

## **Pregnancy Complicated by Thyroid Heart Disease: a Case Report**

Lalu Shalya Kusuma Putra<sup>1</sup>, Yusra Pintaningrum<sup>2</sup>

1. Young Doctor At West Nusa Tenggara General Hospital, Medical Faculty of Mataram University, Indonesia
2. Cardiologist at Cardiovascular Department West Nusa Tenggara General Hospital

Email: [shalya0101@gmail.com](mailto:shalya0101@gmail.com)

### **ABSTRACT**

Hyperthyroidism is known to give effect on cardiovascular system such as arrhythmias, vascular changes, widened pulse pressure, and myocardial remodeling. It can also affect pregnancy by harming both maternal and fetal condition. Uncontrolled thyrotoxicosis can increase the risk of complication such as preeclampsia, maternal congestive heart failure, pregnancy loss, prematurity, low birth weight, stillbirth, and IUGR. A 35 years old pregnant women presented with dyspnea since a year ago and progressively worsened since her 3<sup>rd</sup> month of pregnancy. Other symptoms were swollen legs, palpitations, thyroid enlargement, and sweating. The patient's blood pressure was 140/50 mmHg and heart rate was 97 bpm. On physical examination, a mid-systolic scratching sound was heard over the upper part of the sternum or second left intercostal space at the end of expiration, which is called The Means–Lerman scratch that occurs in patients with hyperthyroidism. This patient Wayne's Index was 24. Chest x-ray showed a pulmonary edema and cardiomegaly. An echocardiography revealed normal LV systolic function (EF by teich 65%), abnormal LV diastolic function grade 3, and mild concentric left ventricle hypertrophy. Laboratory results showed TSHs, FT3, and FT4 were 0.17 uIU/mL, 35.7 Pmol/L, and >100.00 Pmol/L. This patient was diagnosed with G3P2 gestational age 22-23 weeks and thyroid heart disease with heart failure preserved ejection fraction. This patient was given furosemide, propranolol, and propylthiouracil. After the symptoms subside, furosemide was discontinued. The therapy was given with monitoring of fetal heart rate and an improvement was seen throughout the hospitalization.

**Keywords:** Heart failure, Hyperthyroidism, Pregnancy, Thyroid Heart Disease

## INTRODUCTION

Thyroid is an endocrine gland that can affect multiple organs in human body. This function is achieved by secreting thyroxin (T4) and triiodothyronine (T3). Secretion of these hormones are controlled by anterior pituitary by thyroid stimulating hormone (TSH). Anterior pituitary also controlled by hypothalamus via secretion of thyroid releasing hormone (TRH).(1,2)

One of the organ that is affected by thyroid hormones is heart. It could give a positive chronotropic and inotropic effect.(1) On hyperthyroid state, arrhythmias, vascular changes, and myocardial remodeling could happen. These changes will lower the cardiac output and, eventually, increasing the risk of heart failure.(2) Among pregnancy patient, hyperthyroid was found in 0,05% to 3% with 85% case was Graves disease. Uncontrolled thyrotoxicosis and pregnancy will increase.

cardiac burden and the risk of developing heart failure.(3) Other than heart failure, uncontrolled thyrotoxicosis can increase the risk of pregnancy-induced hypertension, pregnancy loss, stillbirth, premature, low birth weight, and intrauterine growth restriction (IUGR).(4) This case report will discuss about pregnant women complicated by thyroid heart disease with preserved ejection fraction heart failure.

## CASE REPORT

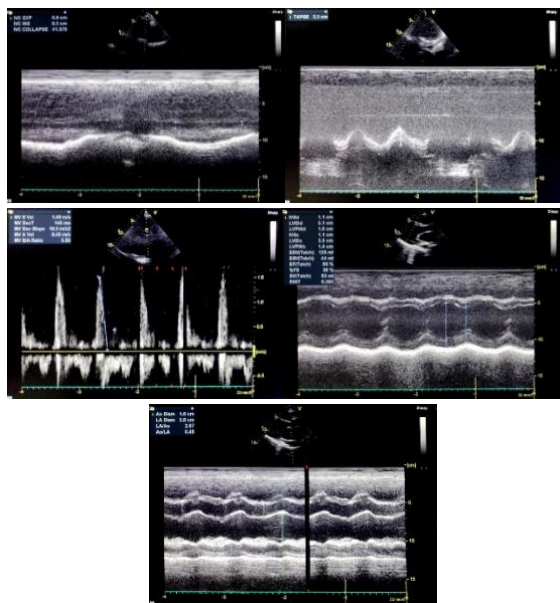
A 35 years old pregnant women came with dyspnea. The patient already felt this symptom since 1 year ago and worsen since her 3<sup>rd</sup> month of pregnancy. Her dyspnea came when she does light activity such as walking to the bathroom. Since a year ago,

