

Case Report

Infective endocarditis complicated with coronary artery septic embolization: is it worth to be mentioned? Case presentation and review of the literature

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Coronary artery septic embolization is a rare, but severe complication of infective endocarditis involving the left side of the valves. The first case mentioned in the literature was a postmortem finding of a left anterior descending coronary artery occlusion by a vegetation fragment. Since this case, there have been several therapeutic strategies published with this clinical setting including medical treatment, percutaneous coronary angioplasty addressing coronary occlusion, surgical intervention for both the infected valve and coronary embolization, and hybrid procedures with transcatheter septic embolus aspiration followed by surgical valvular interventions. Out of the three interventions mentioned, the latter provided the best results and was in concordance with results observed in a case of mitral valve infected endocarditis complicated with acute occlusion of the left anterior descending coronary artery in patient whose comorbidities included hypertrophic obstructive cardiomyopathy. A transcatheter left anterior descending coronary artery embolus aspiration was performed, followed by a surgical mitral valve replacement and septal myectomy with an uneventful post-operative course. Although rare, this severe complication of infective endocarditis has a specific clinical course and therapeutic strategy, and in our opinion, it could be mentioned as a separate entity among embolic complications of infective endocarditis in future guidelines. Previously published cases suggest that the hybrid intervention might be the therapy of choice for this clinical setting; however, larger studies are necessary for confirmation.

Keywords

Coronary artery septic embolization; infective endocarditis; hybrid ap-

proach; infective endocarditis guidelines

1. Introduction

According to the European Society of Cardiology Guidelines for the management of infective endocarditis, the incidence of embolic complications in untreated infective endocarditis (IE) was high between 20-50% and decreased after antibiotic therapy to 6-21% (Habib et al., 2015). Among these, coronary artery septic embolization (CASE) occurred in only 3.5% of all systemic embolizations in a study of more than 600 patients (Fabri et al., 2015). Only several cases of coronary complications in IE treated with different therapies are mentioned in the literature including medical, surgical, transcatheter, and hybrid interventions for both the infected valve and the coronary embolization (Perera et al., 2000; Hunter et al., 2001). Although rare, CASE can have devastating consequences, but adequate treatment strategies may have better results.

We present a case of mitral valve endocarditis (MVE) and hypertrophic cardiomyopathy that was complicated with acute left anterior descending coronary artery (LAD) occlusion by a vegetation fragment. This was treated with a hybrid transcatheter and cardiac surgical strategy. Additionally, we review the literature on infective endocarditis and coronary artery septic embolization.

2. Case presentation

A 52 year-old female patient with no medical history other than treated hypertension was admitted to a district general hospital with symptoms of heart failure including fatigue, low physical tolerance, dyspnea, and recurrent fever. On physical examination, the patient was alert and relatively well without dyspnea at rest. She had a systolic murmur in the mitral area. On ECG, the patient was in sinus rhythm with signs of left ventricular hypertrophy. The

