

The impact of mental health problems on medical comorbidity in pregnancy: a case of overt hypothyroidism

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Introduction

- Congenital hypothyroidism (CH) is thyroid hormone deficiency present at birth.
- Women with CH are more likely to experience adverse pregnancy outcomes.^{1,2}
- We present a patient with CH who failed to engage with antenatal services due to mental health problems, leading to development of overt hypothyroidism during her second pregnancy.

Case Report

- Gravida 2 Para 1, 22 years old.
- Past medical history: congenital hypothyroidism, anxiety and depression, asthma, BMI 50, smoker.
- Previous pregnancy 2018: was seen in anaesthetic clinic. Was on 225mcg thyroxine daily with TSH 0.8 milliUnits/Litre (mU/L) in 3rd trimester. Had category 2 caesarean section (CS) for failed induction.
- Current pregnancy: perinatal mental health involved from 19+6 gestation due to history of anxiety and depression since 2015, worsened in pregnancy. Referred to anaesthetic clinic due to high BMI. DNA for bloods during first trimester requiring home visit to obtain.
- Endocrine: last seen in clinic June 2018 (during first pregnancy). Multiple DNAs for endocrine clinic.
- Obstetric: review at 36+5. Unfortunately TFTs not checked. Elective CS booked.
- Anaesthetic: clinic appointment at 37+5. DNA but agreed over phone to come in for bloods including TFTs the next day.
- TSH >100, FT4 <5.4 (**Chart 1**). Symptoms of long standing constipation, fatigue, lethargy and weight gain. Observations normal. Admitted with plan for category 3 CS.
- Discussion with endocrinology team via Maternal Medicine Network.
- Plan:
 - Loading dose oral levothyroxine 500 mcg stat
 - Loading dose IV liothyronine 25 mcg stat
 - Follow by oral levothyroxine 250 mcg BD for one week, then 250 mcg OD
 - Repeat TFT in one week
 - If decompensates/ myxedema coma, she will need IV levothyroxine
 - Outpatient follow up in thyroid clinic in one week
 - Deranged TFT should not delay any necessary intervention
- Delivered 38+1 by category 2 CS under spinal (uncomplicated with 103mm needle). Female baby 2.3kg born in good condition.
- Returned to theatre 5 hours later with postpartum haemorrhage of 900ml, managed with Bakri balloon and vaginal pack. IV liothyronine and IV levothyroxine given prior to general anaesthetic complicated by bronchospasm.
- HDU care for 24 hours, arterial-line, PCA morphine, continued levothyroxine 250mcg bd. Discharged from anaesthesia on day 3.
- Plan for outpatient endocrine clinic in 2-3 weeks. Did not attend until 1 year postpartum.
- Remained under care of perinatal mental health team with ongoing depression and anxiety.

