

# HUMAN CHORIONIC GONADOTROPHIN-INDUCED HYPEREMESIS AND HYPERTHYROIDISM IN PREGNANCY

AQ Ajmi, MBBS; R Smith, MBChB

## CASE REPORT

A 33-year-old gravida 2 para 1 was referred by her general practitioner at six weeks of gestation with severe nausea and vomiting. She was dehydrated, unable to tolerate fluids orally and had diminished urine output with ketonuria. There was no abdominal pain, bowel or urinary symptoms. Thyroid function tests showed thyroid-stimulating hormone (TSH) <0.5 (normal 0.4-6) and elevated free T3 and T4. Full blood count, urea and electrolytes were within normal limits. An ultrasound scan showed a singleton pregnancy consistent with her dates. She was clinically euthyroid. Thyroid peroxidase antibodies were normal. She was managed with intravenous fluids and antiemetics. The medical team advised conservative management of her hyperthyroidism. Despite a further admission, which was managed conservatively, by ten weeks gestation her thyroid function tests returned to normal.

SYNOPSIS OF THYROID FUNCTION TESTS			
	TSH(0.4-6)	free T4(9-26pmol/l)	free T3(2.5-5.5)
6 weeks	<0.5	28.5	5.6
10 weeks	<0.5	15.1	4.5

Interestingly, transient biochemical hyperthyroidism had occurred during her first pregnancy, with no finding of thyroid disease. She had severe hyperemesis from six weeks gestation, required hospital admission and intravenous fluids on three separate occasions and again was settled by 12 weeks. Blood tests showed biochemical hyperthyroidism which came back to normal by 18 weeks. Of note, beta human chorionic gonadotrophin ( $\beta$ hCG) was 130,000 iu at six weeks. Thyroid peroxidase antibodies, TSH receptor antibodies, lupus anticoagulant and anticardiolipin antibodies were all within normal limits. She was induced at term +10, delivered a single live male baby, 9lb in weight, by spontaneous vaginal delivery. The baby has no thyroid problems. There is no family history of thyroid problems.

## DISCUSSION

Hyperemesis gravidarum is a severe and intractable form of nausea and vomiting in pregnancy. It may result in weight loss; nutritional deficiencies; and abnormalities in fluids, electrolyte levels and acid-base balance. The peak incidence is at 8-12 weeks of pregnancy, and symptoms usually resolve by week 16. Hyperemesis gravidarum occurs in 0.5-10 cases per 1000 pregnancies. The prevalence increases in molar pregnancies and multiple pregnancies. The cause of severe nausea and vomiting in pregnancy has not been identified. Extreme nausea and vomiting may be related to elevated levels of estrogens or human chorionic gonadotropin (hCG). Hyperemesis is associated with hyperthyroidism, pyridoxine deficiency, and psychological factors.<sup>(1)</sup>

Thyroid function tests change during normal pregnancy due to the influence of two main hormones, estrogen and hCG. The hormone hCG is produced in large quantities during pregnancy, particularly at the end of the first trimester. Due to its molecular similarities with TSH, hCG weakly stimulates the maternal gland to increase its hormone production and slightly suppress TSH in the first trimester. Estrogen increases the amount of thyroid hormone binding protein in the serum which increases the total thyroid hormone levels in the blood; free hormone levels, however, usually remain normal.<sup>(2)</sup>

Assessment of thyroid function during pregnancy should be done with a careful clinical evaluation of the patient's symptoms as well as measurement of TSH and free, not total, thyroid hormones. Measurement of thyroid autoantibodies may also be useful in selected cases to detect maternal Graves' disease or Hashimoto thyroiditis and to assess risk of fetal or neonatal consequences of maternal thyroid dysfunction.<sup>(3)</sup>

$\beta$ hCG exists as several isoforms depending on carbohydrate content. Desialated isoforms, which are produced more abundantly in cases of  $\beta$ hCG-induced hyperthyroidism, have greater thyrotrophic activity than the commoner sialated isoforms. Therefore, the quality rather than quantity of  $\beta$ hCG is important in the development of  $\beta$ hCG-induced hyperthyroidism. This also explains why pregnancy, with high  $\beta$ hCG concentrations comparable to those reported in this case, is not usually associated with thyrotoxicosis.<sup>(4)</sup>

