An Infertile Patient with Abnormal Thyroid-Stimulating Hormone

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CASE DESCRIPTION

A 35-year-old woman had thyroid function tests performed as part of a workup for infertility. Thyroid-stimulating hormone (TSH) was suppressed at 0.04 mIU/L (reference interval 0.45– 4.50) and free thyroxine (fT4) was 1.22 ng/dL [0.77–1.78 ng/dL (15.8 pmol/L, 10–23)]. Results were consistent with subclinical hyperthyroidism.

Five months later, TSH was markedly increased (28.6 mIU/L) while fT4 remained within the reference interval (0.92 ng/dL). Antithyroid peroxidase antibodies (TPOAb) were negative (<40 IU/mL), and TSH receptor autoantibodies (TRAb) were markedly increased at 40 IU/L (<1.8 IU/L). The patient denied any symptoms apart from her infertility.

Based on clinical and laboratory features, the diagnosis of blocking TRAb-related subclinical hypothyroidism (SCH) with infertility was made. The patient was started on thyroxine replacement to reduce TSH to <2.5 mIU/L before in vitro fertilization. She achieved the TSH target 6 month later and conceived successfully after 3 cycles of in vitro fertilization. During pregnancy, her TSH was suppressed, with fT4 within or slightly above the reference interval despite gradual reduction and discontinuation of thyroxine replacement. TSH suppression due to high human chorionic gonadotropin (hCG) concentration in pregnancy usually wanes in the second trimester when hCG concentrations fall. Therefore, this patient's persistent TSH suppression could not be solely accounted for by the effects of hCG (Fig. 1). The patient remained clinically euthyroid throughout the pregnancy. She delivered a healthy boy via a normal vaginal delivery at 39 weeks of gestation. Postpartum, serial monitoring of TSH showed persistent suppression for up to 6 months while the fT4 gradually increased. At this time, her clinical features suggested the development of hyperthyroidism (Fig. 1).

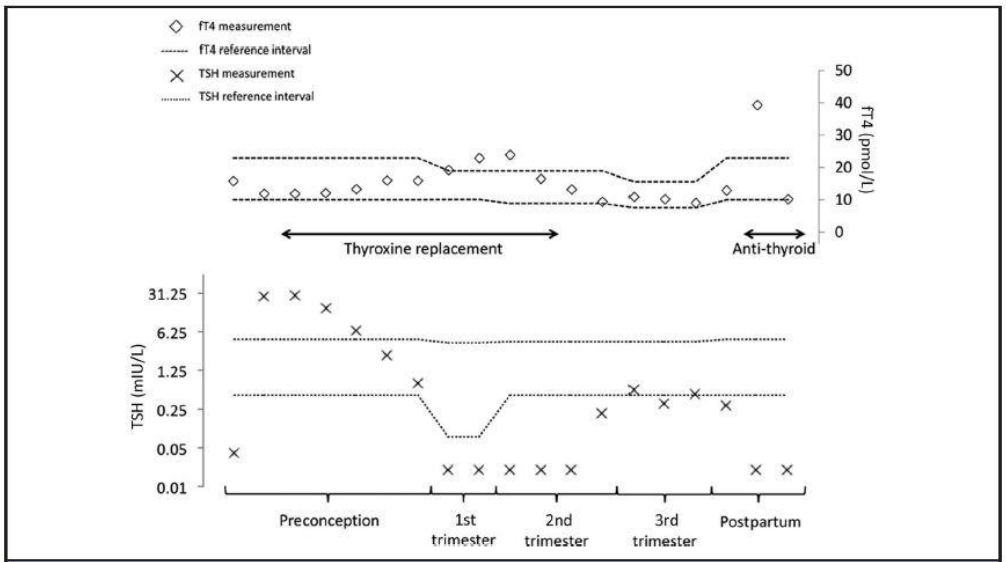

Fig. 1. Thyrotropin (TSH, in log scale) and fT4 trends of the patient, before, during and after pregnancy (time not drawn to scale).

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QUESTIONS TO CONSIDER
• How is SCH defined?
• What are the subtypes of TRAb and what laboratory assays are used to detect and distinguish between them?
• What could explain this patient's changes in thyroid hormone testing results and clinical symptoms?

Final Publication and Comments

The final published version with discussion and comments from the experts will appear in the October 2016 issue of *Clinical Chemistry*. To view the case and comments online, go to http://www.clinchem.org/content/vol62/issue10 and follow the link to the Clinical Case Study and Commentaries.

Educational Centers

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