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Unusual presentation of more common disease/injury

Graves' disease—familiar foe, unfamiliar face

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Summary

A 38-year-old man from a remote tribal area of South India presented with right heart failure. On evaluation, he was found to have untreated Graves' disease (GD) with atrial fibrillation and pulmonary hypertension. The left ventricular function was normal. Secondary causes for pulmonary hypertension were ruled out. He was treated with carbimazole and low-dose propranolol. Post 4 months medical therapy, his pulmonary hypertension completely reversed, thus establishing GD as a reversible cause of pulmonary hypertension and isolated right heart failure.

BACKGROUND

Graves' disease (GD) is the most common cause of hyperthyroidism. Cardiovascular system bears the brunt of the disease, and palpitations with shortness of breath often bring the patient to the clinician. However, the presentation as heart failure is distinctly rare. This is presumably because the disease is detected earlier. In areas with less access to medical facilities, some patients may remain undiagnosed for a long time and present with atypical manifestations. Here, we report a case of young male who presented with pedal oedema and breathlessness. On evaluation, he was found to have GD with pulmonary hypertension (PHT) and isolated right heart failure.

CASE PRESENTATION

A 38-year-old male patient from a remote tribal area in South India presented to us with swelling of both feet for 2 months. He had intermittent palpitations and sweating for the past 6 months. He was breathless on walking a few feet in level ground (New York Heart Association (NYHA) class III).

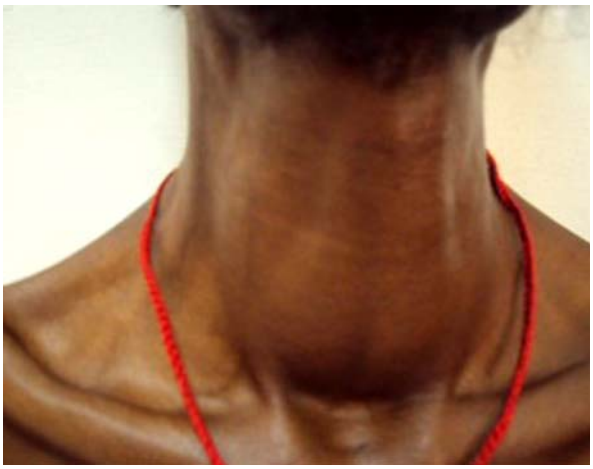
On examination, he was thinly built and poorly nourished. Firm, diffuse thyromegaly and tremors were present. His pulse was 110 bpm and was irregularly, irregular. Bilateral pitting pedal oedema was present. Neck veins were distended and his jugular venous pulse was grossly elevated with very prominent v waves and steep y descent (video 1). Cardiovascular examination revealed S3 and pansystolic murmur over the left lower sternal border. There were no eye signs, onycholysis or acropachy. In view of the above clinical features, hyperthyroidism with cardiac failure was suspected.

INVESTIGATIONS

His biochemical investigations confirmed hyperthyroidism (fT3 of 26.18 pmol/l (normal range 3.06–6.76), fT4 of 112.14 pmol/l (normal range 10.16–24.86) and thyroid stimulating hormone (TSH) of 0.04 mIU/l (normal range 0.5–4.5)). Technetium scintigraphy showed a diffusely increased uptake of 33.9% (normal range 0.5–4.5), suggestive of GD. ECG showed atrial fibrillation with a ventricular rate of 106/min. His echocardiogram showed a dilated right atrium and ventricle with severe tricuspid regurgitation and global right ventricle dysfunction. Right ventricular systolic pressure (RVSP) was estimated to be 54 mm Hg. It was calculated by adding the right atrial pressure (estimated echocardiographically as 8 mm Hg using the inferior vena cava (IVC) dimensions) to the tricuspid valve gradient (46 mm Hg) measured using the tricuspid regurgitation jet velocity. The left ventricular systolic and diastolic functions and mitral valve were normal.

DIAGNOSIS

A diagnosis of GD with atrial fibrillation, pulmonary hypertension and isolated right heart failure was made. Other common secondary causes of pulmonary hypertension were excluded. A normal arterial blood gas analysis ruled out hypoxic pulmonary vasoconstriction and



Video 1 Clip showing elevated jugular venous pulse with very prominent v waves and steep y descent. Also seen is the diffuse thyromegaly of Graves' disease.

consequent raised pulmonary pressure. The patient was negative for HIV, hepatitis A and hepatitis B. Abdominal ultrasound showed no evidence of portal hypertension. Antinuclear antibody and rheumatoid factor were negative. Deep venous thrombosis was ruled out by compression ultrasound of both lower limbs and D-dimer assay.

