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Thyroid Heart Disease in Young Male, a Case Report

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ABSTRACT

Introduction: The thyroid gland produces thyroid hormones that affect all tissue's metabolic processes, including the heart. Disorders of thyroid hormones, both increasing and decreasing thyroid hormones, can cause similar symptoms to primary heart disease. Thyroid heart disease (THD) is a heart disease that occurs due to increasing (hyperthyroid) or decreasing (hypothyroid) thyroid hormones in the circulation. Hyperthyroidism can cause several types of heart disease, including mitral regurgitation, tricuspid regurgitation, cardiomyopathy, heart failure, mitral valve prolapses, atrial fibrillation or sinus tachycardia.

Method: This was a retrospective case report, after analysis of patient clinical data. The patient provided written informed consent to publish their case details and any accompanying images.

Results: Almost all cases of THD occur in middle-aged women. Here we presented a 32-year-old male patient diagnosed with THD caused by graves' disease. Patient was admitted to emergency department due to shortness of breath. Medical and non-medical treatments were administered to the patients, and patients experienced improvement after several days of hospitalization.

Conclusion: In fact, the progression of hyperthyroidism is characterized by remission and long-term exacerbations. Although some patients can remain euthyroid for a long time after therapy, many eventually get into hypothyroidism. Therefore, lifetime follow-up is an indication for all patients with hyperthyroidism.

Keywords: Thyroid Heart Disease, Hypothyroidism, Hyperthyroidism

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INTRODUCTION

The thyroid gland is part of the endocrine system that affects metabolism of tissues and organs. Increase (hyperthyroidism) or decrease (hypothyroidism) of thyroid hormones can cause abnormalities in many organs, including the cardiovascular system. Hyperthyroidism can cause heart failure, atrial fibrillation, mitral regurgitation, and tricuspid regurgitation.[1] Thyroid gland disorder of the heart can cause similar symptoms to primary heart disease. Thyroid heart disease (THD) is a heart disease that occurs because of increasing or decreasing free tyrosine hormone in circulation. Several causes that lead to hyper- and hypothyroid, including severe disease, toxic multinodular struma, toxic adenoma, Hashimoto Thyroiditis, Thyroiditis postpartum, viral, and drugs like amiodaron and hypophysis adenoma, can cause THD.[2,3] Most cases of hyperthyroidism occur in women with a ratio of women and men is 1:5.[4]

Hyperthyroidism is caused by excessive production of thyroxine (T4) and triiodothyronine (T3), where T4 and T3 stimulate the sympathetic nerves and cardiac muscle contractility that increase cardiac output, blood pressure and heartbeats. Additionally, thyroid hormones also cause weight loss, hyperphagia, and excessive

sweating due to hypermetabolism that also lead to cardiovascular disorders. Therefore, hyperthyroidism should be treated with antithyroid drug therapy to prevent cardiac abnormalities.[5–7] Heart disease caused by hyperthyroidism is due to high production of T4 and T3 which interacts with the thyroid stimulating hormone (TSH) receptor in the thyroid follicular epithelial membrane, which results in an increased in the body's sympathetic nerve activity, that increases sympathetic nerves in heart. This then lead to increase electrical impulses from SA node cause increased cardiac contraction resulting in reduced ventricular ejection fraction, increased blood pressure and pulse as well as lead to rupture of chordae tendinea. Additionally, this lead to insufficient close of cardiac valve causing valve regurgitation or prolapse.[5–7]

METHOD

This was a retrospective case report, after analysis of patient clinical data. The patient provided written informed consent to publish their case details and any accompanying images.

