CASE REPORT

Graves' disease as an uncommon cause of acute pericarditis

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SUMMARY

Acute pericarditis is either dry, fibrinous or effusive, independent of its aetiology. A case is presented involving a 44-year-old man with acute pericarditis. The cause was established to be an aggravation of Graves' disease due to non-compliance with treatment. Pericarditis is an uncommon cardiac complication of Graves' disease and is associated with more recurrent episodes when not detected. Pharmacological treatment should include anti-inflammatory drugs in combination with treatment for hyperthyroidism. The specific pathophysiological link between the two conditions is still to be elucidated.

BACKGROUND

Acute pericarditis is the most common pericardial disease and can be caused by viruses, bacteria, tuberculosis, myocardial infarction, malignancy, trauma and autoimmune diseases.¹ Graves' disease is an autoimmune disorder that leads to overactivity of the thyroid gland (hyperthyroidism). Well-known cardiovascular complications of this disease are atrial fibrillation, atrial enlargement and congestive heart failure. Moreover, it is linked with autoimmune complications, such as cardiac valve involvement and pulmonary arterial hypertension.² Since Graves' disease has an autoimmune aetiology, autoimmune pericarditis may be a potential cardiovascular complication. Only a few case reports have addressed this association between acute pericarditis and Graves' disease.^{3–5}

CASE PRESENTATION

A 44-year-old man presented to the emergency department, after visiting his general practitioner, with complaints of sharp chest pain during exercise.

His medical history included a hospital admission 2 years before because of decompensated heart failure. This episode was caused by moderate-to-severe mitral valve insufficiency and severe tricuspid valve insufficiency with pulmonary hypertension, based on hyperthyroidism (Graves' disease; free T4 of 62 pmol/L (normal values: 10–23 pmol/L) and thyroid-stimulating hormone (TSH)-receptor antibodies 32.9 IU/L (normal values: <1.5 IU/L)). After pharmacological therapy, the valve insufficiencies were reduced to moderate. He had stopped all his medication 3–4 months before presentation (metoprolol retard 150 mg and thiamazol 30 mg once daily). He was lost to follow-up since 8 months. Since 1 week he experienced symptoms of hyperactivity, palpitations and loss of weight that he recognised from his hyperthyroidism in 2011, when he

was first diagnosed with Graves' disease. The evening before his presentation the patient experienced sharp chest pain at rest with radiation to the left arm. The pain did not increase after position changing. In addition, there were also complaints of dyspnoea, perspiration and nausea.

On general examination, the patient was sitting up and with a forward bend. His vital signs were a blood pressure of 134/79 mm Hg, a pulse rate 87/min, a body temperature 36.7°C and a saturation of 99% without oxygen. Central jugular pressure was normal and there was no pulsus paradoxus. The heartbeats were regular, a cardiac murmur grade two of six was heard at the second intercostal space on the right, and a precordial friction rub could be heard. Pulmonary sounds were normal. There was no thyroid enlargement or signs of ophthalmopathy.

INVESTIGATIONS

The ECG showed a sinus rhythm of 85 bpm, and concave ST-segment elevation in all leads except aVR and aVL. There was no clear PTa segment depression (figure 1).

Laboratory results including complete blood count, biochemistry profile and cardiac enzymes were within the normal limits. However, TSH was <0.01 mIU/L (normal values 0.3–4.6 mIU/L) and free T4 was 81 pmol/L (normal values 10–23 pmol/L). As the diagnosis of Graves' disease had already been established previously, TSH-receptor antibody analysis was not repeated. In addition, low C reactive protein levels excluded a thyreoiditis. The chest X-ray finding was normal. Transthoracic echocardiography showed normal systolic left ventricular function and dimensions, normal right ventricular function and dimensions, normal left atrial dimensions, mitral valve insufficiency grade 2 (moderate) and no pericardial effusion.

DIFFERENTIAL DIAGNOSIS

As the chest pain was sharp, the cardiac enzymes were negative and the ECG showed concave ST-elevations in almost all leads without relevance to any certain coronary artery, the patient was diagnosed with acute pericarditis rather than coronary artery vasospasm, myocardial infarction or angina pectoris. Furthermore, the differential diagnosis of acute pericarditis includes aortic dissection, aortic stenosis, oesophageal rupture, oesophageal spasm, oesophagitis, acute gastritis, gastro-oesophageal reflux disease, peptic ulcer disease and pulmonary embolism. These diagnoses were unlikely based on the history taking, physical examination and

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Figure 1 ECG showing a sinus rhythm of 85 bpm, and concave ST-segment elevation in all leads except aVR and aVL.

additional investigations. The coexistence of Graves' disease and acute pericarditis in our 44-year-old patient raised the interest in a causal relation between these two pathologies. Since Graves' disease has an autoimmune aetiology, autoimmune pericarditis may be a potential cardiovascular complication.

TREATMENT

The patient was treated with carbasalate calcium 600 mg three times a day in combination with a proton pump inhibitor (pantoprazole 40 mg once daily) until he was asymptomatic. Moreover, colchicine 0.5 mg twice daily was prescribed for 3 months. In addition, metoprolol retard 100 mg and thiamazol 30 mg once daily were restarted.

OUTCOME AND FOLLOW-UP

The chest pain greatly reduced within 24 h after presentation although the ST-segment elevations were unaltered. The patient was discharged the next day with tablets for antihyperthyroidism and carbasalate calcium, colchicine, pantoprazole and metoprolol. Outpatient follow-up was scheduled.

DISCUSSION

Graves' disease is a well-known multisystem autoimmune disease, and is associated with various cardiovascular complications. Few case reports described the association of pericarditis and Graves' disease. The first reports were published in 1958 by Treusch and Jaffe⁶ and in 1981 by Sugar⁷ describing patients with acute pericarditis and hyperthyroidism. Clarke *et al*³ postulated for the first time a similar pathophysiological background of both diseases related to inflammation. At last, Tsai *et al*⁴ and Koo *et al*⁵ also described cases of (recurrent) pericarditis considered to be associated with Graves' disease. The pathophysiology of acute pericarditis remains controversial: infections, autoimmune and autoinflammatory pathways are often mentioned. A review of Maestroni *et al*⁸ about idiopathic recurrent acute pericarditis outlines an immune-mediated pathogenesis with proinflammatory cytokines in the pericardial fluid and absence of these mediators in the plasma, suggesting a local inflammatory response. Moreover, antinuclear antibodies have been detected in a substantial proportion of the patients with idiopathic recurrent acute pericarditis.⁹ The exclusion of infection, by history taking, physical examination and laboratory results, and the presence of TSH-receptor antibodies make the causal association between Graves' disease and pericarditis likely.

However, the pathophysiological mechanisms and associations between pericarditis and Graves' disease still need additional investigation. Nonetheless, clinicians should be aware of the possible association between Graves' disease and acute pericarditis, which might affect the management of these patients.

Learning points

- ▶ Well-known cardiovascular complications of Graves' disease are atrial fibrillation, atrial enlargement and congestive heart failure.
- ▶ Clinicians should be aware that pericarditis may be a rare (unrecognised) complication of Graves' disease.
- ▶ The relationship between pericarditis and Graves' disease needs further investigation to provide a greater insight into the association between both the pathologies.

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Competing interests None.

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