB level prioritisation of work.

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P90

Does real time continuous glucose monitoring improve glycaemic control in patients with Wolfram syndrome and insulin dependent diabetes mellitus?

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Introduction
Wolfram syndrome (WS) is an ultra-rare form of progressive neurodegeneration with diabetes mellitus and optic atrophy as the key clinical manifestations in childhood. Birmingham Children's Hospital (BCH) is the UK lead centre for management of paediatric WS. In recent years, monitoring of glucose in diabetes management increasingly involves continuous glucose monitoring sensors (rtCGM) rather than capillary blood glucose meters (CBG). Using rtCGM in type 1 diabetes mellitus (T1DM) has been shown to improve mean glycated haemoglobin levels (HbA1c), but there is yet to be a study evaluating rtCGM in WS.
Aim
Does rtCGM improve glycaemic control in paediatric patients with WS?
Method
Retrospective case note review of all patients with WS and insulin-dependent diabetes seen between 2018 and 2024 and switched to rtCGM. For each year within this period, data was collected on glucose monitoring device (rtCGM vs CBG), insulin regimen (pump vs multiple dose insulin), and demographic information.
Results
For all patients in the BCH Wolfram Clinic, median HbA1c reduced from 2018 to 2024 (median HbA1c in 2018 was 64 mmol/mol, range 40-122 mmol/mol, vs median HbA1c in 2024 was 53 mmol/mol, range 48-71 mmol/mol). 15 patients from this cohort met the inclusion criteria (median age at study onset was 11 years, range 6-18 years), 9 females: 6 males. rtCGM methods included Dexcom ($n = 6$) and Libre ($n = 7$). At baseline, median HbA1c was 65 mmol/mol (range 47-122 mmol/mol) vs median first recorded HbA1c post-change to rtCGM of 61 mmol/mol (range 48-84 mmol/mol). Following change to rtCGM, 9 patients showed an overall decrease in HbA1c (5 females: 4 males) vs 6 patients who showed an overall increase in HbA1c (4 females: 2 males).
Conclusion
In summary, the mean HbA1c of children with WS has improved over the last 6 years in line with national data for T1DM. Patients who commenced rtCGM demonstrated a modest improvement in HbA1c, perhaps because of the additional burden of complications in WS. Patient feedback suggested acceptability and improved quality of life with rtCGM. Hybrid closed loop treatment in this cohort of patients has the potential to further impact on glycaemic control and quality of life outcomes.

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Diabetes 5

P91

Strategizing early detection and follow-up for type 1 diabetes: The EDENT1FI project

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Background and aims
European action for the Diagnosis of Early Non-clinical Type 1 diabetes For disease Interception (EDENT1FI) targets early Type 1 Diabetes (T1D) detection to reduce the risk of diabetic ketoacidosis, delay disease progression, improve long-term health outcomes and provide a 'softer landing' to insulin therapy. It aims to refine screening and support in early-diagnosed individuals to allow implementation in the clinical care setting.

Materials and methods
EDENT1FI includes 13 countries, including the United Kingdom (UK), and combines partnerships between academia, industry, clinical and patient groups. EDENT1FI aims to screen 200,000 general population children using islet autoantibody testing to detect 600 children with early-stage T1D. Antibody-positive children are followed up according to a novel risk-based approach.
Results
EDENT1FI (www.edent1fi.eu) comprises six work packages (WP). WP1 establishes screening programs across Europe and the UK, aligning with international recommendations and leveraging insights from previous studies. WP2 evaluates the psychosocial and economic impact of screening and addresses ethical considerations. WP3 focuses on follow-up. We will use the Progression Likelihood Score, which combines HbA1c, islet autoantigen-2 (IA-2A) and a 90-minute stimulated glucose, to inform a risk-stratified approach to follow-up, using home glucose testing, HbA1c, continuous glucose monitoring (CGM) and oral glucose tolerance testing (OGTT). The UK leads on assessing 'light touch' minimally invasive approaches to follow-up to reduce patient burden (capillary OGTT and proinsulin: C-peptide). WP4 develops a roadmap for preventive and disease-modifying approaches, utilizing adaptive trial designs. WP5 emphasizes effective communication and dissemination strategies. WP6 ensures effective project management and governance. Embedded within the programme is a patient advisory group who advises on all aspects of the programme. Data from people with early-stage T1D throughout Europe will be collected in a pseudonymised manner in EDENT1FI-REGISTRY, and in the UK through the UK-Islet autoantibody registry.
Conclusion
EDENT1FI represents a pioneering effort to advance early detection of T1D. By leveraging multidisciplinary expertise, international and industry collaboration, the project aims to change the pathway to diagnosis in T1D and improve outcomes for children and adolescents at risk of developing T1D.

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P92

Dinky-betes: a multi-disciplinary clinic for the under 7's

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Background
The challenges of caring for young children under 7 years old with type 1 diabetes are widely acknowledged. Very young children are dependent on caregivers for their diabetes care, the burden of which can have a detrimental effect on psychosocial well-being. Significant glucose variability (GV) can negatively impact early brain development and increase long-term complication risk. Use of advancing technology, specifically hybrid closed loop (HCL) systems, is recommended to minimise GV, optimise time in range (TIR, 3.9-10 mmol/l) and HbA1c outcomes. Having ascertained demand for a dedicated under 7's service, the Leeds Children's and Young Persons Diabetes team aimed to explore a holistic approach to supporting families through the introduction an under 7's clinic.
Method
Dinky-Betes started in July 2023; a monthly play-centred clinic facilitated by the multi-disciplinary team including a diabetes play specialist and clinical psychologist. A tailored pedagogical approach using age-appropriate themed activities supports child social and emotional development and diabetes understanding. Dinky-Betes also actively promotes peer support. Clinical outcomes including HbA1c and continuous glucose monitoring (CGM) data are being collected alongside child and parental quality of life (QoL) scores using an adapted Likert scale and T1DAL measure respectively.
Results
32 families have accessed the Dinky-Betes clinic including 11 patients in their first year of care. All patients are on CGM with 28 on HCL. Preliminary results demonstrate a reduced median HbA1c (55.5 to 53.0 mmol/mol), improved median TIR (62% to 63.0%), and stable median time below range of 3.0% and GV (SD; $<$ 3.0) of 3.5. Preliminary thematic analysis has identified three QoL themes for further evaluation; every child as an individual, supportive factors in diabetes and diabetes and relationships. Peer support helps children try technology/move sites; develop "diabetes friends", share feelings and want to come and engage in clinic; and parents have shared experiences, learning from and with each other.
Conclusions
The holistic approach of Dinky-Betes supports the psychosocial development of children in relation to their diabetes and other important aspects of their lives. The clinic has provided valuable peer support for children, families and staff and has optimised use of HCL and clinical outcomes.

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P93

Factors associated with diabetic ketoacidosis in patients with intensive use of continuous glucose monitoring

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Introduction
Paediatric diabetic ketoacidosis (DKA) is a serious complication of Type 1 diabetes mellitus (T1DM), presenting significant morbidity and mortality risks. The identification of factors associated with DKA would play an important role in directing resources and efforts at effective preventive strategies.
Objectives
To describe the prevalence and factors associated with DKA in patients with diabetes from April 2021-22 and April 2022-23 in Royal Preston Hospital.
Methods
We carried out retrospective analyses of data from patients with type 1 diabetes who presented with DKA from April 2021 to March 2023 and factors associated with DKA were described.
Results
From 2021-22, there were 20 patients (Male = 11 Female = 9) with 27 DKA admissions. From 2022-23 there were 23 patients, (Male = 11 Female = 12) with 28 DKA admissions. The prevalence of DKA were 8.7% and 9.2% respectively. Their mean ages were 11.81 (SD = 4.16) and 12.45 (SD 3.83) respectively with range of 2-17 years. In 2021-22 and 2022-23 respectively, 25% and 30% of patients had previous episodes of DKA and (74% vs 65%) were admitted in mild to moderate DKA. The mean HbA1c was 80 mmol/mol in all patients. In 2021-22, 60% of those with DKA were newly diagnosed and 32% in 2022-23. Factors associated with DKA in 2021-22 and 2022-23 were poor compliance (30% and 54%), presence of illness (5% and 7%), social concerns (48% and 25%) respectively and 40% of patients were receiving Psychology support. In 2021-22, 73% wore continuous glucose monitoring (CGMS), 1 patient was on insulin pump and 48% were on multiple daily injections (MDI), while in 2022-23, 83% wore CGMS, 3 were on insulin pump and 57% were on MDI.
Conclusion
Significant factors associated with DKA presentation were new diagnosis, social concerns associated with poor compliance despite the use of CGMS in over 70% of the patients. Therefore, future work should focus on improving training and awareness of primary care health care providers and parents on early recognition of symptoms of diabetes. In addition, provision of social and psychological support with intensive education would be of great benefit in improving glycaemic control and reducing incidence of DKA and its comorbidity in these patients.

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P94

Establishing clinical follow-up in early-stage pre-symptomatic type 1 diabetes: results from the oxford pre-T1D clinical service

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Introduction
Children and young people (CYP) are increasingly being screened and identified with early-stage type 1 diabetes (T1D). Benefits of an earlier T1D diagnosis include a reduction in diabetic ketoacidosis, hospitalisation and a 'softer landing' into insulin therapy. Early-stage T1D is defined by having $\geq$2 islet autoantibodies (IAb), categorised into stage 1 (normoglycaemia), stage 2 (dysglycaemia), and stage 3 (hyperglycaemia). CYP with a single IAb are at risk of T1D. We present our experience of managing IAb-positive children in the UK's first pre-T1D clinic.
Clinic set-up
Referrals were accepted from throughout the UK, criteria included CY*P* $<$ 18 years, with $\geq$1 IAb and not on insulin therapy. Using a shared care model, appointments were offered face-to-face or virtually, with a multidisciplinary team. The Oxford pre-T1D follow-up pathway is risk-stratified based on patient age ($<$3, 3-9, $>$10 years) and T1D stage (single IAb, stage 1, stage 2), adapted from international guidelines. Follow-up involves a "light-touch" approach, using home glucose monitoring, HbA1c and unblinded continuous glucose monitoring. Service evaluation, including parental anxiety, is assessed by questionnaire, before and after the initial appointment. Risk status is flagged on both hospital and GP health records. Families are educated on home glucose testing and safety net thresholds are provided. Sensor glucose monitoring is used to guide the timing of insulin therapy.

Results
Of the 18 referrals, 13 patients have been seen, with advice provided to healthcare professionals in 5. Patients were identified equally from research platforms and clinical care. So far, 6/18 (33%) had a single IAb, and 12/18 (67%) had ≥2 IAb. Of the children with ≥2 IAb, 2/12 (17%) were in stage 1, 6/12 (50%) in stage 2 and (4/12) 33% were in stage 3, but not on insulin therapy. In follow-up, 8/18 (44%) children have been commenced on insulin therapy, all as outpatients, none in DKA. Questionnaires showed improvement in parental anxiety after the first clinic appointment (pre = 3.6/5 vs post = 2.5/5, where 1 = not bothered, 5 = bothered a great deal).
Discussion
We demonstrate the integration of follow-up of CYP with early-stage T1D into routine clinical care, allowing insulin to be started as an outpatient.

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P95

How many children are out there? A BSPED survey of children and young people with early-stage type 1 diabetes

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Introduction
Type 1 diabetes (T1D) can begin years before clinical presentation. Screening children and young people (CYP) for T1D using islet autoantibodies (IAb) is increasingly popular, as screening reduces diabetic ketoacidosis, hospitalisation and offers access to drug therapies for delaying T1D onset. ISPAD and the INNODIA/GPPAD/FR1DA consortium have provided recommendations for monitoring early-stage T1D (defined as pre-symptomatic with ≥2 IAb). However, no UK-specific guidelines exist, nor for the management of CYP with a single IAb. This survey gathered information on the frequency and management of CYP with ≥1 IAb who are not on insulin.
Methods
We distributed an online survey across the UK's four nations via paediatric diabetes networks (March 2024 – June 2024). Lead clinicians responded on behalf of their unit. Data on prevalence, IAb frequency, clinical management, and sibling testing were collected.
Results
Of 188 units contacted (172 from England and Wales, 11 from Scotland, 5 N Ireland), 84/188 (45%) responded: 76/172 (44%) England and Wales, 4/11 (36%) from Scotland and 4/5 (80%) Northern Ireland. Thirty-six percent (30/84) of units reported managing 111 CYP with ≥ 1 IAb, not on insulin: 39/111 (35%) with a single IAb, and 72/111 (65%) with ≥ 2 IAb. CYP were identified from secondary (47%) and primary care (6%), as well as research platforms (47%). Reasons for early identification included family screening (42%), clinical symptoms suggestive of new-onset diabetes (37%) and following an autoimmune screen (21%). Clinical management included: providing education (23%), glycaemic assessment (18%) and referral to a research study (12%). To assess glycaemic status, clinicians used: HbA1c testing (32%), self-monitored glucose (14%), sensor glucose monitoring (14%), and OGTT (15%). Clinicians reported that if requested to test an unaffected sibling's diabetes risk, 17% would organise IAb testing in clinical care, 61% would refer to a research study, and 17% would not test, and reassure.
Discussion
CYP with early-stage T1D are increasingly being identified in the UK from research platforms, and primary/secondary clinical care settings. The prevalence of screening outside research platforms highlights the need for a UK consensus on a monitoring and follow-up clinical care pathway.

