

# Different Raised free thyroxine levels in a boy with hypertension

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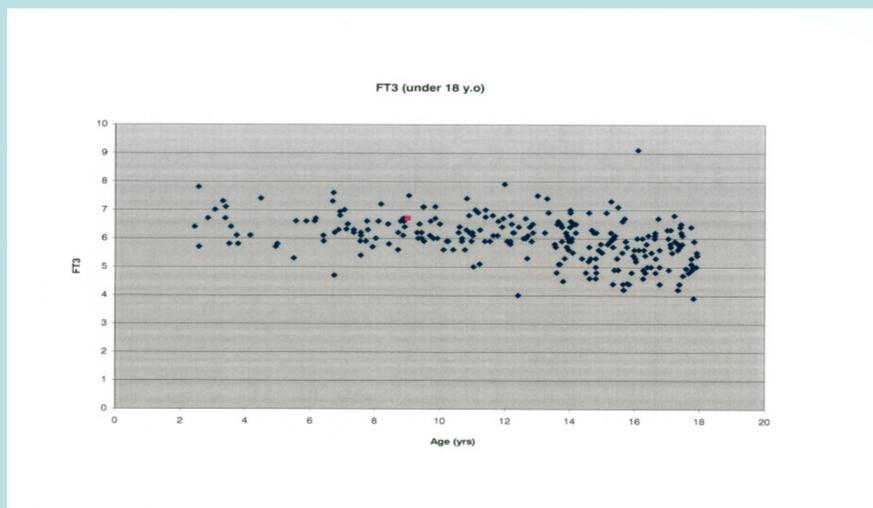
Mid Essex Hospital Services NHS Trust

**Background:** Raised free thyroxine levels in blood results are not unusual in adults. This may be due to protein or drug interference with laboratory assays. However this phenomenon can occur in children depending on the assay method used.

**Case** An 8-year-old boy with a strong family history of essential hypertension and raised BMI was admitted for fixation of a fracture of his right forearm after falling off a roundabout. Routine blood pressure monitoring pre-operatively revealed hypertension of BP 152/64. His height was on the 75th centile and weight on the 98th centile. The 95th centile BP for his height and age was 118/78. His pain was well-controlled, he was not symptomatic from his hypertension, his resting pulse ranged between 80-100/min, he had no palpable goitre. Thyroid function tests showed fT4 23.6 pmol/L (Roche 6.3-14), fT3 6.4 pmol/L (Roche 2.5-5.7), TSH 1.74 mU/L (Roche 0.3-5.6), TPO and TSHr antibodies were negative.

**Management:** 24-hour BP monitoring confirmed persistent hypertension with normal nocturnal dip (mean daytime BP 126/76, night BP 113/74). More than 50% of his systolic recording was above the 95th centile. An echocardiogram showed normal left ventricular size and function. Based on his inpatient and 24 hour ambulatory BP recording, he was started on Atenolol 20mg once daily. At review in clinic 3 months later, his BP was 118/57 and because he complained of dizzy spells, his Atenolol was reduced. Thyroid function tests sent to a Thyroid research laboratory for further studies confirmed that his initial raised thyroxine levels were due to assay interference. Repeat thyroid function tests locally continued to show raised fT3 6.9 pmol/L (no local results for TSH or fT4) paired with the research laboratory results of fT4 17.5 pmol/L (Centaur 10-19.8), fT3 7.4 pmol/L (Centaur 4.05-7.5), TSH 3.8 mU/L (Centaur 0.35-5.5).

	Roche assay	Centaur assay
TSH mU/L	1.74 (0.3 – 5.6)	3.8 (0.35 – 5.5)
fT4 pmol/L	23.6 (6.3 – 14)	17.5 (10 – 19.8)
fT3 pmol/L	6.4 (2.5 – 5.7)	7.40 (4.05 – 7.5)



Healthy cohort  
2.4 – 18 yrs fT3 levels  
using Centaur assay  
(case in pink)  
Courtesy  
of C Moran

**Conclusion:** The local hospital used a Roche assay for all routine thyroid function tests. Centaur assays were used in the research laboratory. The interesting feature here is a coincidental finding of hypertension in an overweight boy possibly due to stress from his fracture. Added to this is a positive family history of hypertension. It is important to be aware of other reasons for a raised thyroxine result and arrange for the appropriate confirmatory tests and the correct management. Be aware of interpreting abnormal thyroid function test results and also results based on the use of different assay methods.

The authors have nothing to disclose

## References

Pitfalls in the measurement and interpretation of thyroid function tests Best practice & research. [Olympia Koulouri](#), [Carla Moran](#), [David Halsall](#), [Krishna Chatterjee](#), [Mark Gurnell](#)  
Clinical endocrinology & metabolism 12/2013; 27(6):745-62.