

INTRAMYOCARDIAL PARAVALVULAR ABSCESS AFTER AORTIC VALVE REPLACEMENT

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Myocardial abscess is a rare but life-threatening disease with various clinical presentations. We describe the case of a paravalvular abscess distending intramurally 7 years post surgery for aortic valve replacement. Early detection and urgent surgical intervention is essential for this otherwise fatal disease entity.

Key-words: Myocardium Heart, valves.

Case presentation

A 59-year-old man was transferred to our radiology department because of general deterioration and a left ventricular ejection fraction of 50%. Besides diabetes mellitus type II, his medical history included a significant aortic valve stenosis and ischemic heart disease for which a combined intervention was performed with prosthetic aortic valve replacement (ON-X-23) and coronary artery bypass grafting 7 years previously.

Three weeks earlier he had been admitted at a general hospital for atrial fibrillation with a fast ventricular response. After successful pharmacological reversion to sinus rhythm he was discharged from hospital within a week. Because of prostatitis he had been taking ciprofloxacin for 7 days, 250 mg twice a day. Eight days later he was admitted again because of poor general condition, confusion and dyspnoea with intermittent fever, up to 38,5°C. Pleural fluid and a consolidation were seen on chest computed tomography. Combined antibiotic therapy was started. Blood cultures and culture of the pleural fluid were negative. Despite this therapy, blood sedimentation and C-reactive protein remained high. No vegetations were seen on transesophageal echocardiography but empirical amikacin was started because of suspected prosthetic valve endocarditis. Left ventricular ejection fraction was 50%.

On admission in our university hospital he was alert and oriented, but ill. He had lost 10 kg of weight in the last 2 months. He was afebrile, had a regular heart rhythm of 90 bpm and a blood pressure of

141/90 mmHg. There were some crepitations in the left lung base and

there was limited lower extremity oedema. An electrocardiogram showed a left bundle branch block.

A PET-CT was performed for two reasons: to find an infectious origin of the suspected endocarditis and, because of his weight loss, nicotine (36 pack years) and alcohol abuse (5-6 U/day), to exclude a neoplasm.

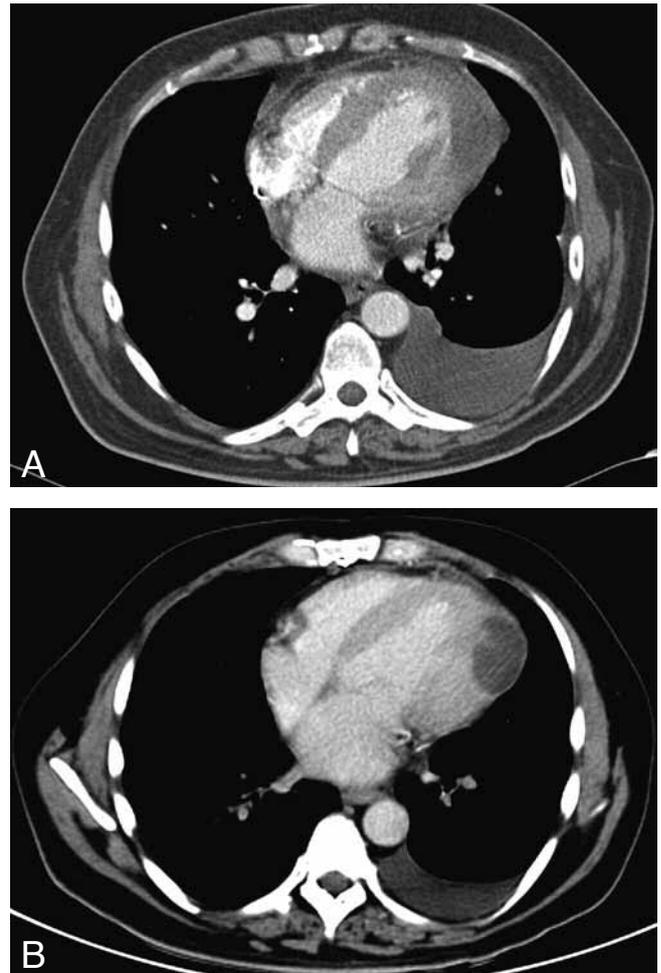


Fig. 1. — A. First CT-evaluation in the referring hospital shows pleural fluid left and a hypodense thickening of the left ventricular wall. No pericardial fluid is seen. B. Imaging 2 weeks later shows enlargement and organisation of the lesion in the left ventricular wall: abscess formation. The abscess can be seen to dissect the myocardial wall.