CASE REPORT

A 32-year-old man was presented to the Emergency Department of Zainoel Abidin Hospital (ZAH), Banda Aceh, with a complaint of shortness of breath that had been felt for two days before entering the hospital. This symptom was initially complained of after the patient returned home from gardening. Shortness of breath is not affected by weather and dust. He also complained of feeling tired quickly, although he can still do activities. History of sleeping using 2-3 pillows and waking up in the middle of the night while sleeping because of tightness was denied. The patient experienced palpitation that was often anxious and led to difficulty sleeping. History of chest pain, coughing and fever were denied. He often gets sweats even in a cold place, feeling hot while in the house. Appetite also increases, but body weight is felt to decrease. There were no complaints of urination and ample water. The patient has had a mass in the neck for six months ago and increasing day by day. He routinely seeks treatment, but the mass has not been smaller. No history of Hypertension, diabetes mellitus, or bronchial asthma, but the patient is a smoker.

Sensorium is compos mentis with normal blood pressure. Heart rate was 96 beat per minute (bpm), irregular rhythm, adequate volume with respiration rate was 26 times per minute and normal temperature. We found the Joffroy sign, Möbius sign, Stellwag sign, Von Graefe sign and Rosenbach sign from physical examination. Examination of thyroid gland showed symmetrical enlargement, unclear boundary, supple with no tender pain and no signs of inflammation. Mass was moved while swallowing, and no bruit was present. We found cardiomegaly and systolic murmur from heart examination. Thyroid hormone examination showed hyperthyroidism with FT4 and TSH were 56,63 ng/dl and TSHs <0,005 uU/ml respectively.

Chest X-ray resulted in cardiomegaly, as shown in Figure 1 below.

Figure 1. Chest X-Ray

We then continued to assess cardiac function using electrocardiography and echocardiography, as shown in Figures 2 and 3 below. ECG showed an Atrial Fibrillation pattern with an average ventricular response. The echocardiography showed the result of MR severe, TR severe and left ventricle dilatation with an ejection fraction of 64%.

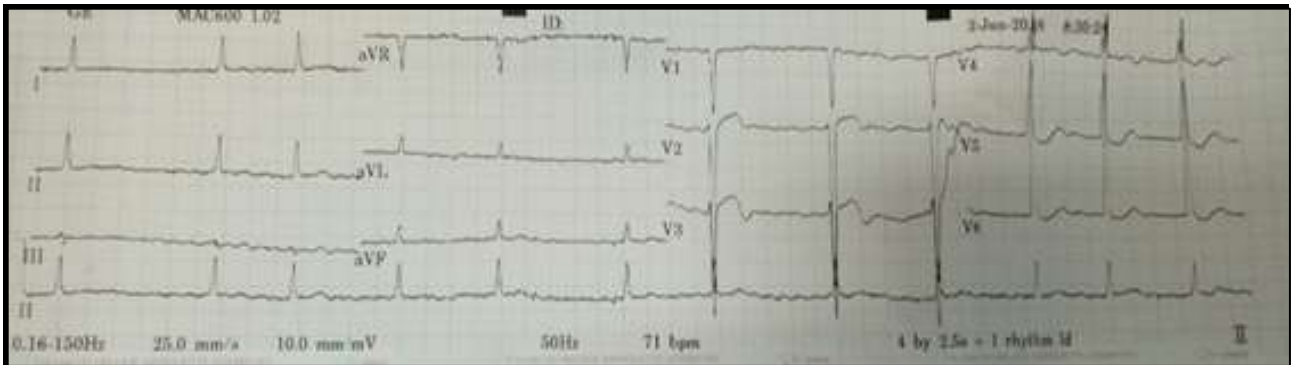

Figure 2. Electrocardiography result

Figure 3. Echocardiography

The patient was diagnosed with thyroid heart disease due to Grave's disease and treated with methimazole 10 mg, ramipril 5 mg, clopidogrel 75 mg daily and propranolol 10 mg and isosorbide dinitrate 5 mg twice daily. Patient showed improvement and was then discharged after seven days of hospitalization.

DISCUSSION

Hyperthyroidism can cause various clinical manifestations that affect the heart's function, blood pressure, body metabolism, and excretion through the kidneys, gastrointestinal system, muscles, fat, and hematopoietic system. Usually, patients with hyperthyroidism develop hyperexcitability, nervousness, emotional instability, muscular weakness, menstrual flow disturbances, weight loss despite increased food intake, and cardiovascular symptoms, such as palpitations in 85% of patients, dyspnea on effort and weakness in about 50% of cases.