The incidence of hyperthyroidism in pregnant women has been estimated at 0.2%. Most women have symptoms before pregnancy, but some will demonstrate symptoms for the first time during pregnancy. The most common cause of hyperthyroidism during pregnancy is Graves' disease, which accounts for 85-90% of all cases. Other causes include subacute thyroiditis, toxic multinodular goiter, toxic adenoma, TSH-dependent thyrotoxicosis, exogenous T3 or T4, iodine-induced hyperthyroidism, and pregnancy-specific associations: hyperemesis gravidarum and hydatidiform mole.<sup>(5)</sup>

Diagnosis of hyperthyroidism during pregnancy is important because untreated or poorly treated hyperthyroidism can lead to adverse obstetrical outcomes. These include first-trimester spontaneous abortions, high rates of still births and neonatal deaths, a two- to threefold increase in the frequency of low birth weight infants, preterm delivery, fetal or neonatal hyperthyroidism, and intrauterine growth retardation. Diagnosis of Graves' disease can be difficult because healthy pregnant women may exhibit tachycardia, palpitations, mild heat intolerance, emotional lability, diaphoresis and warm, moist skin.<sup>(6)</sup>

For these reasons, diagnosis of hyperthyroidism during pregnancy needs to be made on careful clinical observations and well-conceived laboratory testing. As most cases of hCG-induced hyperthyroxinemia are transient, the thyroid function tests usually return to normal by the second trimester without treatment. However, in those women with persistent hyperemesis and hyperthyroxinemia in the second half of pregnancy, antithyroid drug therapy should be considered.<sup>(7)</sup>

Thyrotoxicosis can exacerbate and mimic the symptoms of hyperemesis. Thyroid function tests should be measured in all pregnant women with hyperemesis and the results should be carefully interpreted.

## REFERENCES

1. Edelman A, Logan JR. Pregnancy and hyperemesis gravidarum. Emedicine. Obstetrics and gynecology. <http://www.emedicine.com> (October 5, 2004)
2. Gama R. Hyperthyroidism induced by beta-human chorionic gonadotrophin. *Postgrad Med J* 2001; 77(908):423
3. Fantz CR, Dagogo-Jack S, Ladenson JH, Gronowski AM. Thyroid Function during Pregnancy. *Clin Chem* 1999;45(12):2250-8
4. Cockram CS, Swaminathan R, Chin RK, Lao TT. Hyperthyroidism in pregnancy. *J R Soc Med* 1988;81(1): 58-9
5. Kung AW. Thyroid disease in pregnancy. *Hong Kong Med J* 1997;3(4):388-90
6. Kaplan MM. Assessment of thyroid function during pregnancy. *Thyroid* 1992;2(1):57-61
7. Wier FA, Farley CL. Clinical controversies in screening women for thyroid disorders during pregnancy. *Midwifery Womens Health* 2006;51(3):152-8

— AGE —  
ANAESTHESIA  
ASSOCIATION



Annual Scientific Meeting and First International Conference  
10-11 May 2007  
The Lowry, Salford

**Hip Fracture, Parkinson's, Anaesthesia and Dementia, Intensive Care,  
Basic Science, Cognitive Dysfunction, Acute Geriatrics, Technology  
and Education**

**USA faculty to include:**  
Alex Rooke, Harvard  
Fred Siebert, Baltimore  
Chris Jankowski, Mayo Clinic  
David Martin, Mayo Clinic  
Jeff Silverstein, New York

Frederique Servin, France  
Lars Rasmussen, Denmark

**UK faculty to include:**  
Chris Pomfret, Manchester  
Steve Mousdale, Blackburn  
Dugald Atkinson, Manchester  
Clive Ballard, London  
Richard Griffiths, Peterborough  
Colin Currie, Edinburgh

**European faculty:**  
Vincenzo Fodale, Italy  
Bernadette Veering, Netherlands

£185 for two days (£175 for AAA members)  
Honorary members free registration  
Conference dinner £40  
International Excellence in a First Class Venue  
Registration forms on website;  
[www.aaa-online.org.uk](http://www.aaa-online.org.uk)  
Free papers by 15th April 2007