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Radiological examination

CT findings

On CT, a large multiloculated mass was seen, with a hypodense, non-contrast enhancing content. This mass was largely located in the left ventricular wall, reaching from the aortic valve, over the proximal anterior LV wall to the apical lateral wall (Fig. 1B and 2).

A small portion of this mass touched the prosthetic aortic valve. Compared with the first CT 2 weeks earlier, the speedy evolution as well as the organisation (central liquefaction) were strongly suggestive for abscess formation (Fig. 1A).

The patient was referred for semi-urgent surgical intervention.

Surgery consisted of a repeat thoracotomy and opening of the pericardium. On the lateral apical wall of the left ventricle, a bulging intramyocardial abscess was found ready to rupture. This abscess was cut open along the entire length up to the level of the pulmonary trunk, thereby transecting an already occluded diagonal coronary branch. The close spatial relationship of the abscess with the prosthetic valve was confirmed. After opening the ascending aorta, vegetations were found underneath the prosthetic valve leaflets. The valve had migrated distally from the aortic annulus, but no paravalvular leak was found. The aortic valve ring and periaortic area were thoroughly cleaned. The valve was replaced by a bioprosthetic valve.

An *Enterococcus* species was isolated from the excised aortic valve. The sensitivity of the enterococcus for ciprofloxacin has not been determined.

MRI findings

Four months after surgery an MRI examination of the heart was performed with the aforementioned bioprosthetic valve in aortic position. This posed no contraindication for MRI. No more abscess collection was seen in the myocardium nor perivalvularly. Wall motion was reduced in the basal and midventricular segment of the anterolateral wall, expanding to inferolateral in the apical segment. In this area a large, anterolateral subepicardial rest perfusion defect and a small akinetic segment in the lateral wall were noted. Delayed enhancement imaging revealed a linear subepicardial zone of myocardial fibrosis.

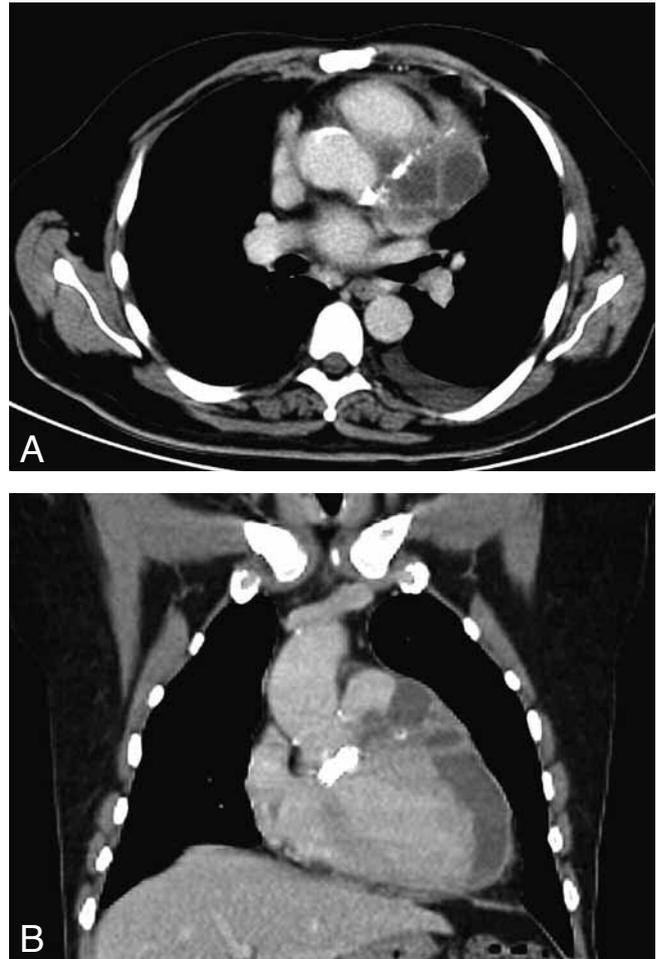


Fig 2. — A. The multiloculated mass touches the aortic valve ring, and surrounds the extensively calcified left anterior descending coronary artery. B. Coronal reformatting shows the aortic valve prosthesis and the multiloculated mass in the left ventricular wall.

