

Thyroid Hormone Assay Interference

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INTRODUCTION

Thyroid function tests (TFT) are commonly requested investigations in both primary and secondary care. Assay interference can result in abnormal concentrations of thyroid hormones inconsistent with the patient's thyroid state. Occasionally, TFTs can be difficult to interpret; the results may not fit with the clinical picture or individual results within the TFT may conflict each other. In these instances, careful reassessment of thyroid status is required. Failure to reach the correct diagnosis may result in inappropriate management.

CASE REPORT

An 88 year-old male was referred to Endocrine Clinic with abnormal thyroid function test (TFT); free T4: 36.9pmol/L (NR: 11-23) and normal TSH: 2.51 mU/L (NR:0.35-5). Atrial Fibrillation was diagnosed recently and he was on Apixiban and Bisoprolol. He had history of prostate cancer, hypertension, oesophagitis, cervical spondylosis, splenectomy and CKD3. He felt well apart from slight heartburn. He was a retired motor engineer. He had no family history of thyroid disease and never had TFT checked in the past. Examination was normal.

INVESTIGATIONS & MANAGEMENT

He was followed up in clinic regularly and free T4 was found to be persistently raised (fT4 from 55 to 59pmol/L with normal TSH from December 2017 till March 2018) on 4 occasions. He remained clinically euthyroid and was not commenced on treatment. Thyroid antibodies were negative. Other blood tests, and pituitary/brain MRI were normal.

Thyroid hormone assay antibody interference was suspected; His TFTs were repeated at a different specialist laboratory, Wythenshawe Hospital in Manchester which revealed normal TFT (f T4 12.0, f T3 3.1, TSH 1.90). Family was screened for the possibility of thyroid hormone resistance; two daughters were found to have normal TFT. Raised fT4 from blood tests carried out at Royal Preston Hospital was a result of assay interference and the patient was discharged from the clinic.

CONCLUSIONS

This case report highlights that antibody interference with Thyroid hormone assay should be considered as differential diagnosis in cases where TFTs do not fit the clinical picture or are incongruent to each other. Following reassessment and consideration of possible confounding factors, if TFTs remain discordant, consider assay interference as a possible cause. After this, consider screening for genetic disorders of the hypothalamic-pituitary-thyroid axis - rare causes of anomalous TFTs.

References

- [Antibody interference in thyroid assays: a potential for clinical misinformation.](#)
Després N, Grant AM.
Clin Chem. 1998 Mar;44(3):440-54.
- [Familial dysalbuminemic hyperthyroxinemia and thyroid hormone autoantibodies: interference in current free thyroid hormone assays.](#)
Sapin R, Gasser F, Schlienger JL.
Horm Res. 1996;45(3-5):139-41.
- [Two cases of anti-ruthenium antibody interference in Modular free thyroxine assay.](#)
Heijboer AC, Ijzerman RG, Bouman AA, Blankenstein MA.
Ann Clin Biochem. 2009 May;46(Pt 3):263-4. doi: 10.1258/acb.2009.008258. Epub 2009 Mar 4.
- [Anti-triiodothyronine auto-antibody interference in recent free thyroid hormone assays.](#)
Sapin R, Schlienger JL, Gasser F, Chambron J.
Clin Biochem. 1996 Feb;29(1):89-92.
- [Challenges in interpretation of thyroid hormone test results.](#)
Lalić T, Beleslin B, Savić S, Stojković M, Cirić J, Zarković M.
Srp Arh Celok Lek. 2016 Mar-Apr;144(3-4):200-3.
- [Interference in thyroid-stimulating hormone determination.](#)
Imperiali M, Jelmini P, Ferraro B, Keller F, della Bruna R, Balerna M, Giovannella L.
Eur J Clin Invest. 2010 Aug;40(8):756-8. doi: 10.1111/j.1365-2362.2010.02315.x. Epub 2010 Jun 7.
- [Antibody interference in free thyroxine assays.](#)
John R, Henley R.
Ann Clin Biochem. 1992 Jul;29 (Pt 4):472-3.