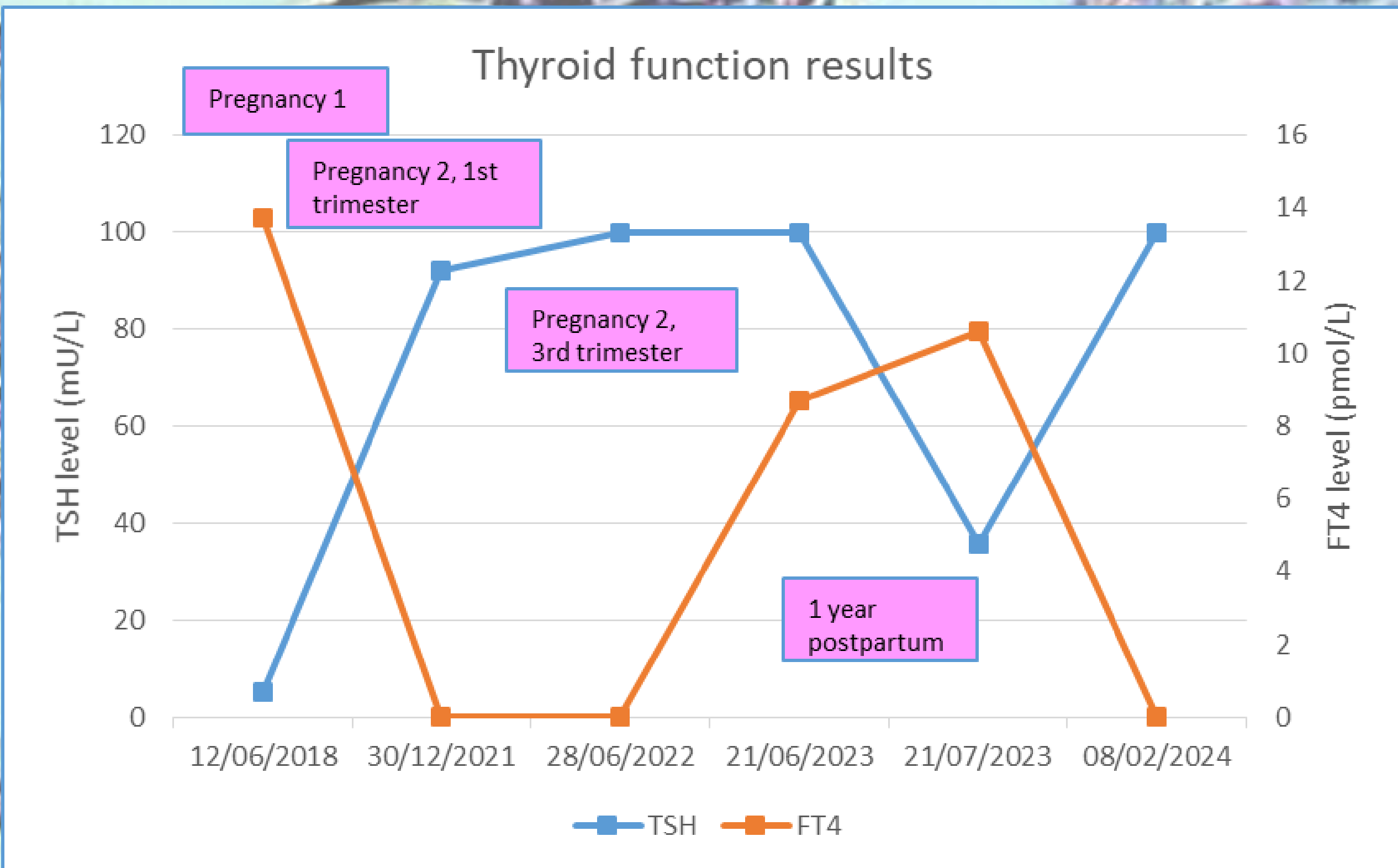


Chart 1 Patient thyroid function results chronology.

Trimester	TSH (mU/L)	FT4 (pmol/L)
1 st	0.05 – 3.70	6.7 – 13.9
2 nd	0.31 – 4.35	5.8 – 12.7
3 rd	0.41 – 5.18	6.2 – 12.2

Table 1 Trimester-specific TFT reference ranges.³

Maternal	Fetal
Pre-eclampsia	Pre-term delivery
Placental abruption	Low birth weight
Miscarriage	Intrauterine death
Risk of caesarean section	Impaired cognitive development
Postpartum haemorrhage	

