

Improved Glycaemia following Parathyroidectomy for Primary Hyperparathyroidism

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Introduction

- Primary hyperparathyroidism (PHPT) is not uncommon. It has varied presentations ranging from asymptomatic disease to the classical ‘stones, groans and moans’.
- It may be difficult to differentiate symptoms of hypercalcaemia from diabetes mellitus (DM).
- We present a case of improved glycaemia in a patient with DM following removal of parathyroid adenoma.

Case

- 45 year old female within a week of diagnosis with Type 2 DM was referred to us with high calcium, high parathyroid hormone and iron deficiency anaemia.
- She was symptomatic with dysphagia, weight loss, loss of appetite, extreme lethargy, polyuria, polydipsia, muscle aches and pains, poor memory, poor concentration and menorrhagia.
- She had coexisting uncontrolled hypertension, PCOS, obesity, osteoarthritis, depression and agoraphobia. She didn't have history of constipation, kidney stones and osteoporosis.
- She had past history of DVT, recurrent Pulmonary embolism and transurethral resection of bladder tumor. She had a strong family history of diabetes mellitus.
- She weighed 117 kilogram. There was no thyroid and parathyroid enlargement to note.

Results

Tests	Results (Normal Range)
HbA1c	↑ 74mmol/mol (48-55)
Adjusted calcium	↑ 3.04mmol/L (2.1-2.58)
Parathyroid Hormone	↑ 10.7pmol/L (1.1-4.2)
TSH	2.56mU/L (0.35-6)
Vitamin D	↓ <10nmol/L (>50)
Serum ACE	<12U/L (20-95)
Serum Electrophoresis	No obvious Paraproteins detected
Serum ferritin	7mcg/L (10-150)
Serum Iron	9mcmol/L(7-26)
Hemoglobin; MCV	↓10.8gm/dL (12-15); 79.7fL(80-100)
Phosphate	0.89mmol/L (0.8-1.5)

- **Ultrasound of parathyroids** showed a large 3.25 × 2.1 cm hypoechoic soft tissue mass inferior to lower pole of left lobe of thyroid suggestive of parathyroid adenoma.
- She refused to undergo upper GI endoscopy and Sestamibi of the parathyroids.
- Investigations outlined in above table is consistent with a diagnosis of primary hyperparathyroidism, poorly controlled diabetes mellitus, Vitamin D deficiency and microcytic anaemia.

Treatment and Progression

- Initially Hypercalcaemia was managed with intravenous fluids and Pamidronate infusion.
- She was initiated on high dose colecalciferol.
- Hyperglycaemia was managed with initiation of NovoMix 30 insulin twice daily and optimised dose of Metformin.
- She was referred to the endocrine surgeon for removal of parathyroid adenoma.
- She was referred back to us for optimisation of glycaemia and hypertension prior to parathyroidectomy. She had difficulty engaging with our services because of depression, forgetfulness, agoraphobia and her own personal circumstances.
- 17 months into the diagnosis, she eventually agreed to undergo parathyroid exploration and parathyroidectomy.
- **Histology** revealed a left lower lobe parathyroid adenoma.
- Pre-operatively, she was on NovoMix 30 insulin 56 units before breakfast and 56 units pre-evening meal. Pre-op HbA1C was 72 mmol/mol.
- Post-operatively, adjusted calcium and PTH level dropped down into the normal range at 2.53 mmol/L and 2.5pmol/L.
- A month and six months post-operatively, HbA1C dropped down to 58mmol/mol and 51 mmol/mol.

Discussion

- Prevalence of Diabetes mellitus in PHPT is around **8.2%**, three times higher than in the unselected age-matched population.¹
- In a study by Kumar et al ², **PHPT patients had higher plasma glucose and significantly lower insulin sensitivity** compared to control subjects. Insulin insensitivity may well be the reason for glucose intolerance. No significant correlation was found between insulin insensitivity and PTH, Calcium and Phosphate values.
- Tassone et al ³ demonstrated a reduction in both basal and stimulated insulin sensitivity in PHPT in spite of increased insulin secretion. They for the first time also showed a **significant relationship between hypercalcaemia and insulin sensitivity** in this condition
- Parathyroid surgery has been reported to improve insulin sensitivity but doesn't always restore normal glucose tolerance or improve glycaemic control in patients with DM.
- Our patient had all the associated risk factors for development of diabetes mellitus.
- It is difficult to say that Parathyroid surgery leading to improved insulin sensitivity was the sole reason for improved glycaemia in her.
- Improved cognition, mood, tiredness may well have improved our patient's compliance to hypoglycaemic medication leading to improved glycaemia.
- This case does highlight that review of Diabetes medications may well be warranted after parathyroid surgery for PHPT in patients with Diabetes mellitus.

References

1. Ljunghall S, Eur J Clin Invest 1983
2. Kumar S, Clinical Endocrinology , 1994
3. Tassone F, Diabetic Medicine, 2009