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P96

Endocrine dysfunction following positive thyroid and adrenal antibodies in children with newly diagnosed type 1 diabetes

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Introduction
Individuals with Type 1 Diabetes (T1DM) are known to be at risk of development of further autoimmune diseases. This study aimed to identify the prevalence of thyroid and adrenal autoimmunity and dysfunction in children with T1DM.
Methods
A retrospective case review was conducted of all children who presented to the Royal Hospital for Children, Glasgow with newly diagnosed T1DM between 01/09/2017-01/09/2022. Data were obtained regarding thyroid peroxidase (TPO) and adrenal antibody status and subsequent thyroid and adrenal function from diagnosis to 24/05/2024 to provide a minimum of 18 months follow-up per patient.
Results
In total, 503 children presented with a new diagnosis of T1DM during the study time period. Data were available for 372 (53% female) with a median age of 9.6 (0.9, 16.1) at T1DM diagnosis. Median duration of follow up was 3 (1.5, 5) years). TPO antibodies were tested at the time of diabetes diagnosis in 349 (94%) and 61 (17%) were found to have raised TPO antibodies. Five children who were not tested for TPO antibodies at diagnosis were found to have positive antibodies on screening when tested later. Girls were more likely to have positive TPO antibodies (71.2%, $P = 0.001$). Only 10/66 (15%) went on to develop thyroid dysfunction (hypothyroidism in all). Of these, 8 had hypothyroidism at the time of initial raised TPO antibody detection and 2 developed hypothyroidism 2.3 and 2.4 years after TPO antibody detection. Adrenal antibody status was obtained at T1DM diagnosis in 368 (99%). Only 3 of these children were found to have positive adrenal antibodies. Two (67%) patients positive adrenal antibodies detected at T1DM diagnosis and 1 child had adrenal antibodies detected prior to diagnosis. Neither of the 2 children with positive antibodies at time of diagnosis have developed adrenal dysfunction with follow-up periods of 3 and 6 years respectively.
Conclusions
Hypothyroidism occurs in 10-20% of T1DM children with raised TPO antibodies with the majority of these having detectable TPO antibodies at the time of T1DM diagnosis. Adrenal autoantibodies are less prevalent in children with T1DM as is the development of adrenal dysfunction following a positive autoantibody status.

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P97

Review of glycaemic control in type 1 diabetes patients following change from standardised insulin pump to hybrid closed loop

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Introduction
Hybrid closed loop pumps (HCL) incorporate insulin pumps (IP) with continuous glucose monitoring (CGM). We reviewed the glycaemic control of patients with Type 1 Diabetes(T1D) cared for at the Evelina who had upgraded from basal bolus regimen or IP to HCL between October 2020 and March 2024.
Method
As per standard care, patients were reviewed in clinic every 3 months and HbA1c was measured, and time in range (TIR) reviewed using CGM data.
Results
Overall, 46 patients had been upgraded, of which 22(47.8%) were males. Median age was 10 years (range 6-16). 27 were on standard insulin pumps and 19 were on basal bolus insulin regimen at the start of HCL. Mean HbA1c values were calculated before and after upgrade and TIR reviewed. The median Hba1c before HCL was 62 mmol/mol with mean of 66.57 mmol/mol and standard deviation (SD) of 17.76%. Mean HbA1c after 90 days of HCL initiation [$n = 35$] was 57.71 +/-12.07 mmol/mol and after 180 days was 55.32 +/-10.14. A single-tailed paired t-test was used to compare the means. When HbA1c before and 90 days after HCL was compared, it showed a p-value of 0.01. There was also a

significant improvement in mean Hba1c after 180 days of HCL (p value of 0.001). Mean TIR (%,$n = 35$) before upgrade was 49.35 +/-17.39 and 65.55 +/-12.85 after 90 days of HCL. TIR after 180days of HCL was 64.04 +/- 18.08 [$n = 28$]. There was a significant improvement of time in range with a p-value <0.001 when the mean TIR before and 90 days after HCL was compared. Similarly, when the mean TIR before was compared with TIR after 180 days of HCL, p value was 0.001.
Conclusion
Our review shows a significant improvement in glycaemic control following a switch from a standard IP or basal bolus insulin to a HCL in our paediatric patients with T1D.

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P98

Type 2 diabetes mellitus in children and young people: a single uk paediatric diabetes centre experience

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Background
Type 2 diabetes mellitus (T2DM) is increasingly prevalent in children and young people due to increasing rates of obesity. The benefits of a dedicated T2DM clinic include MDT input and standardisation of patient care. The aim of this study was to evaluate current practice for management of T2DM upon initiation of the first dedicated T2DM paediatric clinic in Scotland.
Methods
Retrospective review of clinical information via electronic patient records (Clinical Portal and the Scottish Care Information Diabetes Collaboration (SCI-DC) platform) of all CYP aged under 18 years diagnosed with T2DM between 2018 and 2023 at the Royal Hospital for Children, Glasgow.
Results
Of 814 patients under review at the paediatric diabetes service, 26 (3%) had T2DM ($n = 18$), impaired glucose tolerance ($n = 7$) or diabetes not defined ($n = 1$). Fourteen (54%) were female, 13 (50%) were Caucasian and 13 (50%) were from ethnic minority backgrounds. The median age at diagnosis was 13.7 years (range 9.6, 15.7) and duration of diagnosis was 2.7 years (0.2, 5.0). Thirteen (50%) were from very deprived areas (Scottish index of multiple deprivation (SIMD) deciles 1 to 3). All had a BMI of >25 at diagnosis; 14 (54%) had a BMI of >35. Ethnic minority groups had a lower BMI at presentation. There was no difference in BMI SDS at presentation and at 12 months [3.2 (2.3, 4.7) vs 3.1 (2.2, 4.5), $P = 0.58$]. HbA1c was lower at 12 months post presentation [51 (37,124) vs 45 (30, 105) mmol/mol], $P = 0.02$. A family history of T2DM was noted in 21 (81%); in 13 (50%), either one or both parents had T2DM. At presentation, 10 (38%) had metabolic complication. Over 60% of patients had psychiatric comorbidity ($n = 12$) or learning difficulties ($n = 4$). Pharmacologic treatment was commenced in 15 (58%) and included metformin monotherapy ($n = 6$), insulin monotherapy ($n = 3$), metformin and insulin ($n = 5$) and liraglutide ($n = 1$); 14 (54%) were still on pharmacologic treatment at 12 months post diagnosis.
Conclusion
A notable fall in HbA1c 12 months post diagnosis was observed, however, there was no change in BMI. An MDT approach with dietetic involvement from presentation is vital to reduce risk of metabolic comorbidity.

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Diabetes 6

P99

Type 1 diabetes and glut1 transporter deficiency syndrome: a case report

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Case History
A 7 year old presented with 4 weeks of polyuria, polydipsia and one episode of nocturnal enuresis. The child's past medical history was unremarkable, however, her parents reported that she was 'less bright' than her two siblings.
Initial assessment
The child appeared well. Urine dipstick testing showed 3+ glucose. Blood glucose was 17.5, blood ketones were 0.4 and blood gas values were within the normal range.
Results and treatment
The child was admitted to hospital overnight and commenced on the 'walking wounded' protocol (Levemir 0.2U/kg/bd, Novorapid 0.1U/kg with meals). At the time of hospital admission, HbA1c was 93 mmol/mol. Islet cell antibodies were >4,000 U/ml (normal range 0.0-7.5). Six weeks later whilst at home, she had an episode of transient limb weakness and abnormal posturing of her right arm. Her blood glucose was normal at the time of the episode. Cranial imaging was also normal. Four months later, she presented to hospital with disorientation, vomiting and intermittent abnormal posturing of her left arm. She was normoglycaemic with ketones of <0.4 at the time of these episodes. Lumbar puncture (carried out in a fasting state) showed a blood glucose of 17.2 and CSF glucose was 4 with a ratio of 0.23. Genetics results from an epilepsy gene panel showed a heterozygous likely pathogenic sequence variant in *SLC2A1* gene (GLUT1 deficiency syndrome). A ketogenic diet, the treatment of choice in GLUT1 deficiency, was initiated with complexities in managing her diabetes with a higher glucose threshold and a tailored ketone plan. She commenced insulin hybrid closed loop pump therapy and has been stable from a neurocognitive perspective for 2 years.
Conclusion and points for discussion
GLUT1 deficiency syndrome is a rare condition and the likelihood of having this condition concurrently with T1DM is even rarer. The efficacy of ketogenic diets in GLUT1/epilepsy syndromes have been previously reported. Concurrent management of these two rare conditions has been complex but aided by hybrid closed loop therapy and individualisation of care.

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P100

Werner syndrome – a rare presentation with acanthosis nigricans

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Introduction
As the prevalence of obesity increases, incidence of childhood onset type 2 diabetes mellitus (T2DM) has significantly risen, most children having a family member with T2DM. Acanthosis nigricans, marker of insulin resistance, is often noted on presentation. We describe a case of early-onset severe acanthosis nigricans and T2DM in a lean Asian Bangladeshi girl with a rare progeria partial lipodystrophy disorder, highlighting the benefit of genetic testing in unusual cases.
Case
11.4 years old girl was reviewed for severe acanthosis nigricans present since 5.5 years-age. There was a strong family history of T2DM present in her mother, father and maternal grandmother. Parents were non consanguineous. On examination, she had normal growth parameters with height 137.5 cm (-1.09 SDS), weight 32.9 kg (-0.72 SDS) and BMI of 17.4 (-0.16 SDS). Widespread severe acanthosis nigricans, more marked on her face, neck, and skin folds. She had a long narrow face, mild truncal adiposity, thin hair, slender arms and legs. Investigations showed a normal HbA1c 29 mmol/mol (<48), fasting random glucose (BGL) 3.9 mmol/l (3.5-11) with high insulin 63.6 mU/l (2.6-24.9). Baseline pituitary bloods were pubertal and normal. An oral glucose tolerance test confirmed T2DM with fasting glucose 5 mmol/l (<7) and insulin 113mU/at 0min, rising to glucose 13.4 mmol/l (<7.8) and insulin >1000mU/l at 120min. Prolonged OGTT identified dumping syndrome at 270mins with symptomatic hypoglycaemia to 2.5 mmol/l, with insulin 336mU/l, and poor ketogenic response. Diabetes antibodies were negative. Dyslipidaemia, was present with low HDL- 1.0 mmol/l (1.2-1.7) and fatty liver was identified on ultrasound. Due to her slender habitus, MODY genetic testing was requested which showed homozygosity for a pathogenic *WRN* frameshift variant which had previously been reported only *in trans,* confirming Werner Syndrome (WS).
Conclusion
Werner syndrome (WS) is an autosomal recessive, adult-onset segmental progeria syndrome with highest incidence at approx. 1:40,000 in Japan. Cardinal features include bilateral cataracts, premature scalp hair thinning, short stature and characteristic skin lesions. T2DM is present in 71% and there is high risk of neoplasms. Early identification is important in establishing preventative and screening health management. This case highlights the value of MODY genetic testing in unusual presentations of T2DM.

