Percutaneous device closure of a pseudoaneurysm of the left ventricular wall

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CASE REPORT

The percutaneous device closure of a left ventricular pseudoaneurysm is described in a 60 year old man with a history of myocardial infarction complicated by ventricular tachycardia and left ventricular aneurysm treated by coronary artery bypass grafting and aneurysmectomy with ventricular tachycardia ablation. He subsequently developed a large pseudoaneurysm with a high velocity bidirectional jet (TTE) and magnetic resonance angiography (MRA) showed a V4 and a normal QRS axis. Transthoracic echocardiography showed a dynamic LV apical impulse, and an apical pansystolic murmur. ECG showed atrial fibrillation Q waves in leads V1–V4 and a normal QRS axis. Transthoracic echocardiography (TTE) and magnetic resonance angiography (MRA) showed a large pseudoaneurysm with a high velocity bidirectional jet between the posterior wall of the LV close to the apex and a vast sump. It was felt that surgery carried a high risk but a transcatheter approach to close the neck of the pseudoaneurysm are discussed.

We present the case of a 60 year old man who sustained a myocardial infarction, which was complicated by a left ventricular (LV) aneurysm and ventricular tachycardia, and underwent coronary bypass grafting and LV aneurysmectomy in 1999 together with open mapping and ablation. One year later he developed methicillin resistant Staphylococcus aureus (MRSA) septicemia and a left sided empyema, which required surgical decortication through a left thoracotomy in late 2000. He presented after an abnormal cardiac silhouette was found on routine chest radiography. Symptomatically he had New York Heart Association (NYHA) functional class II heart failure symptoms. Examination showed atrial fibrillation, no anginal symptoms. Hand contrast angiography confirmed a stable device in the aneurysmal space. The patient returned to the ward without complication.

There are several Amplatzer devices all based on the same principle and made of the same materials but designed for closure of various defects including atrial septal defect, patent foramen ovale, persistent ductus arteriosus, and muscular, post-myocardial infarction and perimembranous ventricular septal defects. As the orifice to the aneurysm, as its size and position as seen on the MRA appeared suitable for such an approach. Having considered the common devices available, we elected to implant an Amplatzer septal occluder on the basis of wide experience, robust design, retrievability, and ability to reposition the device. Moreover, the sheath diameter required was relatively small.

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Abbreviations: LV, left ventricular; MRA, magnetic resonance angiography; NYHA, New York Heart Association; TTE, transthoracic echocardiography
therefore decided to use an Amplatzer septal occluder, as the length of the central portion between the discs is only 4 mm. This was considered essential for stability and to achieve complete closure.

The MRA clearly showed bidirectional flow between the LV and the pseudoaneurysm. One concern with the interventional approach was that, after the device was deployed, flow from the LV to the aneurysm would persist through the porous device. However, the aneurysm could not generate enough pressure for flow into the LV, thus further enlarging the false aneurysm. This was monitored on TTE during the procedure before the device was released.

The brachial artery approach was chosen, as the length of the sizing balloon and the delivery system are not sufficient for a femoral artery approach. An alternative would have been a femoral vein approach with trans-septal puncture, but the site of the aneurysm orifice would not have favoured this technique.

This approach avoided repeat sternotomy and cardiopulmonary bypass and was performed under local anaesthetic thus reducing the significant morbidity associated with surgery. The patient had a short hospital stay and was well one year after the procedure. We recommend this approach in selected cases.

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REFERENCES