she also complaint of palpitation that occur without any trigger. Her palpitation also accompanied by enlargement of mass on the neck, increased in appetite, excessive sweating, fatigue, and cold preferences. There are no weight changes felt by the patient. Other complaint was swollen on both legs since 3 days before admitted to hospital. It progressively becoming more swollen without pain nor redness. The same symptom was felt 3 weeks before and subside after given therapy. Her blood pressure and heart rate were 140/50 mmHg and 95 bpm. On physical examination, there are palpable mass on the neck with 7 x 3 cm in size, soft surface, and well demarcated. Reduced vesicular pulmonary sound was heard on the basal part. A mid-systolic scratching sound was heard over the upper part of the sternum or second left intercostal space at the end of expiration (The Means–Lerman scratch). Her fundal height was 2 finger under her umbilical. Pitting edema was positive on both lower extremities. Her Wayne's Index was 24. Chest x-ray showed cardiomegaly and pulmonary edema. Ultrasonography examination showed gestational age 17 weeks 3 days, estimated fetal weight 198 grams, normal amniotic fluid volume, with estimated due date on November 20<sup>th</sup>, 2022. On echocardiography, normal LV systolic function (EF by teich 65%), abnormal LV diastolic function grade 3, and mild concentric left ventricle hypertrophy was found. Her thyroid function test showed decreased in TSHs (0,17 uIU/mL), increase in FT3 and FT4 (35,7 Pmol/L and >100,00 Pmol/L). The patient was then diagnosed with G3P2A0L2 gestational age 22-23 weeks and thyroid heart disease with heart failure preserved ejection fraction. She was hospitalized for 4 days. The therapy given was furosemide using syringe pump

injection, propranolol 3 x 40 mg, and propylthiouracil 3 x 100 mg. After an improvement of patient symptoms was seen, furosemide was stopped on her 3<sup>rd</sup> days of hospitalization. While giving treatment, fetal heart rate was also observed.



**Fig 1.** Chest x-ray showing cardiomegaly and pulmonary edema.



**Fig 2.** Echocardiogram showed normal LV systolic function (EF by teich 65%), abnormal LV diastolic function grade 3, and mild concentric left ventricle hypertrophy



**Fig 3.** Ultrasonography showed normal amniotic fluid volume with gestational age 17 weeks 3 days and estimated fetal weight 198 grams.

## DISCUSSION

Heart is strongly related with pregnancy and hyperthyroid. In pregnancy, cardiovascular changes are seen such as vasodilatation, increase in cardiac output (up to 45%), heart rate, and decrease in blood pressure.(5) With hyperthyroidism, the heart workload increase. This condition can affect heart by increasing resting heart rate, stroke volume, myocardial contractility, fraction ejection, and an improvement in diastolic relaxation. (6)

There are varied symptoms of hyperthyroidism that can manifest in pregnancy and this contributes to the delay in diagnosis. In this case report, a widened pulse pressure was found. This happens because there is an increase in resting left ventricular (LV) systolic function and an increase in relaxation rate of LV chamber and LV filling. These contributes to an increase in systolic arterial pressure and a decrease in diastolic arterial pressure. Another finding was The Mean-Lerman Scratch which is usually found in patient with hyperthyroid. Mid systolic murmur happens when there is a rubbing of pericardial and pleura that is heard on the left upper sternal border.(6)

Wayne's Index is a clinical scoring system used to help in assessing whether there is a possibility of hyperthyroid state and its degree. A score less than 11 showed euthyroid meanwhile a score > 19 increase the possibility of toxic hyperthyroidism.(7) In this case, the patient's Wayne's Index was 24 which lead to a suspicion towards uncontrolled thyrotoxicosis state. This condition was confirmed with laboratory results showing an elevated FT4, FT3, and decrease in TSHs. In echocardiography

examination, it was found that the LV systolic function was normal with abnormality in LV diastolic function (grade 3), and a mild concentric of LV hypertrophy. These findings were in line with the effect given by thyroid to the heart. This condition is called high-output heart failure which is caused by tachycardia-mediated cardiomyopathy.(6)

The treatment of choice for hyperthyroidism during pregnancy is anti-thyroid agent. If the level of FT4 is at or slightly elevated from the normal value, therapy could be delayed with monitoring of patient's thyroid status. Pregnant patient thyroid level should be kept in a subclinical hyperthyroidism, this consideration was based on no maternal or fetal complication reported up until now. The goal of therapy is an euthyroid state using the lowest dose that can maintain FT4 level up to 10% of normal range. The drugs of choice are propylthiouracil (PTU) and methimazole. In this case, we use PTU because the risk of congenital abnormalities was low compared to methimazole.(8)

Hyperthyroid is important to diagnose early during pregnancy or, if possible, before pregnancy. This was based on the risk of maternal and fetal that could happen if there is a delay in diagnosing hyperthyroid. These risks increase if the patient was in uncontrolled thyrotoxicosis state. Maternal complication that could happen are preeclampsia, thyroid storm, and congestive heart failure. Congestive heart failure was found in 10% of pregnant women in uncontrolled thyrotoxicosis state. The fetal complication that could happen are prematurity, miscarriage, stillbirth, low birth weight, and intrauterine thyroid dysfunction.(4,9)

## CONCLUSION

Early diagnose of hyperthyroidism in pregnancy is an important thing to do in order to decrease the poor outcome to the

mother and fetal. Increasing awareness to healthcare provider and pregnant women about thyroid dysfunction could be done as a first step of screening.

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