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P101

An analysis of the presence of vascular complications from type 1 diabetes mellitus based on ethnicity and deprivation quintile in a single centre

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Introduction
The National Paediatric Diabetes Audit (NPDA) Report for 2022 to 2023 recommended that all children and young people should have equitable access to diabetes care, regardless of social deprivation, ethnicity, or geography.
Aim
To investigate if ethnicity or socio-economic status impacted the development of vascular complications in patients with type 1 diabetes mellitus (T1DM) undergoing annual diabetes screening.
Methods
Retrospective case notes review (2021-2024) was undertaken for patients cared for at Birmingham Children's Hospital (BCH) aged over 12 years with a diagnosis of T1DM for at least 3 years. Data collected included demographics, Index of Multiple Deprivation (IMD) quintiles and the presence of vascular complications including microalbuminuria, diabetic retinopathy, blood pressure and hypercholesterolaemia. Statistical analyses were performed using Fisher's exact t-test and Spearman correlation.
Results
160 patients met the eligibility criteria (49% male and 51% female). The median age at diagnosis was 8 (0.9-16) years and the median HbA1c was 61 (37- 143) mmol/mol. The majority, 56% were from IMD quintile 1, 19% from quintile 2, 16% from quintile 3, 4% and 5% from quintiles 4 and 5 respectively. 41% were of White ethnicity followed by Asian ethnicity at 35%, Black at 11%, Mixed/Multi-ethnic at 6% and 7% of other ethnicity. 10% developed microalbuminuria, 18% hypertension, 9% had hypercholesterolaemia and 12% had evidence of diabetic retinopathy. There was a statistically significant negative correlation between the deprivation quintile and HbA1c, ($r = -0.247$, 95% CI -0.3914 to -0.09113, p value 0.0016).
Discussion and Conclusion
Our data has shown that higher deprivation levels correlate to a higher HbA1c as per previous reports. Despite this, our rates of vascular complications were similar or below the national average. There were no significant differences in the development of vascular complications based on ethnicity and IMD quintiles. This is likely to be due to the small number of patients who develop vascular complications before transitioning to adult services and the high numbers of patients from the most deprived quintile in our centre. Further work on national datasets is currently ongoing.

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Pizza party socials for young people with diabetes and their families to promote peer support and education

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Introduction
We wanted to re-start local socials for young people with type 1 diabetes and families. In this way forming a network and peer support, accessing diabetes education in an informal environment.
Method
Themed sessions, innovative party games and puzzles for the first session, things like buzz wire, toddler shape sorter blindfolded, how many pins can you get in a potato one handed-using scissors, spot the difference etc. The second session 3 months later we did clay crafts, making a family tree mobile out of clay cut outs. This in particular encouraged 'tree of life' discussions and who supports them to be the person they are. The diabetes MDT were present and on hand for questions, with resources to hand, like Digibete, pump info, carbohydrate counting info etc. Food wise, we decided to make it all gluten free, making it much easier for those that have coeliac disease. Funding came from money through Jack Petchy awards.
Results
1st time - 6 families attended
2nd time - 14 families attended
Feedback:
100% of families would recommend the sessions 'It was perfect' 'We are so grateful to such a wonderful team, not only providing amazing medical care and advice, but go above and beyond providing opportunities for the children to have fun and feel normal' 'I can't thank the diabetes team enough for these sessions' 'Great afternoon, the kids enjoyed clay making' 'She was excited to see the friends she made last time and is already talking about the next one'
Conclusion
These sessions do seem to help 'normalise' diabetes. They are a fantastic way to build networks for families and a great informal way of learning more about their diabetes. Having free food seemed an incentive for families to come to these as we did put them on at tea time. Food also gave rise to discussion around insulin doses. The team enjoyed these and it helped new MDT members get to know their colleagues. Having feedback really boosts team moral and focus's team direction for the future. We have excellent photos of the evenings and a short film we made.

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P103

Understanding paediatric DKA risk at university hospital bristol NHS foundation trust

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Objectives
The objective of this single-centre study at the University Hospitals Bristol and Weston (UHBW) is to ascertain the incidence of diabetic ketoacidosis (DKA) in children with new-onset type 1diabetes and known patients with type 1 diabetes (T1D), and to explore the reasons for DKA among these groups during the period of October 2022-October2023
Methodology
The characteristics of patients who presented with DKA between October 2022 and October 2023 were documented. Data was collected retrospectively from the medical records of these patients.
Results
- **Total Episodes of DKA:** 42 DKA episodes from October 2022 to October 2023.
- **Newly Diagnosed vs. Known T1D:** 54% were newly diagnosed, and 46% were known T1D patients.
- **Gender Distribution:** 52% females, 48% males.
- **Ethnicity:** 80% of the patients were from a white ethnic background.
- **Age Range:** 2-17 years, with a mean age of 12 years.
- **IMD Score:** 20% of the known patients have an IMD score of 3 or lower, while 64% of the population has an IMD score of 5 or lower.
- **Insulin Management in Known T1D Patients:**
  - o 90% were on multiple daily injections (MDI).
  - o 10% were on an insulin pump.
- **Reasons for DKA in Known T1D Patients:**
  - o 64% due to insulin omission.
  - o 26% due to inter-current illness.
- **Management and Education Gaps in Known T1D Patients:**
  - o None had contacted the Paediatric Diabetes Specialist Nurse (PDSN) 48 hours prior to admission.
  - o None had followed sick day rules.
  - o Only 5% had checked ketones in the 48 hours prior to admission.
- **Reasons for DKA in New Onset T1D Patients:**
  - o 43% due to lack of awareness of diabetes symptoms among families.

Conclusion
The findings indicate a critical need for close follow-up and enhanced education and support for patients with type 1 diabetes, especially those from lower socioeconomic backgrounds as identified by IMD scoring. Furthermore, there is a significant need for improved public education about the symptoms of diabetes to reduce the incidence of DKA at the time of diagnosis.

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P104

Identifying barriers to technology use in children and young people (CYP) with type 1 diabetes

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Background
The latest NPDA data has demonstrated that technology use through Continuous Glucose Monitoring (CGM) and Hybrid-closed loop (HCL) is associated with better glycaemic control. A particular national focus is to reduce health inequalities and provide an equitable access to technology.
Aims
1. To identify the barriers for CYP with T1DM to adopting diabetes technology and address these to bridge health inequalities. 2. To look at the ethnic breakdown of those not using technology.
Methods
Our paediatric diabetes database (0-18 year olds) was used to identify patients not using technology. A questionnaire was designed to understand whether technology was offered, used in the past, reasons for discontinuing and barriers for use. Questionnaires were completed during clinic or by telephone. This QIP was registered with Clinical Effectiveness.
Results
- 44 patients (17.6%) met eligibility criteria.
- 6 CYPs were excluded as they had been recently diagnosed.
- 4 patients expressed an interest to use pump therapy and were excluded.

Of the eligible 34 CYP (13.6%), 30 questionnaires were distributed (12%) with 26 responses.
- 16 (61.5%) on CGM.
- 10 (38.5%) not on CGM. Of which 6 (23%) previously used and 4 (15.5%) never used.
- 23 (88.5%) never used pump therapy.
- 3 (11.5%) used and discontinued.

Reasons for not using technology
- Discomfort, Inaccurate readings.
- Too bulky, prefer size of sensor.
- Fear of dislodgement and DKA.
- Interference with sports.
- Visibility, Affects behaviour and emotion.
- Happy with finger pricks and injection.

17% of our CYP are Black, 32.5% Asian and 34% White
Table: Ethnic breakdown of those who are not on CGM or pump

	Not on CGM - 10	Previous CGM use - 6	Not on Pump - 26	Previous Pump use 3	Ethnic breakdown of those not using technology (%)
Black, Black British, Caribbean or African	3	2	6	1	34
Asian or Asian British	2	2	10	0	46
White	3	1	5	1	30
Mixed/Other	2	1	2	1	15

Conclusions
Advancement in technology has improved diabetes management. Most of CYP with T1DM use technology. Barriers to adopting these occur for many reasons therefore support, education and continuing to offer technology is essential to improve uptake in the future.

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P105

Outcomes from hybrid closed-loop therapy in children and young people with type 1 diabetes at leeds children's hospital

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Introduction
Between June 2023 and February 2024, 161 children and young people (CYP) with Type 1 Diabetes (T1D) were started on the Omnipod 5 automated insulin delivery pump at Leeds Children's Hospital. Outcomes were analysed for these CYP and provisional findings are presented. As more data becomes available further statistical analysis will be performed; including comparison with other hybrid-closed loop (HCL) systems, enabling the evaluation of outcomes for all CYP on HCL under our care.
Methods
Patient demographics, treatment therapy prior to HCL, glucose metrics, pump settings and any diabetes-related hospital admissions were collected from electronic patient records and manufacturer's online databases. Pre- and post-HCL glucose metrics were analysed at 3 monthly intervals. Subgroup analysis was performed based on age, sex, ethnicity and index of multiple deprivation (IMD) as well as individual pump settings.
Results
161 CYP aged between 2 and 21 years of age (average 14.1 years; 81 male, 80 female) were included. The mean glycosylated haemoglobin (HbA1c) of 61.9 mmol/mol prior to HCL fell to 57.2 and 55.3 mmol/mol at 3 and 6 months respectively. The largest fall in HbA1c was seen in patients from black and mixed-race ethnicities; 69.6 reduced to 57.3 mmol/mol and 65.3 to 54.8 mmol/mol respectively at 6 months. HbA1c fell from 68.3 to 57.2 mmol/mol in patients from IMD quintile 1. Patients with an automated mode of 100% ($n = 49$) had the lowest mean HbA1c at 3 months; 49.4 mmol/mol. Time in range increased from a mean of 49% to 60% and 61% at 3 and 6 months respectively. Time below range reduced from 3% prior to HCL to 1.9% at 6 months. Female CYP saw a larger drop in HbA1c; 64.3 to 54 mmol/mol compared to male CYP; 59.5 to 56.9 mmol/mol at 6 months. 15 patients were admitted to hospital with diabetes-related complications; 5 in diabetic ketoacidosis.
Conclusion
HCL therapy resulted in improvements in glycaemic control, reduced hypoglycaemia and increased TIR for the majority of CYP reviewed. The largest improvements were seen in patients from black and mixed-race ethnicities and those from IMD 1.

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P106

Searching for hidden MODY in a paediatric diabetes clinic – a clinical review

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Question
What is the Prevalence of undiagnosed Monogenic diabetes mellitus when a formal case ascertainment protocol is followed?
Background
The estimated prevalence of monogenic diabetes in the UK is 3.6%. The UNITED study (Shields et. al 2017) reported the use of urinary c-peptide:creatinine ratio (UCPCR) and autoantibodies as biomarkers to screen diabetes cohorts diagnosed at <30y and currently <50y in two UK cities. Cases found to have UCPCR ≥ 0.2nmol/ mmol had autoantibody testing (GAD and IA2). Those with negative autoantibodies then had genetic testing for monogenic diabetes. MODY rates in our clinic are 0.6% (Table 1).
Methods
A modified version of the UNITED protocol was used to screen our patients for monogenic diabetes. We aim to send autoantibodies (GAD, IA2 and ZnTr8) in all newly diagnosed patients. UCPCR was measured in CYP with diabetes duration >3yrs and negative autoantibodies. Those with UCPCR ≥ 0.2nmol/ mmol and not phenotypical of type 2 diabetes mellitus, underwent molecular genetic testing for monogenic diabetes (R141).
Results
Rates of monogenic diabetes in our clinic population were lower than reported in other studies (Figure 1). Results are summarised in Figure 1.
Discussion
Using biomarkers for MODY screening within a clinical has limitations. Collection of UCPCR 2 hours after a large carbohydrate meal was challenging which may increase rates of false negative UCPCR and reducing case detection. Some autoantibodies were measured >5 years from diagnosis which could increase false positives, leading to unnecessary costs. To date, one child has been re-classified as ketosis-prone diabetes and was able to come off insulin. If all 5 children selected for genetic testing ultimately have a monogenic diagnosis, the prevalence rate in our clinic would be 1.9%, which would be below that reported

Table 1 NPDA Diabetes Types Breakdown in Nottingham Childrens' Hospital 2022-2023.