TREATMENT

He was treated with low-dose furosemide for 7 days after which the oedema subsided. The patient was initiated and treated with carbimazole and low-dose propranolol. He showed remarkable improvement in symptoms over 2 weeks and was later discharged. The dosage of carbimazole was titrated on an outpatient basis.

OUTCOME AND FOLLOW-UP

A repeat echocardiography after 4 months of follow-up showed substantial reduction in estimated RVSP to 26 mm Hg, though atrial fibrillation persisted with a decreased ventricular rate. The patient is currently euthyroid on a maintenance dose of 20 mg carbimazole and is on follow-up.

DISCUSSION

GD is the most common cause of hyperthyroidism worldwide. Majority of the patients present with palpitations and weight loss. In areas with poor medical access, the patient may remain undiagnosed until late stage and hence may present with unusual manifestations. Some of these atypical manifestations include anaemia, jaundice, heart failure and myxoedema.[1]

Thyroid and heart share a close embryological and physiological relationship. Cardiovascular system bears the brunt of the disease in hyperthyroidism. Among the myriad cardiovascular manifestations of hyperthyroidism, atrial fibrillation and heart failure have the maximum impact on patient outcomes. Both right and left ventricular failure are reported in GD. Owing to the rarity of presentation, data are scarce on the exact prevalence of heart failure in GD. Isolated right heart failure as initial presentation of GD is rare.[2–4] Thus, only a minority of GD patients present with heart failure and those who do so, usually have left heart failure. This is due to tachycardia-induced cardiomyopathy, the so-called thyrocardiac disease. The more common exertional dyspnoea in GD is often due to diminished diaphragmatic reserve.[5]

The pathogenesis of isolated right heart failure is as follows: Even though peripheral vascular resistance is decreased, the pulmonary vascular resistance is not similarly affected. The increase in flow through the pulmonary vascular bed without increase in compliance leads to increased pulmonary artery pressure.[6] Other possible mechanisms for development of PHT caused by GD include pulmonary vascular endothelial dysfunction or damage because of autoimmunity or the high cardiac output state, or increased metabolism of intrinsic pulmonary vasodilators.[7] The end result of PHT is right ventricular hypertrophy and eventually failure. The untreated PHT is the probable cause of right heart failure in our patient.

We have not done an angiogram in our patient. However, the absence of traditional cardiac risk factors, isolated right heart failure, primitive life style and 'manual labour' occupation of our patient make coronary artery disease an unlikely cause of heart failure. The absence of angina argues against the presence of significant coronary vasospasm.

Atrial fibrillation occurs in 2–22% of patients with GD. In a study of more than 13 000 hyperthyroid patients, the prevalence rate for atrial fibrillation was <2%, perhaps because of earlier recognition and disease treatment. When that same group of patients were analysed for age distribution, it was seen that there was a stepwise increase in prevalence in each decade peaking at ~15% in patients older than 70 years.[8] Thus, atrial fibrillation is young patients with GD is uncommon.

Our patient showed normalisation of estimated RVSP, thus proving the reversal of PHT. Successful reversal of PHT because of hyperthyroidism of GD has been documented in the past.[7 9–11] Therefore, PHT due to GD carries a good prognosis, in contrast to that in idiopathic primary PHT or secondary PHT due to autoimmune vascular disease, which have a bad prognosis. Atrial fibrillation persisted, probably due to the long-standing nature of the heart disease and enlargement of cardiac chambers. The patient was not treated with anticoagulants as the risk outweighs the benefits in younger patients with atrial fibrillation.[12]

The present case serves to illustrate that isolated right heart failure could be a presenting feature of GD, especially in neglected cases with little access to health care. GD should be suspected in cases of heart failure in young patients, particularly in the absence of traditional cardiovascular risk factors. The importance of detecting this is the chance of cure it offers to patients with pulmonary hypertension and heart failure.

Learning points

- Graves' disease (GD) should be suspected in cases of heart failure in young patients, especially in the absence of traditional cardiovascular risk factors.
- Untreated GD can lead to atypical complications such as pulmonary hypertension and isolated right heart failure.
- Pulmonary hypertension secondary to GD has good prognosis and is reversible with treatment of hyperthyroidism.

Competing interests None.

Patient consent Obtained.

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