Acute Primary Tuberculous Pericarditis

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Acute primary tuberculous (TB) pericarditis is a rare but life-threatening condition. It may lead to diastolic heart failure in constrictive pericarditis. A 77-year-old man suffered from exertional dyspnea for 3 weeks. He had received percutaneous transluminal coronary angioplasty (PTCA) with stent for left anterior descending artery lesion 3 weeks prior to this admission. As dyspnea on exertion persisted, he was admitted to our hospital for possible coronary arterial bypass grafting. No significant in-stent restenosis was found during recatheterization. Meanwhile, bilateral pleural effusions were found, but they were negative for TB cultures and polymerase chain reaction (PCR). Thickening of pericardium with large amount of pericardial effusion was noted during echocardiographic examination 3 weeks after admission. Emergent pericardiotomy was done for cardiac tamponade and biopsy. Acute primary TB pericarditis was diagnosed and antituberculous chemotherapy plus adjuvant corticosteroid treatment were given. The patient was discharged 2 weeks later in fair condition. Unfortunately, one month later he was readmitted due to constrictive pericarditis. Pericardiectomy was done. After a full course of anti-TB therapy for 9 months, the patient kept well after follow-up for one year.

Key Words: Cardiac tamponade • Corticosteroid • Pericardiectomy • Primary tuberculous pericarditis

INTRODUCTION

Acute pericarditis1 (< 3 months) is dry, fibrinous or effusive, independent of its etiology. Most cases of acute pericarditis are viral or idiopathic. Other causes are uncommon, including bacterial infection, tuberculosis, ur- emic pericarditis, myocardial infarction, previous cardiac surgery, complication after radiotherapy, cancer, and inflammatory diseases, etc. Each year, there are approximately 9 million new cases of tuberculosis worldwide, and 3 million die from the disease. Tuberculosis (TB) is a serious problem in developing countries, which account for 95% of worldwide TB cases, and 99% of worldwide TB mortality. TB has not been on the list of the leading causes of death in Taiwan since 1985. However, the incidence of TB in Taiwan remains high. According to a report from the Center for Disease Control of Taiwan in 2002, the incidence and mortality rate of TB were 74.6 and 5.68 per 100,000 population, respectively.2 Pulmonary involvement accounted for 77.8% of cases, with TB and isolated extra-pulmonary involvement only accounting for 22%.3 Cardiac tamponade and constrictive pericarditis are major lethal complications of TB pericarditis.4 Apart from antituberculous chemotherapy with/without corticosteroid therapy, pericardiectomy may be the optimal therapy for TB pericarditis. As the incidence of TB in Taiwan remains high and the symptoms of TB pericarditis are nonspecific, a high suspicion of TB pericarditis should always be kept in mind when encountering a patient with pericardial effusion.

CASE REPORT

A 77-year-old man, a retired bank manager, suffered from chest oppression about 3 weeks prior to this admission. Percutaneous transluminal coronary angioplasty
with stent for left anterior descending artery lesion was done under the diagnosis of coronary artery disease with congestive heart failure at another hospital three weeks previous. But exertional dyspnea persisted. Under the suspicion of in-stent restenosis, the patient was admitted to our hospital for possible coronary arterial bypass grafting surgery on June 13, 2005.

The patient had had history of hypertension and diabetic mellitus for more than 10 years, and he had been taking medication regularly. He had no habit of smoking or drinking. Poor appetite, malaise and loss of body weight were noted in recent weeks. No fever was found. There was no jugular vein engorgement. Bilateral basal rales of lungs and pitting edema of both legs were noted. On the day of admission, echocardiography revealed impaired left ventricle (LV) systolic function. Bilateral blunt costophrenic angles (left side more prominent than the right) were noted on chest radiography (Figure 1). Hepatic vein and inferior vena cava engorgement was noted in abdominal sonography. Pulmonary hypertension (pulmonary arterial pressure: 41/23 mmHg), high central venous pressure (21 mmHg) and low cardiac index (1.81 L/min/m²) were found after Swan-Ganz catheterization measurement. No in-stent restenosis and patency of left circumflex coronary artery & right coronary artery were found in cardiac catheterization. Proximal LAD 50% narrowing was the same as previous. The symptoms improved after the use of inotropic agents. Intermittent low grade fever (37~38 °C) was found during hospitalization, but there were negative results in all the cultures of sputum, pleural effusion and blood.

