

Case Report

Heterophile Antibody Interference with TSH Assay

Thanh D. Hoang DO¹; Alfred F. Shwayhat DO¹; Mohamed K.M. Shakir M.D.²

¹Division of Endocrinology, Naval Medical Center San Diego, CA, USA

²Division of Endocrinology, Walter Reed National Military Medical Center, Maryland, CA, USA

*Corresponding author: Dr. Thanh D. Hoang DO, Division of Endocrinology, Naval Medical Center San Diego, CA, USA,

E-mail: thanh.d.hoang.mil@mail.mil

Received: 04-10-2015

Accepted: 05-07-2015

Published: 05-21-2015

Copyright: © 2015 Thanh

Abstract

Interference of heterophile antibodies with thyroid assays may lead to misinterpretation of the results, unnecessary investigations and wrong course of treatment. It is important to recognize the discordance between the clinical presentation and the biochemical data and to reconcile the disparity. We present a 29-year-old female with falsely low TSH level due to heterophile antibody interference.

Background

Interference of the immunoassays may lead to misinterpretation of the results, unnecessary studies and wrong course of therapy. We report a patient with low TSH due to heterophile antibody interference.

Clinical Case

A 29 year-old female, G2 P0020, referred to Endocrine clinic for evaluation of low TSH level during a fertility work-up. Patient otherwise feels fine. She denies any hyperthyroid symptoms. Her menstrual cycles are normal and regular. She has a history of polycystic ovarian syndrome for which she takes metformin 1500mg/day. She has a history of 2 ectopic pregnancies. There is no family history of autoimmune thyroid disease. On physical examination, BP 119/76, HR 80, RR 16, BMI 27.9. HEENT examination was significant for no proptosis, no lid lag; neck examination revealed thyroid approximately 17gm without goiter or nodules. The remaining physical examination was normal, including no hand tremor; heat radiation, normal DTR.

Laboratory results showed: TSH 0.030 mIU/L (0.465-4.680); FT4 0.98 ng/dL (0.79-2.35); FT3 3.34 pg/mL (2.32-6.09); TT3 1.22 ng/mL (0.970-1.690); thyroid stimulating immunoglobulins 22% (0-139); thyrotropin binding inhibitory immunoglobulins < 6.0 % (<16), thyroglobulin Ab and hCG negative. Thyroid uptake/ scan showed a 9.2% (5-15%) homogeneous uptake at 4 hours bilaterally without photopenic or hyperintense areas. Bedside thyroid ultrasound showed normal-sized thyroid gland with normal blood flow and no nodule. Since she is asymptomatic with normal biochemical markers, except low TSH levels, further evaluation was performed, revealing positive heterophile antibodies. The TSH test was performed by an immunometric immunoassay technique using the VITROS TSH Reagent Pack and the VITROS TSH Calibrators (VITROS

ECi/ECiQ Immunodiagnostic Systems, VITROS 3600 Immunodiagnostic System). After confirming positive heterophile antibodies, further testing with the addition of a nonspecific heterophile blocking reagent (QuickVue Infectious Mononucleosis, Color ImmunoChromatographic Assay) resulted in a normal TSH 1.01 mIU/L and FT4 1.1 ng/dL. Patient continued to remain asymptomatic.

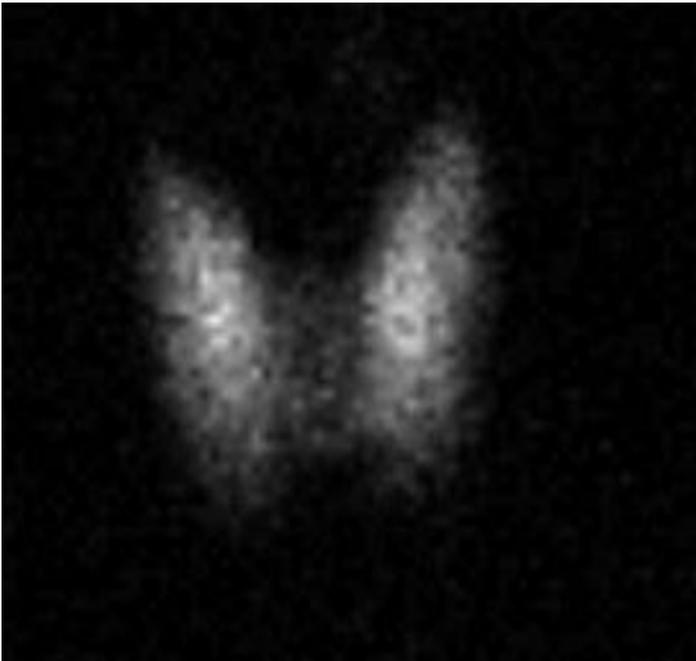


Figure 1. Showing RAI uptake at 4 hours 9.2% (nl 5-15%). There is homogeneous uptake in both lobes. There are no photopenic or hyperintense areas identified.

Discussion

The possibility of interference was considered because of the discordance of the laboratory results with the clinical features. Heterophile antibody may interfere with various TSH immunometric assays by binding to the antigen, the capture or sensor reagent antibodies and/or the antigen-antibody complex, causing falsely high or low TSH (1,2). The severity of interference may depend on the affinity/avidity of interfering antibodies and their concentrations, which may change with time (1). Interference can be transient over weeks in patients with recent bacterial/viral infections, recent immunization, treatment with monoclonal antibodies or blood transfusion; or become chronic over years with autoimmune disorders or exposure to animal proteins. The incidence of interference in TSH immunoassays varies from 0.4-4% (1). Possible improvement can be made by repeat analysis using a different immunoassay platform or alternative technology (liquid chromatography or tandem mass spectrometry), serial dilutions, or blocking antibodies. Although metformin therapy can rarely be associated with suppressed TSH levels, the laboratory studies excluded

this possibility (3).

Conclusion

This case illustrates the significance of interference of heterophile antibodies with thyroid hormone, especially and a suppressed TSH level may have led to misdiagnosis of disease, unnecessary studies and wrong course of treatment. Therefore, it is important to recognize the discordance between the clinical presentation and the biochemical data and to reconcile the disparity.

Disclaimers

The views expressed in this case report are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government.

I certify that all individuals who qualify as authors have been listed; each has participated in the conception and design of this work, the analysis of data, the writing of the document, and the approval of the submission of this version; that the document represents valid work; that if we used information derived from another source, we obtained all necessary approvals to use it and made appropriate acknowledgements in the document; and that each takes public responsibility for it.

References

1. Ismail AA. Interference from endogenous antibodies in automated immunoassays: what laboratorians need to know. *J Clin Pathol.* 2009, 62(8): 673-678.
2. Ross HA, Menheere PP, Endocrinology Section of SKML (Dutch Foundation for Quality Assessment in Clinical Laboratories), Thomas CM, Mudde AH et al. Interference from heterophilic antibodies in seven current TSH assays. *Ann Clin Biochem.* 2008, 45(Pt 6): 616-618.
3. Vigersky RA, Filmore-Nassar A, Glass AR. Thyrotropin suppression by metformin. *J Clin Endocrinol Metab.* 2006, 91(1): 225-227.