Left Ventricular Pseudoaneurysm Caused by Infective Endocarditis

Tung-Chen Yeh, Chun-Peng Liu, Ching-Jiunn Tseng, Pa-Rum Can and Jau-Cheng Liou

A 32-year-old male presented with infective endocarditis and left ventricular pseudoaneurysm (PA). The patient was treated with oxacillin but remained intermittently febrile for the next 3 weeks. Blood culture revealed \textit{Staphylococcus aureus}. Treatment with oxacillin 2 g every 4 hours gradually reduced the fever. Echocardiography then showed an aneurysm-like structure communicating with the left ventricle. However, the patient refused further examinations and insisted on discharge. After 4 days, he was readmitted to our ward with severe dyspnea. Chest computed tomography showed the heart was behind a huge PA. The selected treatments for this rare case of multiple medical conditions were surgical resection of the PA and mitral valve replacement surgery, which achieved a gradual recovery. In this case, early diagnosis and timely surgical intervention resulted in an excellent prognosis.

Key Words: Infective endocarditis • Pseudoaneurysm • \textit{Staphylococcus aureus}

INTRODUCTION

Most reported cases of left ventricular (LV) pseudoaneurysm (PA) are typically related to myocardial infarction (particularly inferior wall myocardial infarction) and cardiac surgery.\textsuperscript{1,2} Diagnosing LV PA is often difficult due to its atypical presentations. The standard noninvasive techniques for diagnosing LV PA are chest computed tomography (CT) and, alternatively, noninvasive thoracic echocardiography. However, chest CT is impractical for patients with unstable hemodynamic conditions. Patients with infective endocarditis complicated with LV PA have high mortality and morbidity, especially those who do not receive surgical intervention.

CASE REPORT

A 32-year-old male with a 3-year history of diabetes mellitus and a 10-year history of cocaine use presented at our emergent care unit with intermittent fever 21 days after receiving treatment with oxacillin 2 g every 4 h at a local regional hospital. The patient’s blood culture revealed \textit{Staphylococcus aureus}. Chest X-ray (Figure 1A) revealed cardiomegaly, and echocardiography (Figure 1C) showed an aneurysm-like structure (4 × 4 × 5 cm\textsuperscript{3}) communicating with the LV and moderate-to-severe eccentric mitral regurgitation but no obvious valvular vegetation. Laboratory data showed leukocytosis (white blood cell counts: 13010/\text{cumm, Seg.: 82\%}) and normocytic anemia (Hemoglobin: 9.0 g/dL). Electrocardiography (Figure 1D) showed sinus tachycardia and no significant ST-T change. However, the patient’s troponin I level (3.7 ng/mL) was...
Blood pressure and pulse rate were 109/72 mmHg and 109 bpm, respectively. The fever gradually receded after a 4-day treatment with oxacillin 2 g every 4 hours. He refused to undergo non-invasive cardiac CT, magnetic resonance imaging or invasive coronary catheterization. Against our medical advice, he requested discharge 9 days after admission.

Four days after his discharge, the patient was again admitted at our emergency department with dyspnea, orthopnea, and bilateral lower leg edema, but no severe chest pain or chest tightness was noted. Chest X-ray showed cardiomegaly and an abnormal bulging shadow over the left cardiac border (Figure 1B). After his conditions had been stabilized, a CT (Figure 2A) revealed a PA over the inferoposterior aspect of the heart. Coronary angiography showed no significant coronary stenosis. However, mild compression of the left circumflex artery by the PA was observed and confirmed by LV angiography (Figure 2B). During surgery, a huge LV PA caused by a ruptured posterior wall was noted (Figure 2C). The PA was confirmed on pathology, and the mitral valve pathology showed valvulitis. After mitral valve (MV) replacement and wide resection, patch closure of the defect markedly improved the symptoms. An echocardiogram revealed a discontinuous site below the anterior leaflet of the mitral valve, a saccular contour of the pseudoaneurysm chamber, and a narrow orifice relative to the diameter of the pseudoaneurysm. The jet flow from the left ventricle to the pseudoaneurysm was visualized by color echocardiography. (D) Electrocardiography showing sinus tachycardia without ST-T change. LA, left atrium; LV, left ventricle; PA, pseudoaneurysm; RV, right ventricle.
graphy performed 6 months after discharge confirmed preserved LV function.

**DISCUSSION**

This 32-year-old male, a drug abuser, was discharged against our advice after undergoing a one-month oxacillin treatment for *Staphylococcus aureus* bacteremia, severe mitral regurgitation and a LV PA. He presented 4 days later with symptoms of acute decompensated heart failure and finally consented to surgery. Diagnoses of a PA and infective endocarditis were confirmed on pathology.

Possible causes of PA can include myocardial infarction, cardiac surgery, infective endocarditis and coronary spasm. The patient had no complaint of severe chest pain or chest tightness, and electrocardiography showed no significant ST-T change. Coronary angiography revealed no significant stenosis and excluded myocardial infarction, infected coronary artery aneurysm or coronary artery spasm associated with cocaine usage. Pericarditis and myocarditis were suspected initially due to the elevated troponin I level. Since electrocardiography showed no diffuse ST-T change or ventricular tachycardia, echocardiography further showed no general LV dysfunction or obvious pericardial effusion, pericarditis or myocarditis were also excluded. We hypothesized that the PA resulted from a local septic embolism. Recent studies indicate that patients diagnosed with staphylococcal endocarditis tend to increase serum troponin levels. Chest CT can exclude very rare cases of PA of the innominate artery.

Infective endocarditis complicated by LV PA is a catastrophic cardiovascular disease with a high mortality rate, especially in the absence of surgical intervention. Frances et al. (1998) reported that the risk of rupture in LV PA is 30-45% and that most cases are related to myocardial infarction or cardiac surgery. Of the 290 cases of LV PA analyzed in that study, the etiology was related to MV infective endocarditis in only two (1%) cases.

Infective endocarditis has a high mortality rate and is difficult to treat. Symptoms include persistent fever and unstable hemodynamic condition. In the acute stage, unstable hemodynamic conditions are often combined with pulmonary edema and respiratory failure. In emergent care patients in unstable hemodynamic condition, heart condition is usually assessed by portable 2-dimensional echocardiography instead of by cardiac CT examination. Three PA characteristics that can be revealed by 2-dimensional echocardiography include: (1) a sharp discontinuity of the endocardial image at the site of communication between the PA and the LV cavity; (2) a saccular or globular contour of the PA chamber; (3) a relatively smaller diameter of the orifice in comparison with the PA.

Infective endocarditis complicated by a huge PA is very rare and is more difficult to treat compared to classic infective endocarditis. The recent American Heart Association Scientific Statement reported that congestive heart failure increases mortality risk in infective endocarditis. The case of infective endocarditis reported here was complicated by both CHF and a huge PA. In LV PA with severe MV regurgitation, mortality risk is substantially increased by MV replacement, wide resection and patch closure of the defect. The patient re-
ported in this case required emergent replacement of the MV and resection of the PA. Surgical treatment of the LV PA by MV replacement with wide resection and patch closure of the defect obtained a good outcome and prognosis. An echocardiography taken 6 months after discharge revealed normal LV function.

CONCLUSIONS

Cases involving infective endocarditis complicated by a huge PA are rarely reported in the literature. This case demonstrated the good outcomes that can be achieved by early surgical intervention, continuous antibiotic treatment for 4 months after surgery, and regular post-procedural echocardiography for 3-4 months thereafter.

REFERENCES