Overall examination showed normal ejection fraction.

Discussion

Cardiac abscess is an uncommon and life-threatening disease. It has been described in various anatomic locations of the heart including the atrial auricle (1), the ventricular free wall (2-4), the interventricular septum (3) or perivalvular (5-8).

The most common situation in which a myocardial abscess will develop is infective endocarditis. The aortic valve region – native and prosthetic valve – is usually involved (9). Rarely, a metastatic myocardial abscess, remote from the main focus, results from coronary embolization of septic material (4).

An abscess can also be found in the setting of septicemia, without infective endocarditis (8, 9). Occasionally myocardial abscess can

occur at the site of a myocardial infarction (8, 9).

There is a wide variety of clinical conditions in which an abscess of the myocardium can occur as a complication, including trauma and penetrating injuries, following invasive cardiac procedures, infection of a (pseudo-) aneurysm, cardiac tamponade, infected transplanted heart following a sternotomy abscess and HIV associated myocarditis (6, 9).

The clinical picture of a myocardial abscess can range from an asymptomatic state to myocardial wall rupture (8). A rapid clinical deterioration will often lead to further diagnostic evaluation and recognition of a myocardial abscess, with symptoms including protracted fever despite adequate antibiotics, development of pericarditis, congestive heart failure or new onset arrhythmias in the context of infective endocarditis (6, 9). A few rare