Diabetes Type	n, %
Type 1 Diabetes	418 (90.5%)
Type 2 Diabetes	27 (5.8%)
CFRD Diabetes	5 (1.1%)
MODY	3 (0.6%)
Other	9 (1.9%)

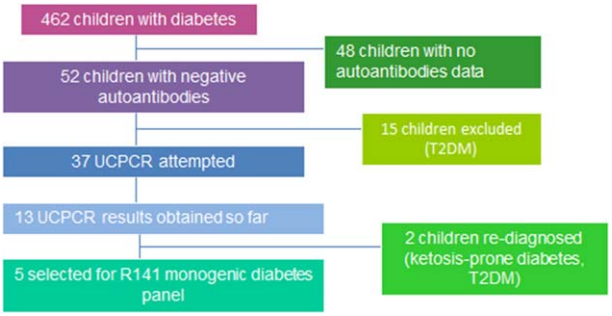

Figure 1 Results of MODY screening using modified UNITED study methods

in the UNITED study. Despite variations in genetic testing rates, we wonder whether there could be regional genetic clustering of MODY.

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Gonadal, DSD and Reproduction 2

P107

First description of kisspeptin unresponsive hypogonadotrophic hypogonadism, anosmia with olfactory hypoplasia (kallmann syndrome) and obesity due to an MC4R variant

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Introduction
Pathogenic *MC4R* gene variants result in hyperphagia and early onset obesity, but puberty is not usually affected. We recently assessed spontaneous LH and FSH pulsatility, response to LHRH and kisspeptin in a previously presented male with anosmia, delayed puberty (Tanner stage A2P1G1, 5ml testes) and obesity (BMI 30.7 kg/m^2) and a *MC4R* variant.
Results
GnRH test showed borderline low peaks (LH 5.0 U/l, FSH 2.6 U/l) and inhibin B 108pg/mL (25-325 pg/ml). MRI brain showed hypoplastic olfactory bulbs, absent olfactory sulci and normal pituitary. CGH microarray, karyotype and the R148 hypogonadism gene panel were normal. Whole exome sequencing in the Genetic Factors Affecting Timing of Puberty Study showed no abnormalities in 52 known genes associated with GnRH deficiency but detected a previously described pathogenic heterozygous variant *MC4R* c.542G > A, p.Gly181Asp, (PM2, PS4, PS3), absent from control databases. University of Pennsylvania Smell Identification Test confirmed anosmia. Testosterone was commenced and stopped on progression of testicular size (10ml) but restarted due to failure to progress in puberty. Aged 26 years, an 8 hour pulsatility study (10 minute sampling) demonstrated low amplitude LH pulses (7 pulses, max LH 0.5 U/l). GnRH stimulation showed a normal pituitary response (LH peak 7.24 U/l, FSH peak 1.89 U/l). However, Kisspeptin-54 (6.4nmol/kg) stimulation demonstrated no increment in LH response, consistent with GnRH deficiency.
Discussion
*MC4R(*p.Gly181Asp) leads to complete loss of function due to reduced cell surface expression and a-MSH binding. Heterozygous p.Gly181Asp variants have been described in several children/adults with obesity. Homozygous *MC4R* p.Gly181Asp was found in a male with obesity and partial HH thought due to abnormal GnRH production. We are the first to describe a heterozygous *MC4R* p.Gly181Asp variant in a patient with obesity and partial hypogonadism due to absent hypothalamic response to kisspeptin, anosmia and hypoplastic bulbs. Interaction between POMC-MC-leptin circuits and Kisspeptin-GnRH circuits is recognised but not well understood. Kisspeptin neurons express MC4R and KNDy neurons receive synaptic input from POMC neurons. Our results highlight the value of kisspeptin testing for diagnosing GnRH deficiency and support a role for MC4R in GnRH secretion by affecting the kisspeptin-GnRH pathway and potentially olfactory/GnRH neuronal development.

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P108

Towards best practice therapies for patients with gonadotropin deficiency in minipuberty and puberty

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Gonadotropin deficiency, secondary either to hypogonadotropic hypogonadism with hypothalamic gonadotropin-releasing hormone (GnRH) deficiency, or to combined pituitary hormone deficiency, is a rare condition where even expert centres manage only small numbers of patients each year. Best practice therapies are not clearly defined, although the case for supporting replacement of combined gonadotropins - in infancy to replace minipuberty and in adolescence to replace puberty - in male patients is developing at pace. Optimal management of females in childhood has been minimally studied. A key step in improving understanding of best practice in this condition is the collection of geographically widespread data. This is facilitated by standardised and accessible international data collection. Our group has established protocols for both gonadotropin replacement of puberty in males with hypogonadotropic hypogonadism, and of minipuberty in infancy in males with central hypogonadism with micropenis and/or cryptorchidism. We are developing a new **electronic registry of hypogonadotropic hypogonadism** (I-HH registry, 4th module in the sex development and maturation [SDM] registries series), due to go-live in summer 2024, and an international survey of clinicians to assess current practice in minipuberty. Both the I-HH module and international survey have been created by an international consortium of paediatric endocrine clinicians. An initial project to review data from patients registered with hypogonadotropic hypogonadism within the existing I-DSD Registries has assessed data on 60 patients from 7 countries. Patients are split between Kallmann syndrome and normosmic hypogonadotropic hypogonadism, with 67% males and 33% females. Data are available on diagnostic testing, family history and follow up. Future analyses within I-HH will examine pubertal induction practices, including therapeutic regime, monitoring practices and response to therapy. This database is also key to recording long-term outcomes for young patients, particularly pertaining to fertility. The **minipuberty survey** using the Jotform platform will capture data on referral pathways, investigations for absent male minipuberty and replacement with either testosterone or central hormone therapy. Distribution channels include society newsletters, national and international conferences, and email snowballing. Results of the survey will depict the current landscape of male minipuberty and guide efforts to address barriers to diagnostic testing and optimal management of gonadotropin deficiency.

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P109

The link between non ketotic hyperglycinaemia (NKH) and precocious puberty in a young child: -a case report

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Non ketotic hyperglycinaemia (NKH)is due to a mutation in the glycine cleavage enzyme system leading to accumulation of glycine in the body especially in the spinal cord and brain. Patients typically present with neurological problems. Some NKH symptoms involve the inhibitory strychnine-sensitive glycine receptors, whereas the pathogenesis of seizures involves the excitatory strychnine-insensitive glycine receptors belonging to the N-methyl-D-aspartate (NMDA) receptor complex. Onset of puberty is marked by increase in pulsatile secretion of gonadotropin releasing hormone (GnRH). A previous report of an 11-month-old-girl with NKH and precocious puberty which regressed with anti-convulsive treatment with gamma-aminobutyric acid (GABA) agonists led to the hypothesis that excessive stimulation of the NMDA receptors linked to the Gonadotropin hormone-releasing hormone (GnRH) neurons by glycine led to the occurrence of precocious puberty in the child. This hypothesis is supported by *in vitro* studies in 15-day-old male rats which showed that glycine concentrations

of 1-10 micromol/l increased the pulse frequency of GnRH secretion. We report another case of a 5-year-old girl with NKH presenting with precocious puberty providing more evidence of association of excessive accumulation of glycine and precocious puberty.

Case report

5-year-old girl presented with new onset breast enlargement which was progressively getting bigger over the last 5 months. She had a background of NKH, global developmental delay (GDD), cortical visual impairment and Intractable epilepsy which were diagnosed in neonatal period. She was born at Term with Birth weight 2.8 kg. On examination she has obvious features of GDD. Pubertal examination showed breast enlargement stage 2 with no pubic hair, axillary or menarche. All other systemic examinations are unremarkable. Investigations showed that the luteinising Hormone (LH) rose from 1nmol/l to a peak of 32nmol/l and follicle stimulating hormone (FSH) rose from 4nmol/l to peak of 47nmol/l following GnRH stimulation test. Transabdominal pelvis ultrasound showed normal anteverted uterus with endometrium thickness 2. 3mm. The ovaries were not visualised. An incidental haematocolpos was present. MRI scan brain showed white matter loss with thinning of corpus callosum, asymmetrical atrophy, ventriculomegaly and central hypoplasia.

Conclusion

This case adds further evidence to association between excessive glycine and development of precocious puberty.

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The mini-puberty that occurred too late

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A 6-month-old, ex premature 25-week-old girl, presented with 7 episodes of painless vaginal bleeding over 48 hours period and breast development. She was born to a non-consanguineous couple and had normal female genitalia at birth with slightly enlarged clitoris. Her mother had pre-eclampsia and focal segmental glomerulonephritis. Baseline investigations (full blood count, liver/kidney/thyroid function and clotting) were all normal. Endocrine investigations included urine for steroid profile and brain MRI, both normal [ND1]. Transabdominal pelvis ultrasound revealed normal adrenals and prepubertal uterus and follicular appearance of the ovaries measuring 18×10×12 mm on the right, and 12×5z13 mm on the left. The first LHRH test showed a pubertal, LH predominant response. As it was felt this could represent atypical mini-puberty (due to prematurity), puberty suppression was withheld. The repeat LHRH test after 2 months is shown below. She remained under regular follow-up for 6 months. There has not been any further vaginal bleeding, and pubertal signs regressed. LH and oestradiol have remained prepubertal.

Table 1: Shows the results of the first LHRH test:

LHRH test	Baseline	30 min	60 min
FSH	4.2 IU/l	11.2 IU/l	15.6 IU/l
LH	1 IU/l	24 IU/l	23.6 IU/l
oestradiol	136 pmol/l	*	*
Prolactin	618 mUnit/l	*	*

Table 2 shows 2nd LHRH test results after 2 months.

LHRH test	Baseline	30 min	60 min
FSH	3.8 IU/l	12.9 IU/l	15.4 IU/l
LH	0.4 IU/l	10.4 IU/l	8.2 IU/l
oestradiol	<37 pmol/l	*	*
Prolactin	256 mUnit/l	*	*

Discussion

Mini-puberty in preterm babies is similar to full-term babies but follows a slightly different pattern. The hypothalamic-pituitary-gonadal axis activation is more prolonged. In preterm girls, there is a more pronounced and prolonged increase in FSH levels, and it is a self-resolving condition that gradually returns to the pre-pubertal state without the need for hormonal treatment. However, close monitoring by a paediatric endocrinologist is recommended.

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P111

A double-edged sword: tough decisions for a young person

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Case Report

A 16.4 year-old patient presented with a history of headaches and maternal concerns that these may be hormone-related due to primary amenorrhoea. There was also a history of low mood and self-harm, known to a private counsellor. The patient was a competitive swimmer at national level and had attributed amenorrhoea and lack of breast development to this, and viewed it positively. Examination revealed androgenised features, clitoromegaly and absence of typical female pubertal progression with pubertal development B1 P4 A3. Investigations showed normal baseline bloods, normal 17-OHP, low oestradiol, high androstenedione and borderline high testosterone. Pelvic ultrasound indicated the absence of Müllerian structures, with inguinal structures suggesting undescended testes. Genetic karyotyping confirmed 46XY genotype. Urine steroid profiling revealed excess adrenal androgens relative to cortisol metabolites, excluding alpha reductase and 17-alpha hydroxylase deficiency. These results were available to the team at the local joint endocrine clinic, but a considered decision was made not to share them at this stage given the significant psychological burden with background mental health concerns. When seen in the specialist MDT, further genetic results had confirmed 17-beta-hydroxysteroid dehydrogenase 3 (HSD17B3) deficiency. Management involved comprehensive counselling about the condition, its implications and treatment options. The MDT including endocrinologists, gynaecologists, and psychologists, played a crucial role in the patient's care. The patient faced a challenging decision: continue with the current hormone imbalance or initiate hormone replacement therapy (HRT) with oestrogen to promote female secondary sex characteristics, while using GnRH analogues to suppress androgen production. The patient, despite initial reluctance due to potential impacts on swimming ability, opted for oestrogen HRT.

Discussion

HSD17B3 deficiency is a rare, autosomal recessive disorder of sex development (DSD). Clinical presentation at birth is variable, but children are often initially raised as girls then develop male secondary sex characteristics during puberty. There are numerous complexities in managing DSD, with nuances specific to individual patients. This patient's journey illustrates that patient autonomy can be both empowering and daunting, feeling like a double-edged sword. It underscores the importance of a multidisciplinary approach in managing DSD, highlighting the need for clear yet sensitive communication with psychological support.

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Clinical decision making based on LHRH test: an audit of practice in a tertiary center

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Introduction

The LHRH (luteinizing hormone releasing hormone) is routinely performed for both precocious (PP) and delayed puberty (DP) in children.

