

Pregnancy with Hyperthyroidism: an Overview

Achmad Areef Widandi¹, Sony Wibisono Mudjnarko²

¹.areef.widandi-2020@fk.unair.ac.id

¹Faculty of Medicine, Universitas Airlangga, Surabaya 60132, Indonesia

²Department of Internal Medicine, Dr. Soetomo General Hospital, Universitas Airlangga, Surabaya 60132, Indonesia

Abstract

Pregnancy with hyperthyroidism is characterized by an excess secretion of thyroid hormones, primarily free T4 and T3, along with a decrease in TSH levels. The thyroid gland undergoes structural and functional changes during pregnancy, leading to clinical conditions that may mimic an excess of thyroxine hormone. Distinguishing between physiological changes and thyroid disorders during pregnancy poses a challenge for clinicians. The prevalence of thyroid abnormalities during pregnancy is estimated at 0.2% among all pregnant women.

The pathophysiology of hyperthyroidism in pregnancy involves changes in estrogen levels affecting thyroid concentration, increased secretion of Thyroid Stimulating Factors (TSF) from the placenta, and enhanced renal clearance of iodine. Clinical symptoms of hyperthyroidism during pregnancy include tachycardia, exophthalmos, and minimal weight gain. Diagnosis relies on the Wayne score, serum concentrations of TSH, T4, and T3, and adherence to trimester-specific reference ranges. Complications of untreated hyperthyroidism in pregnancy include pre-eclampsia, premature birth, and an increased risk of adverse outcomes for both the mother and the fetus.

Keywords: Pregnancy, Hyperthyroidism

1. Introduction

During pregnancy there are changes in the structure and function of the thyroid gland. Apart from that, clinical conditions will arise that are similar to thyroid dysfunction. During pregnancy, thyroid hormones can increase, this is due to stimulation of the thyroid gland by hCG and is usually limited to the first 12-16 weeks of pregnancy. The hCG hormone also has a weak TSH agonist effect. These changes often make it difficult for clinicians to differentiate whether the condition is a physiological condition or a thyroid disorder (Iskandar, 2021). research states that the incidence of preeclampsia in pregnant women is five times higher in pregnant women who have uncontrolled hyperthyroidism during pregnancy and the birth weight of babies born is 10 times lower than in pregnant women who do not have hyperthyroidism (Anggraeni & Aryasa EM, 2022).

2. Pregnancy with Hyperthyroidism

2.1. Definition of Pregnancy with Hyperthyroidism

During pregnancy, there can be an increase in the body's metabolism and an elevation in the secretion of hormones to meet the needs of the fetus. One of the hormones that increases is the thyroid hormone. Hyperthyroidism in pregnancy is a condition where there is an excess secretion of thyroid hormones from the thyroid gland. Pregnancy with hyperthyroidism is characterized by an increase in the levels of free T4 and T3 with a decrease in TSH levels. Throughout pregnancy, the size of the thyroid gland increases by 10%-40%, and there is a 50% increase in the secretion of T4 and T3 (Suparman, 2021).

During pregnancy, structural and functional changes occur in the thyroid gland. These changes can lead to clinical conditions that resemble an excess of thyroxine hormone. Clinicians may find it challenging to differentiate whether the condition is physiological or a thyroid disorder. Thyroid diseases during pregnancy require more complex management due to their specific characteristics in certain conditions. Thyroid disorders can impact pregnancy, and vice versa. Thyroid abnormalities are quite commonly found during pregnancy, with an estimated frequency of 0.2% in all pregnant women (Iskandar, 2021).

Untreated hyperthyroidism during pregnancy can have consequences for both the mother and the fetus, such as miscarriage, hypertension disorders, premature delivery, low birth weight, and congestive heart failure (Iskandar, 2021).

2.2. Epidemiology of Pregnancy with Hyperthyroidism

Pregnancy with hyperthyroidism has an incidence of approximately 2-17 in 1000 births, constituting 1% - 3% of the total cases of hyperthyroidism. Other data indicates that hyperthyroidism during pregnancy occurs in about 0.05%-3% of all pregnancies (Suparman, 2021).

Pregnancy with hyperthyroidism is estimated to affect around 0.2% of all pregnant women worldwide. The prevalence of hyperthyroidism in the United States is approximately 0.1-0.4%, with the most common etiology being Graves' disease. Globally, the estimated occurrence of hyperthyroidism in pregnant women is 0.053% of all pregnancies (Iskandar, 2021).

2.3. Pathophysiology of Pregnancy with Hyperthyroidism

According to Glinoeer, the thyroid gland in pregnant women can be affected by 3 changes, namely:

1. Increased levels of the hormone estrogen during pregnancy can affect changes in thyroid concentration due to increased TBG levels. Increasing TBG will increase protein binding iodine levels starting from week 12 of pregnancy, which can reach 2 times the normal level. The increase in TBG levels during pregnancy can be caused by increased production by liver cells and decreased peripheral TBG degradation due to modification of oligosaccharides due to high estrogen secretion.
2. During pregnancy, there is an increase in the secretion of Thyroid Stimulating Factors (TSF) from the placenta, namely HCG or Human Chronic Gonadotropin. HCG and TSH are both glycoproteins that have identical alpha groups.
3. During pregnancy, there is an increase in renal clearance of iodine, resulting in a decrease in the supply of iodine in the thyroid gland of pregnant women.

