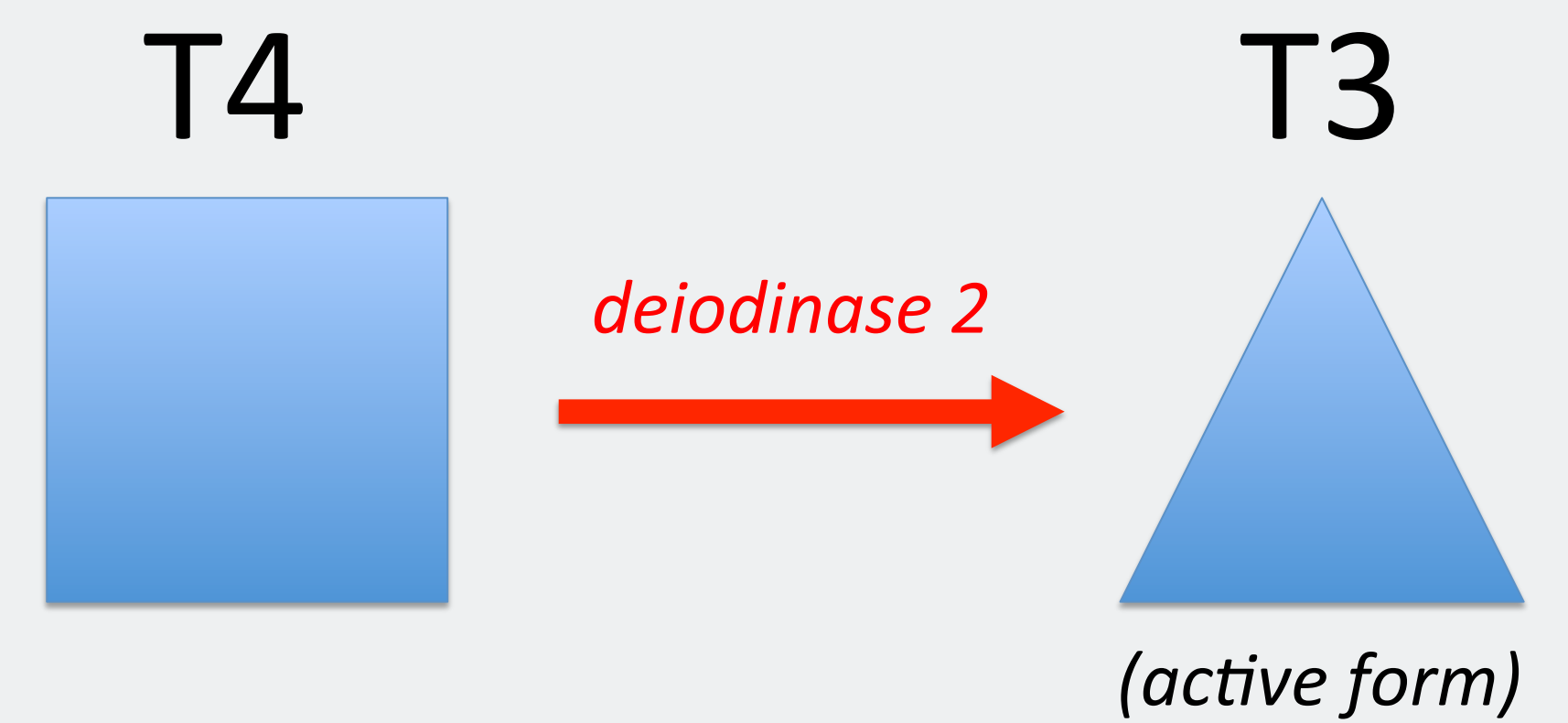


Combination T₃/T₄ therapy in paediatric patients with autoimmune hypothyroidism unresponsive to T₄ therapy alone

Victoria Price, Hussain Alsaffar, Poonam Dharmaraj, Renuka Ramakrishnan
Endocrinology Department, Alder Hey Children's Hospital, Liverpool, UK

Introduction

- We do not fully understand why some hypothyroid patients complain of persistent symptoms despite normalisation of TSH with levothyroxine therapy.
- Recent evidence in adults suggests that polymorphism in deiodinase 2 enzyme could lead to lower level of T₃ in some tissues and persistence of symptoms.
- A combination therapy with T₃/T₄ may improve symptoms especially psychological well-being, mood and memory in such patients.
- Combination therapy is used in adults but rarely in children.



Results

Case 1:

- 14 year old female diagnosed with autoimmune hypothyroidism
- Patient complained of low mood, poor memory and tiredness, affecting her school performance despite normalisation of TSH
- Transient symptomatic relief only, with increasing doses of levothyroxine (T₄) to maximum 125 micrograms
- Other baseline investigations unremarkable
- Liothyronine (T₃) was added in after 2 years of levothyroxine, with significant improvement of her symptoms

Case 2:

- 12 year old female diagnosed with autoimmune hypothyroidism
- Continued to have low mood and lethargy despite increasing doses of levothyroxine to 150 micrograms
- Other baseline investigations unremarkable
- T₃ was added to her therapy after nearly 3 years with good effect and patient-reported improvement in mood and energy levels

Patient	At diagnosis		On T4 treatment			On T3/T4 treatment			Current treatment		Tiredness, memory and concentration
	fT4 (9-19pmol/L)	TSH (0.3-3.8 mu/L)	fT4	TSH	T3 (1.3-2.5 nmol/L)	fT4	TSH	T3	T ₄ (mcg)	T ₃ (mcg)	
Case 1	Unknown	Unknown	15.7	0.36	2.3	14.3	0.88	2.6	75 OD	10 TDS	Improved
Case 2	5.7	296	13.4	0.86	1.5	9.4	0.46	1.5	75 OD	10, 20 BD	Improved

Patient comments:

Before combination treatment

"She feels excessively tired throughout the day though she has had a good night's sleep. She has missed a lot of school due to this and generally feels like lying down most of the time. This is very unlike H who is normally a very academic, active young lady."

On combination treatment

"She is positive now that she will be able to cope with the stresses and strains of starting a new academic year at a new school."

"[She] is doing much better on her combined T4 and T3 now. Her energy levels are much improved. She is coping very well with her daily routine and is able to do a lot more physical activity."

"Overall [she] says that although she is not 100%, she is better than when she was on [Levothyroxine] only and would not like to go back to this."

Conclusion

- Our paediatric patients with autoimmune hypothyroidism showed a good symptomatic response to T₃/T₄ combination treatment after a limited response to T₄ alone.
- Both patients opted to continue combination treatment despite increased frequency of dosing.
- Prospective paediatric RCT is required comparing T₄ and T₃/T₄ combination therapy to identify the subset of patients who may benefit.

Further information: Renuka.Ramakrishnan@alderhey.nhs.uk