Aim

To assess utility of LHRH test results in guiding clinical decisions.

Materials & Methods

In this pilot study, we retrospectively studied LHRH tests done in 2019. A peak luteinizing hormone (LH) (pLH) $\geq$ 5 IU/l and an LH:FSH (follicle stimulating hormone) ratio $>$ 1 indicated a pubertal response, pLH $<$ 5 IU/l indicated a pre-pubertal response. Pubertal status at discharge was noted for the DP cohort

Results

71(35M:36F) tests were done in 2019. 39 (10M:29F, mean age 7.41 years) were done to assess PP and, 32 [23M:6F:3 disorder of sex development (DSD), mean age 13.81 years] for DP.

Precocious puberty

31% (11/35) tests showed a pubertal response. GnRH analogue treatment was given to all boys with pLH$>$ 5 IU/l (n = 5) and females with pLH $\geq$10 IU/l (n = 5), regardless of LH: FSH ratio, and in selected females with pLH 5-9 IU/l *and LH*: FSH $>$1 (n = 1).

Delayed puberty

Of the 32 tests, 78% (25) showed a pubertal response and 22% (7), a prepubertal response. 15 (13M, 2F) of those with pLH$>$5 had constitutional delay in growth

and puberty (CDGP), and hypogonadism was ruled out in two DSD cases. 6 were lost to follow up. Testosterone therapy was given to 3 of 4 males with pLH < 5 IU/l, both with pLH 5-8 IU/l, and 66% (6/9) with pLH > 8 IU/l. Where long term data was available, of those with pLH > 5 IU/l, 92% (12/13) males and 75% (3 of 4) females progressed spontaneously in puberty. One male and one female developed hypogonadotropic hypogonadism at follow up. Of those with pLH < 5IU/l all 5 (3 males) with long term data, remained on sex steroid replacement at transition.

Conclusion

Whereas the practice to use GnRH analogue treatment in Precocious puberty with pLH > 5 was uniform, sex steroid therapy for Delayed puberty was variable across pLH subgroups. pLH > 5 IU/l had a positive predictive value of 88% for spontaneous pubertal progress and pLH < 5IU/l was highly sensitive to predict continued sex steroid replacement at transition.

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P113

Standardisation of care for boys with 47,XXY in the west of scotland

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Background

Klinefelter syndrome (KS) is a sex chromosome disorder characterised in males by a 47, XXY genotype. There is a highly varied phenotypic spectrum among affected individuals, which may present challenges with standardisation of care.

Aims

To determine the clinical characteristics of boys with 47, XXY seen at a tertiary paediatric endocrine clinic in the West of Scotland and develop checklists to standardise care.

Methods

A single centre retrospective observational study was undertaken of all known boys with KS seen at the tertiary endocrine clinic. We gathered data identifying various clinical characterstics of KS within our patient cohort as well as details on their current management and involvement of different medical specialists in their care. From this, we generated checklists to aid in the future care of boys with KS.

Results

We identfied 56 male patients with a confirmed diagnosis of KS between 2004-2024. Data were available for 48 (86%) of these boys. Twelve (25%) of the 48 boys were diagnosed prenatally and for the remaining 36 boys, the median age (range) at diagnosis was 4.8 (0, 17) years. Motor delay was present in 15 (31%) and speech delay in 21 (44%). We identified associated neurocognitive and mental health disorders (eg. anxiety, depression, Attention Deficit Hyperactivity Disorder, autism spectrum disorder) in 29 (60%). Of the 32 boys of pubertal/post-pubertal age, 16 (50%) had biochemical evidence of gonadal dysfunction and were subsequently on a form of testosterone replacement therapy, and had been referred for fertility evaluation.

Conclusions

In conclusion, a deeper understanding of the broad phenotypic spectrum of KS is an integral step towards improving standardisation of care in these patients.

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Miscellaneous/Other 2

P114

Diazoxide hypersensitivity in neonatal hyperinsulinism due to HNF4A variants

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Background

Dominant inactivating mutations in the *HNF4A* gene have been associated with diazoxide-responsive hyperinsulinism (HI) during the neonatal period. However, there is limited literature reporting exceptional diazoxide sensitivity in neonates with HI due to novel *HNF4A* mutations. Objectives: To report on five neonates with HI due to *HNF4A* gene mutations who developed diazoxide-induced hyperglycemia and to explore phenotype-genotype correlations.

Methods

Retrospective data collection of five neonates (3 females, 2 males) diagnosed with HI due to a heterozygous pathogenic *HNF4A* variant, who developed diazoxide-induced hyperglycemia soon after starting diazoxide treatment. Two probands were siblings.

Results

All neonates presented immediately after birth with hypoglycemia and high glucose requirements (glucose infusion rate [GIR] range 17-20 mg/kg/min). Diagnosis of HI was confirmed by hypoglycemia screen. Subsequently, diazoxide was administered at doses ranging between 2–5 mg/kg/day during the second week of life, leading to marked hyperglycemia (maximum 15 mmol/l) within a few days in all five cases. Discontinuation of diazoxide was necessary for blood glucose normalization, but all infants exhibited persistent HI upon cessation. Therefore, a lower dose of diazoxide (1-2 mg/kg/day) was restarted, effectively controlling HI. Genetic testing confirmed heterozygosity for different pathogenic *HNF4A* variants, apart from the two siblings that were carrying the same variant, maternally inherited in four cases and paternally in one.

Conclusion

Diazoxide-induced hyperglycaemia is a rare adverse effect observed in neonates with HI due to *HNF4A*variants, necessitating temporary cessation of treatment. Upon confirmation of persistent HI, restarting diazoxide at a lower dose can effectively manage the condition. Our cohort did not demonstrate mutation-specific predisposition to this complication, highlighting the importance of clinician and caregiver awareness regarding this risk.

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P115

Enzymes in endocrinology: gynaecomastia in a 5 year old boy

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Introduction

Aromatase excess syndrome (AEXS) is a rare autosomal dominant disorder caused by gain-of-function mutations in the aromatase gene (*CYP19A1*). It is characterised by pre or peripubertal gynaecomastia due to increased estrogen production from circulating androgens. Other features include advanced bone age, signs of testosterone deficiency such as small testis, high pitched voice and sparse facial hair in males, with macromastia and early puberty in females.

Case presentation

We report a 5 year old boy who presented with bilateral gynaecomastia and no features of pubertal development. He was otherwise healthy with no systemic disease or medications usage. His parents are nonconsanguineous and of Gambian descent. There was no family history of gynaecomastia in males nor macromastia or early puberty in females. At presentation, the patient was of lean build with height of 115.8 cms(+1.3SDS), weight of 19.5 kg (+0.3SDS) and BMI of 14.5 kg/m2 (-0.9SDS). He had bilateral breast tissue of B3-4 staging. Investigations showed 46XY karyotype, normal thyroid function and prolactin, undetectable FSH and LH, undetectable testosterone and androstenedione, with moderately elevated estradiol concentration for age (99 pmol/l). Urine steroid profile was normal. Ultrasound abdomen did not show any abdominal or testicular masses, except for few calcific foci in both testes consistent with testicular microlithiasis. Bone age was significantly advanced at 8.4 years with a chronological age of 5.1years (+4.6 SDS). Genomic analysis for disorders of sex development did not identify any pathogenic variant. Microarray CGH studies showed no evidence of copy number variant of the region including CYP19A1 and DMXL2 genes; further inversion analysis is pending. He was clinically diagnosed with AEXS with advanced bone age and raised estradiol concentration, having ruled out other causes of prepubertal gynaecomastia. The patient was managed with the aromatase inhibitor Letrazole, at dose of 2.5 mg once daily. He demonstrated an excellent initial response with undetectable estradiol concentration and reduction in breast size at 8 weeks.

Conclusion

This case highlights the rare diagnosis of AEXS (prevalence < 1in 1000000) in prepubertal child with gynaecomastia and advanced bone age. Treatment of this condition includes long term use of aromatase inhibitors with or without GnRH analogues or surgical mastectomy.

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P116

Looking beyond the obvious in a case of precocious puberty

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Introduction
Precocious puberty (PP) in boys merits a thorough clinical review as an organic cause is more likely. This case reports an unusual cause of PP.
Case Report
A 5-year-old boy with a background of prematurity presented with PP. There was no family history of early puberty. Central PP was confirmed by a luteinising hormone-releasing hormone test (peak LH 5.8iu/l and FSH 3.0iu/l) and further investigations were performed (table1). He was managed with 8-weekly gonadotropin releasing hormone analogue (Goserelin), which was increased to 4-weekly secondary to aggressive behaviour and detectable hormones (table1). A discrepancy was found between venous and capillary testosterone levels raising the possibility of exogenous testosterone exposure (table1). The safeguarding team supported discussions with contacts, including family and school staff, but no history of topical testosterone was identified. Anastrozole and Bicalutamide were introduced to reduce synthesis and action of testosterone as his symptoms could not be controlled. Continued efforts were made to find an extraneous cause of testosterone. The patient's father, who was not living with him, but had daily contact informed us about his transdermal testosterone therapy. He then voluntarily switched to parenteral testosterone to minimise exposure. Anastrozole and Bicalutamide were discontinued and Goserelin was reduced to 10-weekly, with an improved clinical trend (table1).
Discussion
This case highlights the importance of considering unusual causes of PP. Transdermal testosterone transfer occurred despite clear patient information leaflets and precautionary measures. Regularly educating patients with the symptoms that may occur in contacts during accidental transfer is essential. It also highlights the need to obtain information from all family contacts as this may not be readily known due to it being confidential and sensitive in nature.

Table 1 Investigations

	5.6yrs	6.3yrs	6.5yrs	6.6yrs	6.6yrs	8.3yrs
Height cm (SDS)	121 (+ 1.55)					140.9 (+ 2.06)
Mid-parental height SDS	-1.10					
Pubertal exam	A1,P3,-G3,b-ilat-eral TV 5mls					A0,P2,-G2,-RTV 3ml,-LTV 4ml
Bone Age (years)	9.2			11.2		11.7
Lutenising Hormone (iu/l,NR2-10)	0.2		1.4	1.1		0.3
Follicle Stimulating Hormone (iu/l;NR2-8)	0.4		0.7	0.5		0.6
Capillary Testosterone (nmol/l;NR9-40)		36.4	798	73.6	324	
Venous Testosterone	1.4		5.6	2.3	2.9	1.3
Urine Steroid Profile	Normal					
MRI head	Pubertal pitu-itary					
Ultrasound adrenals/testes		Normal				

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P117

Optimising risk stratification for aortopathy in turner syndrome using aortic size index

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Background
Turner Syndrome (TS) is a complete or partial loss of the second X chromosome affecting approximately 1:2000 females. Cardiovascular complications in TS include increased risk of congenital cardiac malformations, hypertension, and aortic dissection. The Clinical Practical Guidelines for the Care of Girls and Women with Turner Syndrome (published 2024) guidance suggests using aortic size index (ASI, aortic diameter divided by body surface area) thresholds. The ASI is feasibly influenced by BSA equation selection, and falsely reassuring in those with very high weight. We analyse the influence of BSA estimation equation selection and after adjustment for ideal body weight on those meeting threshold for surgery.
Methods
A retrospective observational cohort study was carried out in three tertiary centres of patients with confirmed TS attending for routine monitoring of their aortic diameter through echocardiography or magnetic resonance imaging. ASI error from DuBois was calculated and Bland-Altman plots for each of five alternative body surface area estimation equations were analysed. Numbers reaching the threshold for surgical intervention were determined for each of ASI and ideal-weight-aortic size index (iwASI, weight adjusted to the same z-score for height).
Results
132 patients were included in the study. Mean age at imaging was 27.9 years (range 16 – 58 years.) 112 subjects had karyotypes available, 50 (45%) were 45X, 50 (45%) were 45X/46XX or other variants, 12 (11%) had Y material. Compared to DuBois, all alternative BSA estimation equations underestimated ASI, with the greatest degree of underestimation when Furqan or Boyd equations were used. In a sub-analysis of 53 subjects with clinical risk factors, up to seven out of the 53 subjects (13%) had aortic risk category lowered simply by using an alternative BSA estimation equation for adjustment of ASI. Using iwASI, four subjects were identified as meeting the criteria for surgical intervention, that were not identified using standard ASI; one of which experienced a fatal aortic dissection. All four subjects had BMI $>$ 35 kg/m2.
Conclusion
Our results demonstrated that compared with Dubois, alternative BSA estimation equations lead to underestimation of ASI. Our findings suggest using iwASI values should be considered when interpreting ASI in TS, particularly at extremes of weight.