Table 2 Risks of overt hypothyroidism in pregnancy.^{1,2}

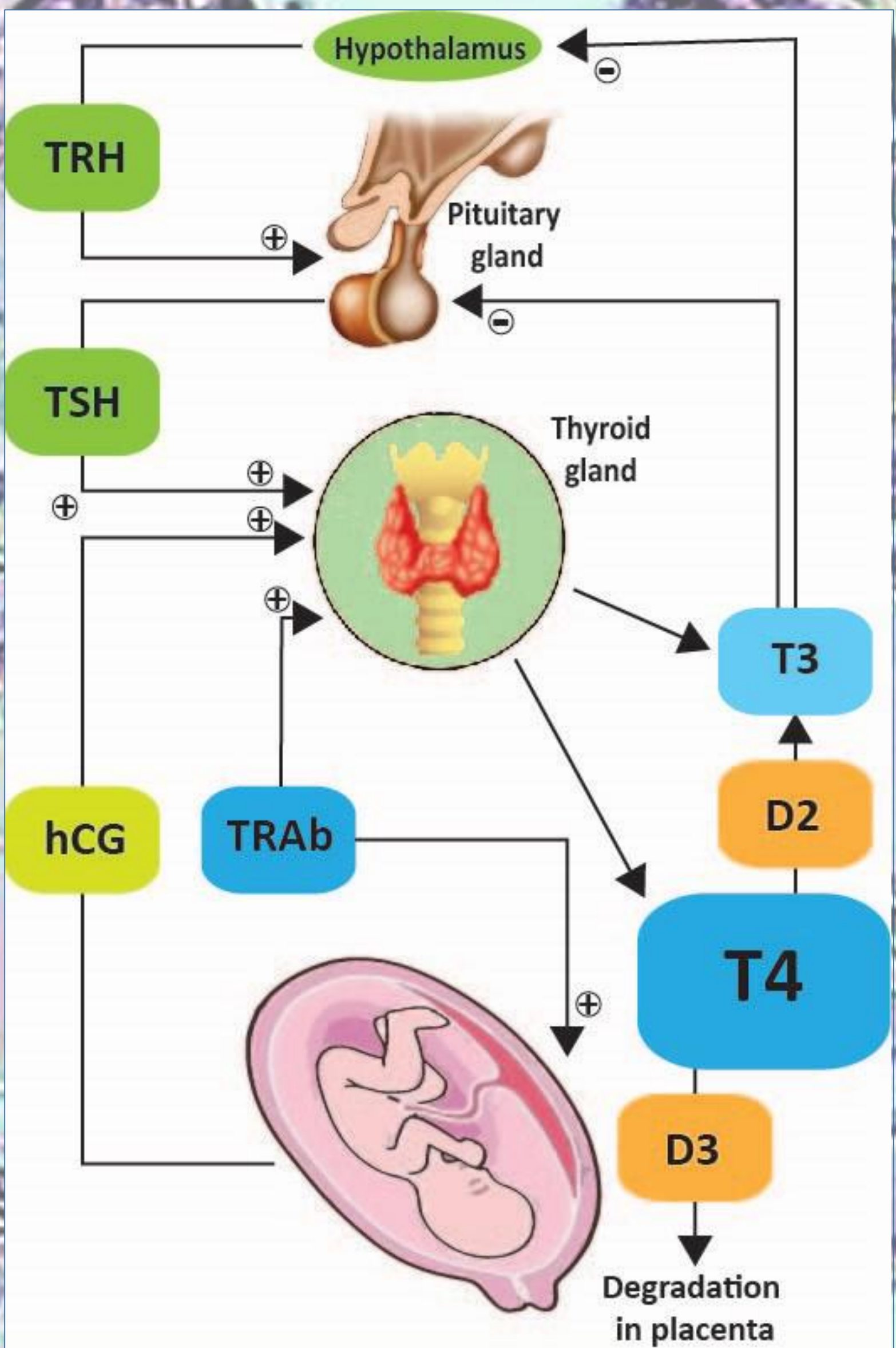


Figure 1 Hypothalamic-pituitary-thyroid axis in pregnancy.⁵

Discussion

- Primary overt maternal hypothyroidism is defined as the presence of an elevated thyroid stimulating hormone (TSH) and a decreased serum free thyroxine (FT4) concentration during gestation, with both concentrations outside the (trimester-specific) reference ranges (**Table 1**).^{2,3}
- Risks of inadequately treated overt hypothyroidism to the mother are shown in **Table 2**.^{1,2}
- Multiple studies have also concluded that undiagnosed, untreated, or undertreated patients with hypothyroidism are at increased risk of developing depression.
- There is a risk of myxedema coma, although rarely reported in the literature. This is more likely with a precipitating event, such as general anaesthesia. Features include hypothermia, mental status changes, hypoventilation, and metabolic derangement including hyponatraemia and hypoglycaemia.
- In the first trimester, maternal hCG directly stimulates the TSH receptor, increasing thyroid hormone production and resulting in a subsequent reduction in serum TSH concentration (**Figure 1**).⁴
- TFTs should be checked once every trimester, and 4-6 weeks after any change in dose of thyroxine. Thyroxine should be titrated to maintain serum TSH concentration not more than 2.5mU/L throughout all trimesters of pregnancy.²
- Medical and pregnancy-related characteristics highlighted as increasing risk of maternal death in the UK in the MBRRACE report this triennium include:
 - Pre-existing medical comorbidities (56% of women who died)
 - Pre-existing mental health problems (37% of women who died)
 - BMI $\geq 30\text{kg/m}^2$ (34% of women who died).⁵
- Our patient had many of the risk factors highlighted in the most recent MBRRACE report.
- There is difficulty in providing optimal antenatal care when a patient does not attend appointments with obstetric, midwifery, perinatal teams, and GP.
- Multiple contact attempts were made by the midwife throughout the pregnancy in this case.
- Our case highlights the utility of specialist clinics and maternal medicine networks.
- It also shows the importance of managing perinatal mental health effectively.
- It is not possible in this case to determine whether depression and anxiety were exacerbated by hypothyroidism.
- The American Thyroid Association recommends all patients with depression, including postpartum depression, should be screened for thyroid dysfunction.²

References

1. Juliane Léger, Sophie dos Santos, Béatrice Larroque, et al. Pregnancy outcomes and relationship to treatment adequacy in women treated early for congenital hypothyroidism: a longitudinal population-based study. *The Journal of Clinical Endocrinology & Metabolism*. 2015;100:860-9.
2. [2017 Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and the Postpartum](#) Alexander, Pearce, et al., *Thyroid*. March 2017, 27(3): 315-389. doi:10.1089/thy.2016.0457
3. North Bristol NHS Trust. Thyroid Function Tests. <https://www.nbt.nhs.uk/severn-pathology/requesting/test-information/thyroid-function-tests/#:~:text=In%20pregnancy%20the%20following%20ranges,6.2%20%E2%80%93%2012.2%20pmol%20L>. Accessed 24/04/24.
4. Calina, D.; Docea, A.O.; Golokhvast, K.S.; Sifakis, S.; Tsatsakis, A.; Makriganakis, A. Management of Endocrinopathies in Pregnancy: A Review of Current Evidence. *Int. J. Environ. Res. Public Health* **2019**, *16*, 781. <https://doi.org/10.3390/ijerph16050781>
5. Knight, M. et al. (eds) (2023) Saving lives, improving mothers' care. Accessed 26/01/2024 https://www.npeu.ox.ac.uk/assets/downloads/mbrrace-uk/reports/maternal-report-2023/MBRRACE-UK_Maternal_Compiled_Report_2023.pdf