Cholesterol pericarditis associated with rheumatoid arthritis
A rare case report

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Abstract
Background: Cholesterol pericarditis (CP) is a special type of pericarditis. It is characterized by chronic pericardial effusion with high cholesterol concentration and with or without the formation of crystals in pericardial effusion.

Methods: In this case report, we described a 74-year-old male with massive pericardial effusion. He presented with no symptoms. However, he had 8-year history of rheumatoid arthritis medicated with methotrexate, celecoxib, and prednisone, and 5-year history of hypertension medicated with amlodipine besylate. On admission, transthoracic echocardiography revealed a large pericardial effusion.

Results: We performed pericardiocentesis for this patient and a lot of cholesterol crystals were found in pericardial effusion under the microscope. A successful operation of thoracoscopic pericardiectomy was proceeded, and the diagnosis was confirmed by surgical pathology. The patient was well recovered and discharged on the tenth day after surgery. It could be predicted that pericardiectomy under video-assisted thoracoscope could be a promising therapy for CP.

Conclusion: Rheumatoid arthritis may cause CP with no symptoms. Pericardiectomy could be a promising therapy for CP.

Abbreviations: CP = cholesterol pericarditis, CT = computed tomography.

Keywords: cholesterol pericarditis, pericardial effusion, rheumatoid arthritis

1. Introduction
Pericarditis is a common pericardial disease. Cholesterol pericarditis (CP) is a special type of pericarditis. It is characterized by chronic pericardial effusion with high cholesterol concentration and with or without the formation of crystals in pericardial effusion.\textsuperscript{[1,2]} We described a 74-year-old male with massive pericardial effusion in this case report.

2. Case presentation
A 74-year-old male was hospitalized with massive pericardial effusion showed by transthoracic echocardiography in annual physical examination 2 days ago. He presented with no symptoms (no chest pain, no dizziness, no fatigue or shortness of breath). He had a history of rheumatoid polyarthritis treated by methotrexate, celecoxib, and prednisone for 8 years and hypertension medicated by amlodipine besylate for 5 years. On admission, physical examination showed muffled heart sound, without jugular vein distension, bilateral lower limb edema, cardiac pathologic murmur, or pulmonary rales. His vital signs were normal (temperature 36.8°C, blood pressure 131/78 mm Hg, heart rate 62 beats per minute). Transthoracic echocardiography revealed a large pericardial effusion (Fig. 1). Computed tomography (CT) demonstrated interlobar effusion, pericardial effusion, and a little of pleural effusion (Fig. 2).

Laboratory investigations were as follows: higher neutrophil ratio, rheumatoid factor, anticyclic citrullinated peptide antibody, C-reactive protein, antinuclear antibodies, and lower T3 level (Table 1). Kidney and liver function tests, T4, free T4, free T3, thyroid-stimulating hormone, erythrocyte sedimentation rate, total cholesterol, triglycerides, glucose, tumor markers were normal.

We performed pericardiocentesis and drained 100 mL of faint yellow effusion. Pericardial effusion analysis showed abnormal items, such as red blood cell, nucleated cell, neutrophil proportion, lymphocyte ratio, lactate dehydrogenase, protein,
and chloride (Table 2). The search for neoplastic cells, bacteria, acid-fast bacillus was negative in pericardial effusion. A lot of cholesterol crystals were found in pericardial effusion under the microscope (Fig. 3).

The patient was discussed with our cardiac surgeons and accepted an operation of thoracoscopic pericardiectomy. The diagnosis was confirmed by surgical pathology. This patient recovered and discharged on the tenth day after surgery.

3. Discussion

Pericarditis was the most common form of pericardial disease worldwide. It has been reported that pericarditis was associated with infectious, such as viral, bacterial and tuberculosis, and noninfectious, such as systemic vasculitis, hypothyroidism, cancer and postcardiac injury syndromes.[3,4] CP, which was first reported in a case of pericardial effusion of gold paint appearance in 1919,[5] was a special rare type of pericarditis characterized by chronic pericardial effusion with high cholesterol concentration, with or without the formation of crystals.[6]

Many studies have shown that patients who suffered CP presented with dyspnea, chest pain, dizziness, fatigue, or shortness of breath.[7–9] However, our patient had no symptoms above. Rheumatoid arthritis has been suspected to be associated with CP. One possible mechanism is supposed to be the release of cholesterol from pericardial cell membranes or from necrotic rheumatoid nodules.[10,11] According to previous history and the augment of C-reactive protein, rheumatoid factor, anticyclic citrullinated peptide antibody in the patient’s blood, the patient was in an active stage of rheumatoid arthritis. A faint yellow appearance and many cholesterol crystals were shown in our case, and it could be a diagnostic basis of CP. The surgical pathology has shown a fibrously thickened pericardium with cholesterol crystals, which further approved the diagnosis. CP was one of the idiopathic pericarditis.[12] It has been reported that acetylsalicylic acid, nonsteroidal anti-inflammatory drugs, corticosteroids, colchicine, and immunosuppressive drugs were used in the treatment of idiopathic pericarditis.[13] But the therapeutic effect of these drugs in CP was not effective. Barcin et al have suggested the effusion tended to recur and instances pericardiocentesis only provided temporary relief.[14] A further study has shown that the patients who proceeded traditional open operations of pericardiectomy had a perioperative morbidity and mortality as high as 21%.[15] Taking all these situations into full consideration, we considered that pericardiectomy under...
A thoracoscope was a better way to cure the disease. After discussion with cardiothoracic surgeon, a successful operation was performed. Moreover, the patient was well recovered and discharged on the tenth day after surgery. Therefore, we propose that pericardiectomy under video-assisted thoracoscope may be a new promising therapy for CP.

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