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P118

Hypoglycemia during treatment of acute lymphoblastic leukaemia [ALL] in children: case report series

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Background
Recent studies have linked both PEG -asparaginase and 6 mercaptopurine [6MP] with hypoglycemia, However, the risk of hypoglycemia associated with ALL therapy is not well understood, despite its potential to cause adverse events in children. We report three cases in Wales.
Case 1
An 18-month-old female with pre-B ALL presented with hypoglycemia during the induction phase of chemotherapy [PEG-asparaginase and high-dose dexamethasone] Hypoglycemic screen [HOG] showed hypoglycemia [2.3 mmol/l], inappropriately borderline insulin [3.0 mU/l], high C peptide [413 pmol/l] inappropriately low beta hydroxybutyrate [$<$0.01], high non esterified fatty acid [3.66 mmol/l] and markedly low Cortisol [$<$28 nmol/l]. Short Synacthen test not done as she still on induction phase but hypoglycemia resolved after initiating hydrocortisone.
Case 2
A 12 yr old male with T -cell Lymphoblastic Lymphoma presented with hypoglycemia during his maintenance chemotherapy [daily 6mp, weekly methotrexate and monthly steroids] when he was fasting. HOG screen showed Hypoglycemia [2.1 mmol/l], inappropriately high insulin [5.4 mU/l] and high C peptide [511 pmol/l], appropriately high beta hydroxybutyrate [0.75 mmol] and high non esterified fatty acid [1.59 mmol/l]. Blood results returned to normal once maintenance chemotherapy was stopped.
Case 3
An 8 years male with B-cell ALL presented with hypoglycemia during his maintenance chemotherapy when he was fasting. HOG screen showed hypoglycaemia [1.2 mmol/l], appropriately low insulin [$<$3mU/l] and low C

peptide [85 pmol/l]. High beta hydroxybutyrate [0.83 mmol/l] and high non esterified fatty acid [3.39 mmol/l]. Still on maintenance chemotherapy.
Conclusion
Case reports in the literature suggest that hypoglycemia associated with PEG-asparaginase is hypoketotic and likely secondary to hyperinsulinism. The mechanism of action of asparaginase is to convert asparagine to aspartic acid. However, asparaginase is also shown to convert glutamine to glutamic acid. Glutamate is a known stimulator of insulin secretion. Ketotic hypoglycaemia is associated with 6-MP without a clear aetiology. It is unclear from our case the cause of low cortisol this required further investigations/study. These findings highlight the importance of counselling about the risk of, and monitoring for, hypoglycemia, particularly in young children.

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P119

Genotes for clinicians – a genomic testing resource for paediatric endocrinologists

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Introduction
Genomic testing is increasingly embedded within mainstream clinical paediatric endocrinology care, facilitated by initiatives such as The National Genomic Test Directory which outline genomic tests currently commissioned by NHS England. Paediatric endocrinologists therefore require a knowledge of which (if any) genomic tests would facilitate the management of a young person presenting with an endocrine disorder; when and how to order them; and what to do with the results.
Discussion
To develop requisite knowledge and awareness of genomic testing, the Genomics Education Programme of NHS England has developed an educational resource available to all adult and paediatric endocrinologists for use in clinical settings – the Genomics Notes for Clinicians (GeNotes) programme. Two categories of resources, Tier 1 and Tier 2, have been written and reviewed by specialists in the field and are available on the GeNotes website (www.genomicseducation.hee.nhs.uk). Tier 1 resources centre around commonly encountered clinical scenarios, explaining which genetic testing should be considered, how to order this, and which type of testing (e.g., genetic panel, exome sequencing) can be requested for that specific scenario. Tier 2 resources are more knowledge-based and expand on specific conditions, covering an overview, clinical features, genetic causes, genetic testing, genetic counselling, and how to integrate genetic testing into management.
Summary
Paediatric endocrinologists may feel uncertain or apprehensive about ordering genetic tests for children with paediatric endocrine conditions under their care. The GeNotes resources will empower paediatric endocrinologists to navigate the contemporary landscape of genomic testing in mainstream clinical care.

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P120

Usefulness of freestyle libre 3 CGM in detecting hypoglycaemia in two infants with diazoxide non-responsive hyperinsulinism

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Prevention and early treatment of hypoglycaemia in young patients with congenital hyperinsulinism (HI) is essential for reducing the risk of neurological and fatal consequences as well as optimising treatment. Continuous glucose monitoring (CGM) provides more comprehensive glucose measuring and the ability to alert when hypoglycaemia occurs. Some studies suggest that CGM can be a helpful tool in the management of HI alongside capillary blood glucose (CBG). FreeStyle Libre 3 (FSL3) is a recent generation CGM that has improved accuracy and smaller size, which can be particularly beneficial for use in infancy, the age when most patients with hyperinsulinism are diagnosed. In our centre, FSL3 was utilised for two patients with HI in adjunct to 4 hourly CBG measurements during inpatient admissions to hospital.
Patient A
6 month old female, diagnosed with HI in the neonatal period (genetics for HI negative for known mutations). Non-responsive to Diazoxide and started on increasing doses of Octreotide up to 25.5 mg/kg/d. She received nasogastric feeding with Infantrini Pepisorb and Maxijul (glucose 12.7%) continuously overnight and 3hourly in the day. She was admitted to the hospital for recurrent hypoglycaemia. Over a 4-day admission, she had 6 episodes of hypoglycaemia, 5 of which were identified by FSL3 prompting additional CGB checks.
Patient B
16 month old female, diagnosed with HI at 12 month (genetics showed paternally inherited ABCC8 pathogenic variant). Non-responsive to Diazoxide and started on increasing doses of Octreotide up to 11.7 mg/kg/day. She was fed via gastrostomy with Nutrini continuously overnight and 2 feed boluses during the day. She was admitted to hospital for 11 days due to vomiting and recurrent hypoglycaemia. She had 5 episodes of hypoglycaemia requiring treatment, 4 of those were identified by FSL3 prompting an early CBG measurement. A total of 9 asymptomatic hypoglycaemic events (glucose <3.5 mmol/l) were additionally identified by the FSL3 low glucose alarm which occurred out with the routine times for CBG. Hypoglycaemia ranged between 2.1- 3.4 mmol/l. Our experience in two infants with HI highlights the potential benefits for early hypoglycaemia recognition by using FreeStyle Libre 3 in conjunction with CBG in young patients with recurrent hypoglycaemia.

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P121

Management strategies and patient outcomes of congenital hyperinsulinism (CHI) related with beckwith-wiedemann syndrome (BWS) – insights from an CHI highly specialized centre

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Background
CHI is a well-recognized cause of hypoglycemia in infancy and is often associated with syndromes like BWS. While hypoglycemia resolves spontaneously in nearly half of BWS cases, others experience persistent, severe hypoglycemia due to CHI, requiring medical or surgical intervention. This study outlines treatment outcomes for CHI in BWS patients at our CHI Highly Specialized Centre.
Methods
We conducted a retrospective analysis of 23 patients referred to our center for CHI associated with BWS between 2003 and 2022. Patients categorized into those managed medically and those managed surgically. Medical treatment included diazoxide and, if unresponsive, somatostatin analogues (octreotide, lanreotide) or sirolimus, along with enteral carbohydrate supplementation. Treatment responsiveness was assessed based on achieving euglycemia and tolerating age-appropriate fast. Surgical intervention was pursued for medically unresponsive patients.
Results
We analyzed 23 patients with CHI associated with BWS. BWS was suspected based on typical clinical features and genetically confirmed in 20 cases. The most common genetic cause was uniparental disomy of chromosome 11p. All patients presented with neonatal hypoglycemia due to hyperinsulinism. Most cases were managed medically (19), while 3 required pancreatic surgery (two sub-total pancreatectomies; one lesionectomy). One baby died due to other BWS-related complications. Among those managed medically, 13 were treated with diazoxide (3-20 mg/kg/day); 4 received high-dose octreotide (35-40 mg/kg/day), with two transitioning to lanreotide; 2 treated with medication combinations (diazoxide/octreotide or octreotide/sirolimus). At discharge, 18 patients were feeding orally, while 5 required frequent gastrostomy or nasogastric tube feeds. Fourteen of the medically treated patients stopped treatment at a median age of 1.5 years (range 2 months to 8 years), while 5 continue treatment. Three patients required pancreatectomy and continue to have hypoglycemia post-surgery, managed with octreotide in one case and diazoxide in the other two.
Conclusion
Most patients responded well to diazoxide, resolving CHI by a median age of 1.5 years. Severe cases required both surgical and medical treatments. Our study underscores initial medication use (diazoxide, octreotide, lanreotide) and supplemental carbohydrates. Surgical intervention remains an option if medical treatment is ineffective, requiring a multidisciplinary approach in a specialized center for optimal outcomes and ongoing surveillance.

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P122

Safety of lanreotide in infants with congenital hyperinsulinism

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Background
Lanreotide, a prolonged-release somatostatin analogue, has been used off-label for nearly a decade to treat congenital hyperinsulinism (CHI) cases resistant to diazoxide. Lanreotide's side-effects include diarrhea, topical allergic reactions, hepatitis, gallstones, growth suppression, hypothyroidism, and gastrointestinal dysmotility. However, there are limited case reports documenting its safety in infants with CHI.
Objective
To evaluate the safety of lanreotide treatment initiated during infancy (<9 months) for managing CHI.
Methods
A longitudinal observational study was conducted at our Highly Specialized CHI Center, documenting side-effects in CHI patients treated with lanreotide from 2014 to 2023. Side-effects were defined as anomalies identified in liver function tests (LFT), abdominal ultrasound, growth parameters, thyroid function tests, or allergic reactions post-lanreotide administration.
Results
Twelve infants diagnosed with CHI started lanreotide before 9 months of age. All had KATP channelopathy (compound heterozygous or paternally inherited recessive variant), except one with a GCK pathogenic variant. Median age at lanreotide initiation was 6 months (range 3-9 months), with median follow-up age of 30 months (range 11-102 months). Acute side-effects were observed in 17% (2/12), predominantly abdominal symptoms, with 8% (1/12) experiencing topical allergic reactions at the injection site. Long-term side-effects were documented in 10 patients; 2 discontinued within 6 months due to ineffectiveness. None developed necrotizing enterocolitis (NEC) despite lanreotide initiation at 3 months. Primary side-effects included elevated liver enzymes (3 AST, 0 GGT, 1 ALT) and coagulation abnormalities in 2 patients. One patient developed gallstones. Height SDS decreased from 0.62 to -0.26 without IGF-1 suppression. No cases of central hypothyroidism were reported.
Conclusion
Long-term use of lanreotide for managing CHI was linked to liver function abnormalities and an elevated risk of gallstones. Nevertheless, discontinuation of lanreotide treatment was deemed unnecessary based on our findings. Our data endorse the safety of initiating lanreotide treatment during infancy (<9 months) for managing CHI. However, diligent monitoring of liver function tests (LFT) and growth is imperative for all patients receiving lanreotide.

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Obesity 2

P123

Ethnicity, deprivation and bmi outcomes: experience from a paediatric complications of excess weight service (CEW) in the UK

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Introduction
Since launching our West Midlands CEW service, we have been supporting children and young people (CYP) and their families with a diverse ethnic background who live in the most deprived areas in the country. The association of obesity and socio-economic deprivation is well reported with its prevalence over twice as high in the most deprived areas and pathways to ethnic differences in obesity have been previously explored. What is less well documented is the interaction between deprivation or ethnicity and outcomes in CYP living with obesity.
Aim
To investigate the outcomes in terms of change in BMI SDS related to deprivation (Index of Mean Deprivation -IMD) and ethnicity.
Methods
Retrospective review of patients first seen in CEW service between 2022 and 2023. Change in BMI SDS analysed with 2 tailed t-test.
Results
Sixty-seven patients were analysed, 34 males and 33 females. 31(46.3%) were White British and 30 (44.8%) from a Black, Asian and Minority Ethnic (BAME) background. Most patients were living in the most deprived areas, with 42 (62.7%) in Deciles 1 and 2, in contrast to only 12 (12.9%) in Deciles 5 and above. Whilst receiving support from the CEW service, CYP from BAME background reduced their BMI z score only by 0.01 in 12 months compared to White British who showed reduction in the same time by 0.3 ($P = 0.39$). Independent of ethnic background, CYP living in the most deprived areas (decile 1+2) reduced their BMI z score by 0.1 vs 0.2 for those living in higher deciles ($P = 0.34$). When comparing CYP living in similar areas of deprivation (decile 1+2), those of White British background showed better outcomes in comparison to those of BAME (0.2 vs 0.05 BMI z score reduction, $P = 0.26$).
Conclusion
Our experience, so far, demonstrates that even whilst receiving holistic support from the same multi-disciplinary team, the outcomes appear different, with CYP from BAME background living in the most deprived areas showing less reduction in BMI although this did not reach statistical significance. Further research is needed in larger cohorts and longer-term to identify and remove barriers to achieve equality in better outcomes.