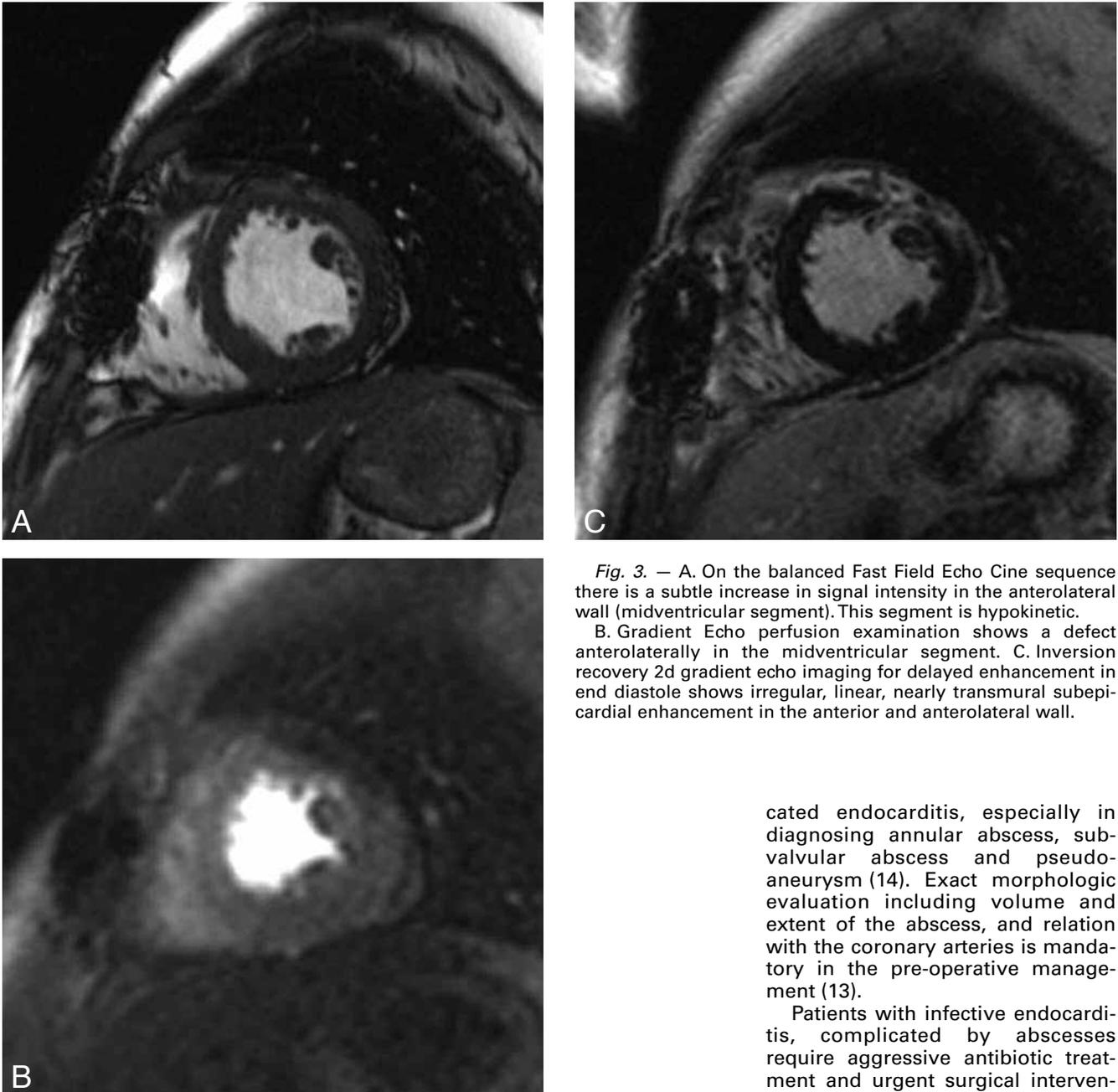


Fig. 3. — A. On the balanced Fast Field Echo Cine sequence there is a subtle increase in signal intensity in the anterolateral wall (midventricular segment). This segment is hypokinetic.

B. Gradient Echo perfusion examination shows a defect anterolaterally in the midventricular segment. C. Inversion recovery 2d gradient echo imaging for delayed enhancement in end diastole shows irregular, linear, nearly transmural subepicardial enhancement in the anterior and anterolateral wall.

cases of intermittent compression of a coronary artery by a paravalvular pseudoaneurysm or aortic valve abscess have been described (10, 11). Intracardiac fistulas are also a rare complication of infective endocarditis (12).

Echocardiography is accepted as the non-invasive gold standard in the detection of myocardial abscesses (9). The trans-oesophageal approach has an improved sensitivity (80-88%) in comparison with the trans-thoracic echocardiography (25-36%), providing better detection of paravalvular abscesses, associated vegetations, valvular perforations, fistulas and rupture of chordae

tendineae (13). Due to artifacts caused by valve prostheses or vascular calcifications, the echocardiographic diagnosis of an abscess remains difficult. These two echocardiographic approaches should therefore be considered as complementary techniques. CT is the appropriate technique for the extensive evaluation of thorax and mediastinum in a context of septicaemia. Computed Tomography can depict lesions that are not accessible by trans-oesophageal echocardiography (13). Cardiac MRI has a high temporal and spatial resolution. A few case reports and studies suggest its useful diagnostic value in the setting of compli-

cated endocarditis, especially in diagnosing annular abscess, subvalvular abscess and pseudoaneurysm (14). Exact morphologic evaluation including volume and extent of the abscess, and relation with the coronary arteries is mandatory in the pre-operative management (13).

Patients with infective endocarditis, complicated by abscesses require aggressive antibiotic treatment and urgent surgical intervention (15, 16).

Anderson D.J. et al. (2005) found that mortality tended to be higher in patients with nonenterococcal prosthetic valve endocarditis, compared to enterococcal prosthetic valve endocarditis; however there was no statistically significant relation ($p = 0,08$). Mortality and outcome of enterococcal endocarditis are similar in patients with either native or prosthetic valve endocarditis. Intracardiac abscesses are more likely to be found in patients with enterococcal prosthetic valve endocarditis, while patients with enterococcal native valve endocarditis are more likely to have detectable valve vegetations or new valvular regurgitation (17).

In conclusion, myocardial abscess is a rare but life-threatening disease with various clinical presentations. It occurs most frequently in infective endocarditis, but several other causes have been described. Early detection and urgent aggressive intervention are essential. We report an unusual intramural location of a large, late post-surgical, paravalvular abscess.

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