Bilobar apical pseudoaneurysm after left ventricular venting in a Marfan’s patient

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A Marfan patient presented with a bilobar apical pseudoaneurysm after repeated surgery. These abnormalities were demonstrated by three-dimensional-echo, Doppler, and CT-reconstruction. The pseudoaneurysm was related to an apical venting procedure. In this case, a conservative approach was chosen, although in general, pseudoaneurysms form an indication for operative correction, because of the risk of rupture and acute tamponade.

KEYWORDS
Marfan; Pseudoaneurysm; Apical venting; 3D-echo; CT

A 45-year-old man with Marfan syndrome, underwent aortic root and valve replacement (Bjork Shiley) 24 years ago, and was operated five times during the last 13 years. During the last two operations in 2003, an aneurysm of the ascending aorta, occurring at the distal suture line of a Bentall prosthesis, was corrected and the aortic arch and brachiocephalic trunk were replaced. He was asymptomatic thereafter. A routine echocardiogram was scheduled in 2006. Close inspection with Colour-Doppler revealed a high intensity jet in the left ventricular (LV) apex. Continuous wave-Doppler registration aligned over the apex showed systolic velocities up to 4.5 m/s into the LV apex and diastolic backflow from the apex (Figure 1), suggestive of an apical pseudoaneurysm. This was beautifully demonstrated by three-dimensional echocardiography, where a pseudoaneurysm of the LV apex communicates via a fistula with a false aneurysm intrapericardially (Figure 2). An additional CT revealed a pseudoaneurysm of 17 mm width which communicates with a 40 mm large cavity under the LV, explaining the flow pattern (Figure 3). Most likely, the pseudoaneurysm developed after this patient’s second aortic operation when apical venting was applied, using an 8 Fr ventricular drainage system. This venting site was closed using a purse string suture (Ticron 4-0).

Because of his excellent clinical condition and the fact this would be his sixth cardiovascular operation, we extensively discussed his case and choose not to reoperate him and scheduled him for close follow-up. During subsequent echocardiographic examinations, the aneurysm did not change in size.

There are only a few articles addressing venting-associated complications, mostly concerning aortic-valve-related procedures. Frequently, re-operation for pseudoaneurysms is mandatory, because of the risk of acute tamponade. A pseudoaneurysm is most likely formed following acute elevation of ventricular pressure imposed upon poorly regenerated myocardium. It, therefore, is recommended to use different routes of LV venting.

A pseudoaneurysm is a condition where a defect occurs in the inner layers of the heart (incomplete rupture) and the outer layer of the aneurysm is formed by remnants of myocardium and visceral pericardium. In a false aneurysm (complete rupture), the aneurysmal space is surrounded by parietal pericardium, fibrous tissue, or thrombotic material. The neck of the pseudoaneurysm is narrow (less than half the diameter of the pseudoaneurysm). In general, LV pseudoaneurysm is a hard to diagnose condition. The best diagnostic modality is LV angiography; alternatively, transoesophageal echocardiography and magnetic resonance imaging are good non-invasive diagnostics. Most often, it occurs after myocardial infarction or cardiac surgery. The most important complications are arrhythmia, rupture, thrombo-embolism, and endocarditis. In pseudoaneurysms, the mortality rate is high, depending on the aetiology, nevertheless sporadic cases are known to live for several years without any complaints.
References


Figure 1 Two-dimensional and continuous Doppler flow pattern showing velocities up to 4.5 m/s during systole towards the transducer at the apex, which reverses during diastole.

Figure 2 Three-dimensional echocardiography shows that the left ventricular cavity communicates through a fistula with the pseudoaneurysm cavity (A) which itself is connected to the intrapericardial false cavity (B) through another fistula (solid arrow).

Figure 3 Three-dimensional CT-reconstruction, left oblique view. Pseudoaneurysm 17 mm wide (dotted arrow), and just beneath that a 40 mm wide intrapericardial cavity exists (solid arrow).