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P124

Use of medical technology and daily weight measurements in the management of severe childhood obesity

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Introduction
Due to the increasing prevalence of childhood obesity, and challenges presented by associated physical and psychological comorbidities, NHS England initiated a pilot to treat Complications from Excess Weight (CEW) in dedicated clinics across the country. Facilitating sufficient face-to-face appointments with increased need for services carries associated costs and greater demand, both on the patient and their families, and on the medical team. To supplement the regular clinical encounters, a digital support system (Evira) designed for daily home weight measurements was introduced into the treatment pathway to provide consistent input from the multidisciplinary team whilst reducing the need for physical visits.
Methods
Patients seen in the Alder Hey CEW clinic between January and June 2024 were offered the opportunity to use the custom-made digitless measuring device as part of their treatment pathway. The device transfers the measurements via Bluetooth to a mobile application and presents BMI Z-scores graphically with an individualised weight loss target curve. Additionally, the data is transferred to a web-based interface that enables the clinic to monitor patient progress as they receive additional input from the multidisciplinary team, and to provide regular contact through the application's communication system.
Results
A cohort of 32 patients were enrolled into the device after discussion and consent from the patient and their families. The average age was 13.6 years. The average BMI standard deviation score (SDS) at the start of treatment was +3.64, with a mean change in the first month of use of -0.043 SDS, a mean change of -0.012 in the second month, and a further change of -0.021 after the third month. During the first month, 100% of patients recorded at least one measurement, with 92% recording at least one by the third month, and on average patients recorded measurements on 3.5 days per week.
Conclusions
Use of regular home measurements alongside a standard treatment pathway can promote greater autonomy amongst the patient population regarding positive changes by providing graphical representation of their progress. Additionally, with continuous data provided to the clinic, adherence to treatment can be tracked and supported on a regular basis especially between clinic appointments.

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P125

Health-related quality of life scores in children and young people with obesity following intervention and support from a tertiary mdt weight management service

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Introduction
Obesity in children and young people (CYP) can cause various physical disabilities and psychological problems. They are at risk of being stigmatized, leading to poor academic performance and social interactions. It is important to assess the impact of obesity on the lives of CYP through tools such as Health-related quality of life (HRQOL) questionnaires.
Aim
Longitudinal assessment of the anthropometric parameters and HRQOL scores at baseline, 3 to 6 months (mean duration = 7.4months) and 12 to 18 months (mean duration = 14.88 months) of CYP with obesity, managed by the Complications of Excess weight (CEW) service.
Methods
The study included 34 patients (16 males) with an average age of 13.65 years (range 6.16-16.75 years) and a mean baseline BMI of 42.94 kg/m^2. Participants completed the PedsQL 4.0 Generic Core Scales, a paediatric quality of life questionnaire consisting of 24 items with five response dimensions (never, almost never, sometimes, often, almost always) covering physical health, emotional health, school well-being, and social well-being. The psychosocial health summary score combined data on emotional, social, and school functioning, while the total score was the average of all item scores.
Results
The total HRQOL score improved from a baseline of 56.47 $\pm$ 49/100 to 57.97 $\pm$ 19.76/100 at the annual review. The most affected subdomains were school and emotional functioning, with baseline scores of 50.99 $\pm$ 21.75/100 and 53.34 $\pm$ 21.07/100, respectively. Interventions including psychological support, cognitive restructuring, medical management, and social support improved the psychosocial score summary from 54.74 $\pm$ 17.49/100 to 56.76 $\pm$ 19.27/100 at 6 months, and 56.62 $\pm$ 20.71/100 at 12 months. There was also a steady decrease in BMI SDS from a baseline of 3.81 $\pm$ 0.59 to 3.76 $\pm$ 0.64 and to 3.68 $\pm$ 0.67, at their 6 month and 12 months review, with a significant p-value ($P = 0.029$).
Conclusion
Our study demonstrates that targeted interventions by a multidisciplinary service can improve HRQOL in CYP with obesity. The questionnaire helps healthcare professionals identify specific issues and provide focused support. Investing in multidisciplinary teams is crucial for managing obesity-related complications, including mental and emotional health issues, thereby enhancing long-term outcomes and overall well-being

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P126

Management of early onset obesity due to melanocortin 4 receptor (MC4R) defect with glucagon- like -peptide receptor agonist

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Introduction
Childhood obesity, has been linked to several nutritional and genetic factors. In some patients, monogenic causes can be identified, due to single gene mutations in specific pathways related to appetite regulation. One of the most common monogenic causes of obesity is heterozygous mutations in Melanocortin 4 receptor (MC4R), with a prevalence of 2% to 6% in juvenile-onset obesity. We report the effect of Semaglutide (GLP1 analogue) in two adolescent patients with severe obesity due to heterozygous MCR4 mutation.
Discussion
Our first patient, a twelve-year-old boy, was referred to the tertiary weight management team for excessive weight gain since the age of one, consistently above the 99.6th percentile. He was diagnosed with insulin resistance, elevated HbA1c, dyslipidaemia, fatty liver, and a heterozygous MC4R alteration (E61K) inherited from his mother. Despite multidisciplinary lifestyle interventions, his weight reached 187.5 kg (BMI 56.5 kg/m^2; body fat: 63.9%) at age 13. He began weekly Semaglutide, increasing from 0.5 mg to 1 mg. After 12 weeks, his BMI decreased to 52.2 kg/m^2 (weight 176.8 kg, body fat: 52.7%), with a 5.7% weight loss at 3 months and 11% at 12 months. Our second patient, a twelve-year-old girl, was referred to the weight management service for complications from excess weight, including raised intracranial pressure and sixth nerve palsy, which required surgical intervention. She had experienced excessive weight gain since age three. Despite initial treatment with daily GLP-1 analogues, Metformin, and lifestyle changes, her weight increased to 118.8 kg (BMI 49.6 kg/m^2, body fat 66.5%) by age 13. She was then started on Semaglutide, dose gradually increased from 0.5 to 1.7 mg weekly. This led to a 6.8% weight loss at 3 months and 9.2% at 9 months, weight at 106 kg (BMI 43.6 kg/m^2, body fat 61.4%), with improvements in dyslipidaemia, insulin resistance, and overall health.
Conclusion
Semaglutide has proven to be useful for our patients with MC4R mutations experiencing rapid weight gain and related complications. GLP-1 analogues may help counteract MC4R-related appetite dysregulation, proving beneficial for those with this mutation.

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P127

A group exercise programme tailored for a tertiary paediatric weight management service: patient and parent experience

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Background
Whilst recent systematic reviews have suggested potential benefits to exercise interventions on metabolic outcomes for children and young people (CYP) living with obesity, there is a lack of studies examining the qualitative experiences of CYP as to exercise provision within obesity services. Weight stigma has a negative impact on self-esteem and may discourage participation in physical activity. We describe the experiences of CYP under the care of a tertiary weight management service, and their parents, who attended a group exercise programme and barriers to participation for those who declined.
Methods
Approximately 220 CYP aged 2-17 years, with mean body mass index SDS 3.40, are under the care of the tertiary weight management service. All patients aged 7-14 years ($n = 157$) were invited to participate at no cost, in a group exercise programme run by an external provider ("Gymrun") comprising 12 weekly sessions lasting 45 minutes each. 29(18%) took up a place and retention was 86%. At the end of the programme, families were invited to undertake semi-structured telephone interviews about their experiences with a clinical psychologist. All families who declined the programme ($n = 128$) were asked to complete a questionnaire.
Results
Thirteen parents and four CYP participated in interviews following the programme. Four main themes emerged, i) anxiety about not knowing what to expect, ii) importance of celebrating success, iii) inclusivity and iv) noticing change. Increased motivation, confidence, strength and positivity were also described. Previous negative experiences and social anxiety were identified as causing uncertainty for the majority of CYP prior to the first session. 22/128(17%) families who declined the programme completed questionnaires. Common barriers to participation included travel time (55%), distance from home (50%), cost of travel (32%) and uncertainty about what to expect (18%). 54% reported not having enough information about the programme.
Conclusions
This activity program was received positively by families who attended. Motivation derived from taking part, may support other lifestyle changes, and potentially benefit long-term health. Identification of barriers to participation influenced service design, including the development of a film about the programme for future participants to reduce uncertainty and anxiety about what to expect.

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P128

The challenges of managing hypothalamic obesity in childhood

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Background
Hypothalamic obesity (HO), defined as abnormal weight gain due to physical hypothalamic destruction, is characterised by significant hyperphagia. HO is not usually responsive to dietary interventions. No pharmacotherapies are specifically approved for HO and efficacy of glucagon-like peptide-1 receptor agonists (GLP-1 RA) is uncertain. Outcomes of bariatric surgery in adults with HO are variable. We describe a young person with HO and the different management strategies utilised.
Case
This 11-year-old female was referred to paediatric endocrinology with slowing of linear growth (height velocity 3rd centile; BMI-SDS 1.66). Glucagon stimulation testing demonstrated deficiencies in growth hormone and adrenocorticotropic hormone requiring hormone replacement. A Rathke's cleft cyst was found on pituitary magnetic resonance imaging and a trans-sphenoidal resection was performed due to potential risk of visual compromise. Post-operatively, the young person developed arginine vasopressin (AVP) deficiency and central hypothyroidism. Additionally, her weight increased exponentially (BMI 34.7 kg/m^2; BMI-SDS 3.34 at 12.5 years) despite lifestyle interventions. A monogenic obesity panel detected no pathogenic variants. Obstructive sleep apnoea was diagnosed requiring nocturnal non-invasive ventilation. She also experienced significant fatigue and low mood. Liraglutide (maximum 3 mg daily) (GLP-1 RA) was commenced at 12.6 years for weight management but stopped after 13.8% weight gain (+0.08 BMI-SDS increase) at 12 months. Subsequent treatment with semaglutide (maximum 2 mg weekly), another GLP-1 RA, reduced hunger and enabled weight stabilisation (0.6% weight gain after 12 months; -0.32 BMI-SDS reduction).A laparoscopic sleeve gastrectomy was performed aged 15 years, with bariatric surgery considered the only remaining treatment option to control hunger and achieve weight loss. Semaglutide was discontinued prior to surgery and not recommenced. Despite initial 7.6% weight loss (-0.46 BMI-SDS reduction) after 3 months, at 6 months post-operatively her weight had increased by 4.4% (+ 0.17 BMI-SDS increase) with return of hyperphagia.
Conclusions
This case with HO and obesity-related complications showed some response to GLP-1 RA and bariatric surgery. More data are required to evaluate the use of pharmacotherapy and bariatric surgery for HO and associated sequelae in the paediatric population. Consideration is warranted as to whether weight stabilisation, rather than loss, reflects a successful treatment outcome in this challenging condition.