On July 6, a follow-up echocardiography revealed severe hypokinesia of the right ventricle (RV) free wall with preserved LV systolic function. Tumor of the pericardium with large pericardial effusion was noted, too. Thickening of the pericardium was confirmed in a chest computed tomography (Figure 2). Pericardial window thru minimal thoracotomy was arranged. Unfortunately, cardiac tamponade occurred (blood pressure: 80/50 mmHg, heart rate: 138/min and respiratory rate: 30/min, SpO2: 87%), emergent pericardiotomy via subxyphoid approach was done. Caseous-like turbid fluid, about 150 cc, was drained (Figure 3). Bilateral thoracic intubations

Figure 1. Chest radiography, performed on the day of admission, showed bilateral blunt costophrenic angles (left side more severe than the right).

Figure 2. Chest computed tomography revealed thickened pericardium, large amount of pericardial effusion with right ventricle compression and bilateral pleural effusions (left side more prominent than the right).

Figure 3. Pleural effusion (A) revealed light yellowish color, while pericardial effusion (B) was caseous-like turbid fluid.
were performed, and a large amount of clear transudate was drained. The vital signs became stable after the procedures. The patient was sent to intensive care unit for recovery. The systolic function of RV and LV were found normal by echocardiography 2 weeks later.

Numerous acid-fast bacilli were identified in the specimen from the pericardium (Figure 4). The TB-polymerase chain reaction (PCR) test of pericardial effusion was positive. Negative finding of acid-fast stain in sputum and pleural effusion was found. The TB-PCR test was negative, too. Cultures of sputum and pleural effusion also yielded negative findings. Four combined antituberculous chemotherapy (EMB 800 mg + isoniazid 320 mg + pyrazinamide 1000 mg + rifampin 480 mg per day) plus adjuvant corticosteroid therapy (prednisolone 60 mg per day) were given. The fever subsided on the next day of regimen. The patient was discharged in good condition. Dyspnea on exertion (New York Heart Association Function Class II–III) developed again one month later. He was re-admitted to our ward under the impression of constrictive pericarditis on September 5, 2005. Pericardiectomy was done (Figure 5). Numerous acid-fast bacilli were found in the excised pericardium. The symptom of exertional dyspnea was absent after pericardiectomy. After a full course of anti-TB therapy for 9 months, the patient kept well after one year follow-up.

**DISCUSSION**

The incidence and mortality of TB pericarditis in developing countries are still high. The mortality rate in untreated acute effusive TB pericarditis can approach up to 85%, and was reduced to 3–11% in patients who received oral medication. In Taiwan, the incidence of tuberculosis has remained high in recent years. The clinical manifestations in patients with TB pericarditis usually are nonspecific. Dyspnea, jugular vein distension, fever (usually < 39 °C), cough, tachycardia, leg edema and chest tightness or pain were the most commonly found clinical manifestations. Combined intra- and extrapulmonary TB had a significantly higher incidence of high fever and a longer duration of fever. Low-voltage QRS and inverted T-waves were the characteristic findings of electrocardiogram in TB pericarditis in one previous report, but this was not seen in our patient. Although isolated extra-pulmonary involvement only accounted for 22% of cases with TB, pleural effusion was found in 63% of cases with TB pericarditis. Clinicians should have a high index of suspicion of TB pericarditis when encountering a patient with pericardial effusion in Taiwan, especially if co-existent pleural effusion is noticed.

The diagnosis is made by the identification of Mycobacterium tuberculosis in the pericardial fluid or tissue, and/or the presence of caseous granulomas in the pericardium. PCR can identify DNA of Mycobacterium tuberculosis rapidly from only 1 µL of pericardial fluid. High adenosine deaminase activity and interferon gamma concentration in pericardial effusion are also diagnostic. Pericardial biopsy enables rapid diagnosis with better sensitivity than pericardiocentesis (100 vs. 33%).

