Mycotic Left Main Coronary Artery Aneurysm Following Double-Valve Replacement for Active Infective Endocarditis

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A 68-year-old man underwent double-valve replacement (DVR) for active infective endocarditis caused by *Enterococcus faecalis*. Postoperative coronary angiography (CAG) revealed a saccular aneurysm originating from the distal portion of LMCA with severe stenosis at the ostium of the left anterior descending (LAD) artery and left circumflex artery (LCx). Emergent surgical resection with concomitant coronary artery bypass grafting were performed. Mycotic coronary artery aneurysms have a great tendency to rupture, and this may result in cardiac tamponade and sudden death. Early recognition and prompt surgical intervention is mandatory to minimize those fatal complications.

Keywords: coronary artery aneurysm, mycotic, left main coronary artery, infective endocarditis

We present a case of successful treatment for mycotic left main coronary artery aneurysm following double-valve replacement for infective endocarditis.

Case Report

A 68-year-old man was referred to our hospital with high grade fever. He had a history of self-catheterization due to neurogenic bladder and obstructive nephropathy. Transthoracic echocardiography (TTE) confirmed severe aortic and mitral regurgitation with vegetations and severe destruction on both of those valves. Blood cultures on admission were positive for *Enterococcus faecalis*, and; therefore, intravenous administration of ampicillin sodium and gentamicin sulfate was initiated for active infective endocarditis. Although further investigation of the aortic root and coronary arteries was considered, cardiac catheterization was avoided because of the friable vegetation of the aortic valve. Progressive heart failure necessitated emergent surgical intervention. And then he underwent double-valve replacement (DVR) with bileaflet mechanical valves (#21 and #31, St Jude Medical Inc., USA for aortic and mitral valve, respectively). Following surgery, the antibiotic treatment was continued, and body temperature fell down with decreased white blood cell...
counts and C-reactive protein level. On postoperative day 14, postoperative follow-up TTE was performed and revealed extensive cardiac dysfunction with low LVEF estimated at 37% although mechanical prostheses were normal. No significant changes in the electrocardiogram were observed, and the creatine kinase MB fraction was within normal limits. Coronary angiography (CAG) revealed a saccular aneurysm originating from the distal portion of LMCA with severe stenosis at the ostium of the left anterior descending (LAD) artery and left circumflex artery (LCx) (Fig. 1).

Emergent surgical resection and revascularization were proposed. At the first step, coronary artery bypass grafting of the left internal thoracic artery (LITA) to the left anterior descending (LAD) artery and a saphenous vein graft (SVG) to the posterolateral (PL) branch of the left circumflex (LCx) artery were constructed in on-pump beating-heart manner. Then, under cardiac arrest, the pulmonary trunk was mobilized and the LMCA aneurysm could be exposed. The LMCA aneurysm was carefully dissected and totally excised. The orifices of the LMCA and the LAD artery were oversewn. Finally, an additional SVG was anastomosed to the LCx artery orifice because of the insufficient graft flow of the SVG to PL branch.

The postoperative course was uneventful. Postoperative CAG confirmed all patent grafts (Fig. 2A and 2B). Histopathologic examination of the aneurysmal wall revealed inflammatory cell reaction in the media (Fig. 2C). The patient remains well and was free from recurrent infection 6 months after the operation.

Discussion

Coronary artery aneurysms are uncommon, with overall incidence of less than 2% in the general population. They rarely involve the left main coronary artery (LMCA). LMCA aneurysm is extremely rare with incidence of 0.1% in large angiographic series. Acquired coronary aneurysms are most commonly atherosclerotic in nature, although other etiologies including congenital malformation, Kawasaki’s disease, trauma, dissection, complications of angioplasty, vasculitis, syphilis and other infections.

Mycotic coronary aneurysms are rare and are a known complication of infective endocarditis, occurring in less than 0.5% of all infective endocarditis cases. Several mechanisms may be involved in their pathogenesis as follows: embolic occlusion and sterile infarction of the vasa vasorum, direct bacterial invasion of the arterial wall, and injury from deposition of immune complexes in the arterial wall. To date, some clinical cases of mycotic coronary aneurysms have been reported. In those reports, aneurysms were most frequently seen with left anterior descending or circumflex artery and the vast majority of those causative organisms were Staphylococcus aureus. To our knowledge, our present case is the first report of mycotic left main coronary artery aneurysm following double-valve replacement for active endocarditis caused by Enterococcus faecalis. Special attention should be paid to patients with infective endocarditis and multiple emboli following surgical treatment of the endocarditis. The postoperative period can be complicated by the consequences of septic embolization, one of which could be infective aneurysm formation. We could not found the LMCA aneurysm before the double-valve replacement by CT scan, TEE, or direct visual diagnosis.

Because of the rarity of LMCA aneurysms, it is difficult to standardize treatment. The surgical treatment is most widely used to avoid complications including thrombosis, rupture, and coronary embolization. Various surgical strategies have been adopted, such as reconstruction, resection, or isolation with concomitant coronary artery bypass grafting. The natural history of mycotic coronary aneurysms is unclear. Small aneurysms
may resolve with antibiotic therapy, whereas aneurysms greater 1 or 2 cm in diameter may enlarge and eventually rupture. Therefore, aneurysms should be excised or excluded from circulation and the distal coronary artery should be revascularized.

In conclusion, mycotic coronary artery aneurysms have a great tendency to rupture, and this may result in cardiac tamponade and sudden death. As shown by the case of our patient, early recognition and prompt surgical intervention is mandatory to minimize those fatal complications.

References