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P129

First year outcomes in a paediatric complications of excess weight (CEW) service

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Background
We aimed to evaluate first year outcomes for our Complications of Excess Weight (CEW) Service based at our tertiary paediatric centre. Children and young people with significant obesity in our region and referred to the service, receive tier 3 weight management support, including intensive lifestyle and psychosocial assistance both through clinics and in the community, including support delivered at home. Referral criteria are an age less than 16 years ay referral with a Body Mass Index Standard Deviation Score (BMI SDS) >3.3 or BMI >98th centile with 2 obesity associated complications.
Methodology
Using routinely collated data, demographic details were recorded and mean and median BMI SDS were measured at baseline (programme entry), and after 6 months and 12 months intervention for all participants. Changes in BMI SDS were compared. A fall of 0.25 BMI SDS was considered clinically significant.
Results
A total of 277 patients had accessed CEW services up until the end of August 2023. The majority were of white ethnicity (44%), from the most deprived decile (43%) and were secondary school aged (45%). Twelve-month follow-up data was available for 54 patients (19.5%). Mean and median BMI SDS outcomes were compared between baseline and 12 months. Mean BMI SDS fell by 0.20 over 12 months across the whole cohort. Females achieved a greater BMI SDS reduction than males, with a 0.21 mean decrease in BMI SDS, compared to males (0.18 mean BMI SDS decrease). When broken down by age, both pre-school aged children and primary school aged children demonstrated clinically significant BMI SDS reductions (reduction of 1.26 and 0.40 BMI SDS respectively). Secondary school aged children did not demonstrate clinically significant results. Those who were prescribed medications Liraglutide or Semaglutide ($n = 7$), showed greater BMI SDS reduction than those not prescribed medication (mean BMI SDS loss of 0.21 with medication compared to the mean BMI SDS gain of 0.01 without medication).
Conclusion
These preliminary results for children aged 11 years and younger are encouraging, but there is still a need to consider strategies to improve outcomes, particularly in adolescents and to determine if positive results are sustained.

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Thyroid

P130

Profile and management of thyroid disease in children and young people (CYP) attending type 1 diabetes clinics in southern health and social care trust (SHSCT)

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Introduction
Acquired primary hypothyroidism is the most common autoimmune endocrine disorder associated withT1D. It is associated with presence of antibodies called Thyroid peroxidase (TPO) and requires lifelong supplementation with Levothyroxine. NICE guidelines (NG145)1 recommends regular surveillance of thyroid levels for primary hypothyroidism every 4-6 months until puberty and then annually.
Aims
To audit our practice of managing CYP with primary hypothyroidism at the T1D clinics across SHSCT.
Methods
This was a retrospective chart review of CYP with T1D and thyroid disease. The management of thyroid disease in the T1D clinic was recorded and compared against national guidelines. Families were asked about their experience of thyroid management at clinics.
Results
The prevalence of hypothyroidism among children with T1D aged 0 to 16yrs was 3.3%: with a female to male ratio of 4.1. Three out of six relevant NICE recommendations were fully met while 3 were only partially met. TFTs were checked in all CYP with T1D, FT3 was appropriately checked, and all diagnosed with primary hypothyroidism are treated with levothyroxine. Criteria not fully met included TPO antibody measurements as recommended, 4-6 monthly TFT checks for prepubertal and annual checks for pubertal CYP and 6-12 weekly check post dose adjustments. Families were satisfied with information regarding medication but would like more information on risks of over or under treatment.
Conclusion
We are only partially compliant with NICE recommendation for monitoring of TFTs in CYP with hypothyroidism at T1D clinics. Valuable recommendations regarding frequency of monitoring and offering parental information as above have been made.

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P131

Role of thyroid scintigraphy in the etiologic workup of congenital hypothyroidism

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Background
Thyroid imaging is recommended in the workup of children suspected with Congenital Hypothyroidism (CHT). Many centres in UK currently do not undertake scintigraphy routinely in CHT workup due to pitfalls such as unavailability, questionable benefit over ultrasound, result may not influence decision to treat or not, time constraints to complete scan within 5 days of starting treatment, etc.

Aim
Retrospective analysis of scintigraphy data in diagnostic work up of children with suspected CHT in a single tertiary centre over 17.5 year period.
Method
All children who had scintigraphy as part of diagnostic workup of CHT between January 2006 to June 2023 were analysed. Scintigraphy result were classed as eutopic (normal uptake), ectopic and dysplasia/aplasia. Data collection included sex, ethnicity, plasma free thyroxin (fT4), plasma Thyroid Stimulating Hormone (TSH), treatment commenced or not and the outcome (permanent or transient) at age of 2.5 years.
Results
102/170 (60%) of suspected CHT referrals underwent scintigraphy were analysed. 65% were females and 51% were of White Caucasian ethnicity (39% South Asian). 58% had eutopic gland, 27% dysplasia/aplasia and 15% ectopic. Median fT4 was higher and median TSH lower in the eutopic group compared to the other two groups. 96/102 (94%) were commenced on treatment. All those not started treatment ($n = 6$) had eutopic scan (TSH range 11-34 miu/l). Status of CHT permanence at age of 2.5 years were analysed ($n = 84/96$). 66/84 (79 %) had permanent CHT vs 18/84 (21 %) were transient (off treatment). Among permanent group, 42 % had eutopia, 41 % aplasia/dysplasia and 17% ectopia vs 89% eutopia and 11% ectopia among transient group. Median fT4 was lower (8.8 pmol/l vs 13 pmol/l) and median TSH higher (82 miu/l vs 52.1 miu/l) among the permanent group.
Conclusion
Eutopia was the most frequent finding in our cohort which makes Dyshormonogenesis as most common cause of CHT. Although scintigraphy is helpful in predicting permanent CHT with ectopia and dysplasia/aplasia, it is unhelpful in eutopia which is more than half of the cases. Ultrasound rather than scintigraphy along with biochemical markers (TSH and fT4) can help provide etiological diagnosis and predict permanence.

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P132

Challenges & uncertainties with intra-uterine thyroxine treatment for a significant foetal goitre – a case report

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An enlarged neck mass (20x18mm), anterior to spine was incidentally discovered in foetal 20-week anomaly scan, with neck fixed in hyperextended position throughout the scan. Mother (G2P1) was asymptomatic without thyroid under or overactivity; maternal baseline thyroid function and thyroid antibodies were negative. At 21-weeks, the small stomach bubble confirmed oesophagus was compressed and swallowing compromised, with high(ish) amniotic TSH (8.5). MDT opinion was foetal blood sampling and foetal treatment with mother's consent. The treatment benefits for large goitre are foetal survival, reduced goitre size, facilitate safe delivery at term, and facilitate intubation if preterm birth occurred. Foetal neurodevelopmental benefits are very likely, but unable to document. The challenges were associated risks with repeated interventions (amnio/cordocentesis), preterm delivery and uncertainties around optimum thyroxine dose to reduce foetal goitre and interpreting foetal results. After careful consideration, IV thyroxine at 10 mg/kg on estimated foetal weight, for 10 days, to be administered once every 2 weeks was chosen. Foetal treatment commenced at 23-weeks (15.03.2024), with goitre of 25x13mm. 50 mg of IV thyroxine (estimated foetal weight 0.5 kg) was administered via cordocentesis, and foetal blood confirmed profound hypothyroidism (TSH >100, FT4 3.9 & FT3 1.5) and gene panel testing identified compound heterozygous mutation in foetal thyroglobulin gene. Mum was started on 50 mg thyroxine daily, to supplement intrauterine transfer. Foetal goitre was monitored regularly with 2 weekly intra-amniotic thyroxine administration. At 33-weeks (24.05.2024), goitre has remained stable (24x16mm) and now less significant in relation to foetal size. The foetus can completely flex the head, trachea is patent without goitre pressure, stomach bubble is normal in size, without polyhydramnios. Repeat cord blood shows improved thyroid function (TSH >100, FT4 8.5, FT3 2.1), with stable maternal thyroid function. In summary, foetal goitre size has not increased; foetal thyroid function has improved; mother, pregnancy & foetus have continued to thrive confirming effective & safe intra-uterine thyroxine treatment. 33-week scan suggests a normal vaginal delivery is possible, without need for an EXIT procedure. An MDT approach with ENT, Neonatal and Obstetric teams is underway at Brighton (with tertiary support) for safe delivery of this baby, sometime in July 2024.

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P133

A rare case of chronic diarrhoea: medullary carcinoma of the thyroid

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We present an 8-year-old black African girl with no significant past medical history. The patient presented with a 7-month history of profuse watery diarrhoea after moving to the UK from Nigeria. There was no history of bloody stools, abdominal pain or vomiting. The diarrhoea had worsened to approximately 10 watery episodes a day. She was noted to have progressive neck swellings with 4 kg weight loss over this time, prompting emergency department attendance. There was no history of night sweats or fever. Her weight at initial assessment was 19 kg. Extensive infection screen was unremarkable, including negative stool, HIV1/2 antibody, TB gamma interferon, gastric lavage and Mantoux testing. Biochemistry results were largely unremarkable but with a noted raised calcitonin of 117,896 ng/l (reference range: 0-6.4 ng/l). Plasma and urinary metanephrine levels were normal as were parathyroid and thyroid hormone levels. The patient had ultrasound and CT imaging of her neck, chest, abdomen and pelvis. Ultrasound imaging of the thyroid gland demonstrated suspicious inhomogeneous calcified nodules. Multiple enlarged lymph nodes were visualised in the anterior and posterior triangle of right neck and left anterior neck, containing internal calcification (largest measuring 30x27mm). Chest imaging revealed enlarged lymph nodes and scattered lung nodules. Sclerotic lesions were identified in the sacrum, iliac bone and vertebral bodies. Infiltrative pathology was also demonstrated in the pericardial area. The imaging was suggestive of an extensive malignant process, likely arising from the thyroid. Differentials included tuberculosis, carcinomatosis and sarcoidosis. The patient underwent biopsy, revealing a diagnosis of metastatic medullary thyroid cancer (MTC), with disease in thyroid, lymph nodes, lungs and bones. MTC accounts for approximately 5% of paediatric thyroid malignancy, with an incidence of 0.27/1,000,000 cases/year. MTC originates from parafollicular C-cells, these neuroendocrine cells produce calcitonin and are not responsive to thyroid stimulating hormone. Tumour secretion of calcitonin and calcitonin-gene related peptide are known causes of diarrhoea. This case highlights the importance of considering thyroid pathology in children presenting with chronic diarrhoea. While 80% of MTC cases are sporadic, a familial form exists as part of the multiple endocrine neoplasia (MENII) syndrome. In this case the MENII mutation screen is pending.

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P134

Renal impairment: to refer or not to refer to endocrinologist?

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Background
Hypothyroidism, a common condition, manifests with diverse clinical symptoms and is generally manageable but can be life-threatening if untreated in severe cases. It has been recognized as an uncommon cause of renal impairment and rhabdomyolysis; conditions reversible with levothyroxine replacement therapy. Here, we present the case of a teenager incidentally diagnosed with severe primary hypothyroidism due to autoimmune thyroiditis, accompanied by acute kidney injury (AKI), myositis, and pancreatitis, all of which improved with appropriate treatment.
Case report
A 14-year and 9-month-old boy presented to the gastroenterology team with a two-month history of recurrent epigastric pain. He reported significant weight gain and extreme fatigue over the past year. Clinical examination revealed obesity (BMI 32.4 kg/m^2, $+2.99$ SDS), hypotonia, dull facial expressions with periorbital oedema, and slow speech, with stable cardiovascular status. A barium meal study confirmed severe gastroesophageal reflux disease, leading to the initiation of Proton Pump Inhibitors. Biochemical investigations showed elevated creatine kinase levels, AKI, rhabdomyolysis, hepatitis, pancreatitis, and anaemia. Subsequent thyroid function tests confirmed primary hypothyroidism due to autoimmune thyroiditis, indicated by undetectable free T4 (<3.9 pmol/l), markedly elevated thyroid-stimulating hormone (250 mU/ml), and positive anti-TPO antibodies. Despite extensive investigations, no other clear cause for his conditions was identified except for a dysplastic small right kidney found on renal ultrasound. Therefore, the diagnosis of severe, long-standing primary hypothyroidism causing AKI secondary to rhabdomyolysis was established. Levothyroxine replacement therapy was cautiously initiated at a low dose (50 mg daily) to minimize the risk of atrial fibrillation. The dose was gradually increased to 125 mg daily, achieving euthyroid status. Importantly, starting thyroid hormone replacement therapy led to rapid resolution of myositis, hepatitis, pancreatitis, and significant improvement in renal function.

Conclusion

Delayed diagnosis of primary hypothyroidism can lead to complex and life-threatening presentations, including AKI secondary to hypothyroidism-induced myopathy and rhabdomyolysis. Hypothyroidism should be considered in patients presenting with decreased renal function and elevated creatine kinase in the absence of other causes of rhabdomyolysis. Initiation of treatment in severe primary hypothyroidism cases should be gradual and closely monitored to achieve euthyroidism while minimizing the risk of atrial fibrillation.

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