Various antituberculous drug combinations and treatment duration of different lengths (6, 9, 12 months) have been applied. Although corticosteroids are capable
of suppressing inflammatory reaction in TB pericarditis, the use of corticosteroids will inevitably further compromise the immunity in vulnerable elderly suffering from TB pericarditis. Despite the use of steroids remaining controversial, a meta analysis of patients with effusive and constrictive TB pericarditis suggested that tuberculosis treatment combined with steroids might be associated with fewer deaths, and less frequent need for pericardiocentesis or pericardiectomy. In our patient, the fever subsided rapidly after the use of prednisolone. High-dose prednisolone (1-2 mg/kg per day) should be given, since rifampicin induces its liver metabolism. The dose is maintained for 5-7 days and is progressively tapered to discontinue in 6-8 weeks.

Since cardiac tamponade and constrictive pericarditis are two major lethal complications of TB pericarditis, can we predict or prevent these conditions? Based on the echocardiographic findings, TB pericarditis has been categorized into: (1) early stage, when only pericardial effusion is found, and (2) advanced stage, when fibrin strand formation or fibrosis with thickening of pericardium reflecting constrictive pericarditis is detected. An early report indicated that cardiac tamponade developed in approximately 50% of patients who did not received adequate treatment in the first 3 months after the diagnosis of TB pericarditis. Yang et al. reported their 14 years’ experience, indicating that 37.5% of patients with early-stage TB pericarditis developed constrictive pericarditis, while among patients with advanced-stage disease, 85.7% subsequently developed pericardial constrictions. From the study of Suwan and Potjalongsilp, cardiac tamponade in the early stage of TB pericarditis was the most predictive factor for subsequent constrictive pericarditis, and the degree of fibrosis of pericardium before treatment was the most important determinant of developing constrictions.

In early-stage patients with minimal pericardial effusion, pericardiocentesis with biopsy can be done to confirm the diagnosis. If cardiac tamponade develops, creation of a pericardial window should be done. If constrictive pericarditis presents, pericardiectomy is the treatment of choice. The operative mortality for pericardiectomy is around 2.3%. As a poor hemodynamic result after complete pericardiectomy relates to the preoperative degree of constriction and resultant cardiomyopathy, the long-term survival after pericardiectomy for constrictive pericarditis is related to LV systolic function, renal function and pulmonary artery pressure; early pericardiectomy is recommended when constrictive pericarditis is diagnosed, or when conditions suggests a high possibility of developing constrictive pericarditis.

In conclusion, clinicians in Taiwan should maintain a high index of suspicion for TB pericarditis when a patient develops an unexpected pericardial effusion. Despite the use of steroids remaining controversial, tuberculosis treatment combined with steroids is recommended if no clear contraindication is present. In patients with advanced-stage TB, if there is cardiac tamponade in the early clinical stage, or if severe fibrosis of the pericardium and constrictive pericarditis develop, early pericardiectomy will be the optimal treatment.

REFERENCES

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急性原发性结核心包膜炎

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急性原发性结核心包膜炎是一十分罕见但卻致命的一種狀況，它通常導致侷限性心包膜炎進而造成舒張性心衰竭。我們報告一位 77 歲男性在住院前三個月因冠心症合併心衰竭接受左前降支支架置放術。後因氣喘而到本院求診，要求進行冠狀動脈繞道手術。心導管攝影顯示除左前降支之支架外無明顯病兆。住院後反覆有兩側肋膜積水，積水之所有結核檢查皆呈陰性。3 週後於心臟超音波檢查發現心包膜有增厚情形且合併大量心包膜液，因為造成心包填塞而從劍突施予緊急心包膜切開術。經組織病理診斷為急性原發性結核心包膜炎，我們給予抗結核菌藥物合併類固醇輔助治療後病情明顯好轉並於幾天後出院。病患於一個月後因侷限性心包膜炎而施予心包膜截除術。病患在九個月的抗結核藥物治療後，追蹤至今滿一年仍保持良好狀態。

關鍵詞：心包填塞、類固醇、心包膜截除術、原發性結核心包膜炎。