These symptoms may be initially mild and gradually worsen. The appearance of angina, which may be due to a disturbance of the oxygen supply/demand equilibrium or vasoconstriction, is rare; however, it usually suggests the presence of obstructive coronary artery disease. During the clinical examination, the most common finding from the cardiovascular system is tachycardia, with 90% of patients having a resting heart rate above 90 bpm.[8–10] In this case, the patient presented to the Emergency Department of ZAH with complaints of shortness of breath. The patient also complains of chest palpitations, is often anxious and has trouble sleeping.

Graves' disease is an autoimmune disorder characterized by hyperthyroidism, diffuse goiter, ophthalmopathy, and dermopathy.[11,12] Hyperthyroidism can cause eyeball disorder because of lymphocyte infiltration in extraocular muscles with an inflammatory reaction. As shown in this patient, we found Joffroy sign, mobius sign, stellwag sign, von grafe sign and Rosenbach sign. Examination of the thyroid gland also showed symmetrical enlargement with unclear boundary, supple, no tender pain, no signs of inflammation as usually shown in Grave's disease.

There are different types of heart disease caused by hyperthyroidism, including mitral regurgitation (MR) and tricuspid regurgitation (TR). MR is when blood flow returns from the left ventricle to the left atrium at the systolic phase due to incomplete mitral valve closure. Mitral regurgitation is divided into acute and chronic mitral regurgitation. TR is the return of blood flow from the right ventricle to the right atrium due to the closure of the tricuspid valve.[5,7] In this case, we found atrial fibrillation, mitral regurgitation, tricuspid regurgitation and dilated left ventricle, parallel with echocardiography.

Treating thyroid heart disease should be carried out immediately, covering medical and non-medical treatments.[3,4] In non-medical therapy, bed rest and diet to reduce the burden of the heart with a soft diet, low in salt and calories, and reduce all forms of stress, both physical and psychological that can aggravate the work of the heart. The beta-blockers are intended to reduce heartbeat and can reduce the conversion of thyroid hormones as well. Beta blocker will rest the heart and give a longer diastolic filling time to prevent heart failure. Propranolol is also essential to overcome the peripheral effects of thyroid hormones, stimulators of beta-adrenergic receptors. Beta-blockers also suppress the nervous system to reduce palpitations, anxiety, and hyperkinesis, although beta-blockers do not affect the increase in oxygen consumption.[13]

Anticoagulants are recommended for AF, mainly if it stays three days or more, continued for four weeks after returning to sinus rhythm and euthyroid conditions. The primary therapy for hyperthyroidism is to directly reduce the thyroid hormone produced by the thyroid gland using antithyroid drugs; besides that, it can be supported by radioactive iodine therapy and subtotal thyroidectomy surgery.[3,13] The most used antithyroid drugs are propylthiouracil (PTU) and methimazole. In this case, methimazole 10 mg daily was chosen as antithyroid drug. Patient experienced improvement and were allowed to be discharged after that and suggested to control to the outpatient center routinely.

CONCLUSION

We presented a 32-year-old male patient diagnosed with thyroid heart disease with graves' disease. Patients were treated for seven days at ZAH Banda Aceh with several treatments. The progression of hyperthyroidism is characterized by remission and long-term exacerbations unless the gland is damaged by surgery or radioactive iodine. Some patients can remain euthyroid for a long time after therapy; many eventually become hypothyroidism. Therefore, lifetime follow-up is an indication for all patients with hyperthyroidism.

DECLARATIONS

Ethics approval and consent to participate.

CONSENT FOR PUBLICATION

The Authors agree to publication in Journal of Society Medicine.

COMPETING INTERESTS
None.

AUTHORS' CONTRIBUTIONS
All authors significantly contribute to the work reported, whether in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas. Contribute to drafting, revising, or critically reviewing the article. Approved the final version to be published, agreed on the journal to be submitted, and agreed to be accountable for all aspects of the work.

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