In pregnancy there is an increase in the glomerular filtration rate, increased iodine excretion, and a decrease in the iodine pool. During pregnancy there is also an increase in the TSH response to TRH. This is caused by increased estrogen (Glinoeer, 2015).

2.4. Symptoms of Pregnancy with Hyperthyroidism

Pregnancy with hyperthyroidism has many clinical symptoms. In pregnancies with mild hyperthyroidism, it is difficult to make a diagnosis because they have normal symptoms during pregnancy. Clinical symptoms in pregnancy with mild hyperthyroidism can include tachycardia, exophthalmos, and no weight gain (Suparman, 2021).

Distinguishing hyperthyroidism due to Graves' disease in pregnancy is not easy because the clinical symptoms of thyrotoxicosis in pregnancy are similar to normal pregnancy conditions such as palpitations, intolerance to hot air, and warmer skin. Typical symptoms include goiter, ophthalmopathy, palpitations, and weight loss even though the mother eats a lot. On physical examination, ophthalmopathy, diffuse goiter, tremors and clammy skin were also found (Pramono & Soebijanto, 2016).

2.5. Diagnosis of Pregnancy with Hyperthyroidism

The Wayne score can be used to diagnose hyperthyroidism. The Wayne Index is based on the symptoms and complaints experienced by the patient. This assessment is used to determine whether the patient has thyroid disease or not based on the symptoms experienced. On the Wayne Index, a value is obtained from +45 to -25, where if the score is more than 19 it can be said that the patient has toxic hyperthyroidism, if the score is less than 11 then the patient is euthyroid, and a score of 11 to 19 means the patient is in an equivocal condition. The use of the Wayne Index aims to assist in establishing a hip diagnosis. The diagnosis of hyperthyroidism in pregnancy also uses serum concentrations of TSH, T4, and T3 which are the same as normal women. In normal susceptible pregnancies, thyroid hormones differ each semester, at the beginning of pregnancy the TSH concentration is 10% lower than in normal conditions due to increased hCG. According to the American Thyroid Association (ATA) and the Endocrine Society (ES), TSH levels in the first trimester are 0.1 mIU/L to 2.5 mIU/L, second and third trimesters are 0.3 mIU/L to 3 mIU /L (Anggraeni & Aryasa EM, 2022).

2.6. Complications of Pregnancy with Hyperthyroidism

Pregnancy with untreated hyperthyroidism can have a negative impact on the pregnant woman, the pregnancy as a whole and the fetus. Preeclampsia and premature birth are complications in pregnancies with hyperthyroidism. One study in 2006 reported that uncontrolled hyperthyroidism in pregnancy could result in a five times higher incidence of pre-eclampsia and low birth weight 10 times higher than in mothers without hyperthyroidism. Apart from that, it can cause serious complications in the mother such as miscarriage, placental abruption, premature birth and preeclampsia (Anggraeni & Aryasa EM, 2022).

3. Conclusion

Pregnancy with hyperthyroidism, marked by increased thyroid hormones, presents challenges in diagnosis due to overlapping symptoms with normal pregnancy. The condition, affecting 0.2% globally, is often linked to Graves' disease. Changes in thyroid gland structure and function during pregnancy, influenced by factors like elevated estrogen and placental TSF, contribute to altered hormone levels. Clinicians face difficulties in distinguishing mild symptoms, necessitating the use of the Wayne score for diagnosis. Untreated hyperthyroidism poses risks, including preeclampsia and premature birth. Management strategies should focus on early diagnosis and personalized care to mitigate complications, ensuring a healthier pregnancy. Ongoing research will refine our understanding and enhance care for pregnant women with hyperthyroidism.

Acknowledgements

The authors would like to express their gratitude to all parties involved in the making of this review.

References

- Iskandar, I. (2021). Kehamilan dengan Hipertiroid. *Jurnal Kedokteran Nanggroe Medika*, 4(1), pp.16–21. doi:10.35324/jknamed.v4i1.114.
- Anggraeni, R. and Aryasa EM, T. (2022). Manajemen Hipertiroid pada Kehamilan. *Jurnal Anestesi Obstetri Indonesia*, 5(2), pp.127–34. doi:10.47507/obstetri.v5i2.102.
- Suparman, E. (2021) 'Hipertiroid dalam Kehamilan', *e-CliniC*, 9(2), p. 479. doi: 10.35790/ecl.v9i2.34907.
- Glinoe, D. (2015) 'The Regulation of Thyroid Function in Pregnancy : Pathways of Endocrine Adaptation from Physiology', 18(3), pp. 404–433.
- Pramono, L. A. and Soebijanto, N. (2016) 'Laurentius A. Pramono.pdf', *Cdk*, 43(6), pp. 435–439.