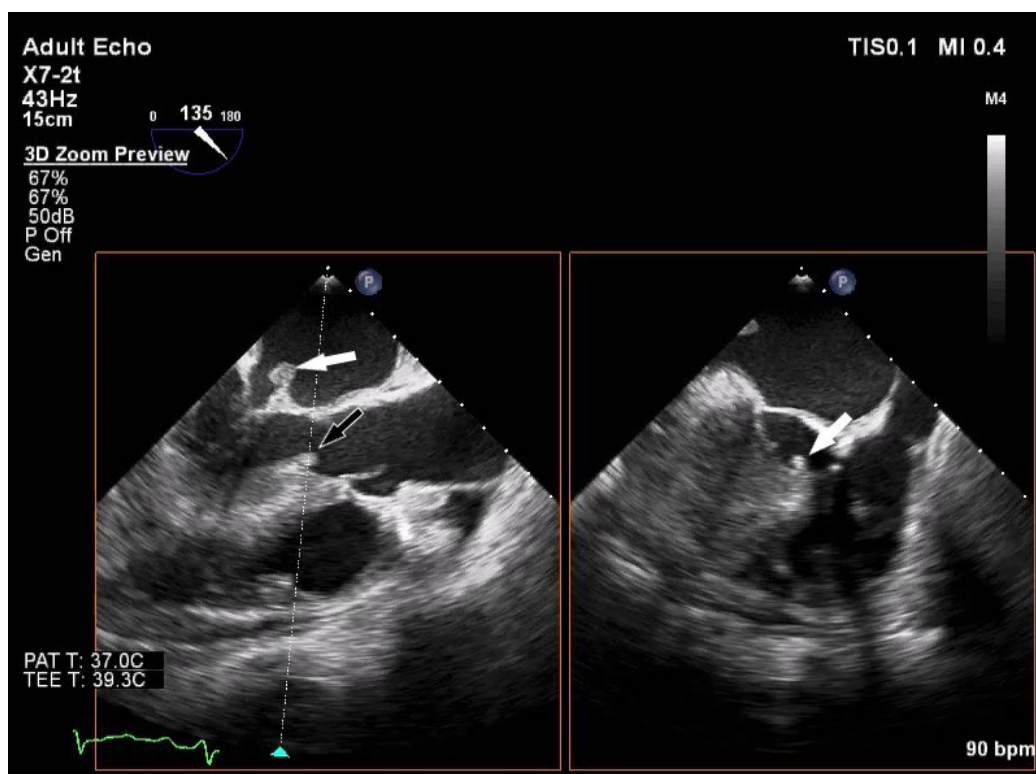


Figure 1. Preoperative TEE demonstrates mobile vegetations on both the anterior and posterior mitral leaflets (left white arrow: vegetation on the anterior mitral leaflet), along with a vegetation on the subaortic interventricular septum (left black arrow, right white arrow).

transthoracic echocardiography (TTE) raised suspicion of mitral valve endocarditis along with significant left ventricular hypertro-

phy (LVH) and subaortic stenosis.

The patient was transferred to the university hospital for fur-

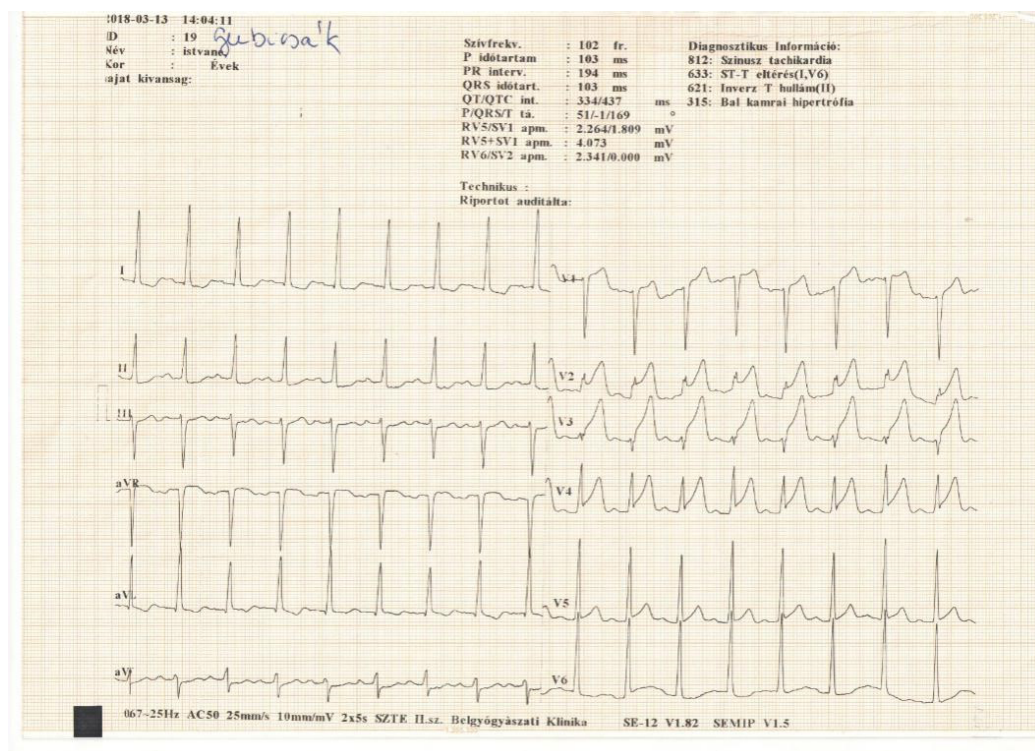


Figure 2. ECG during chest pain: significant ST segment elevation in V1-V4 (STEMI)



Figure 3. Coronary angiography showing the proximally occluded LAD

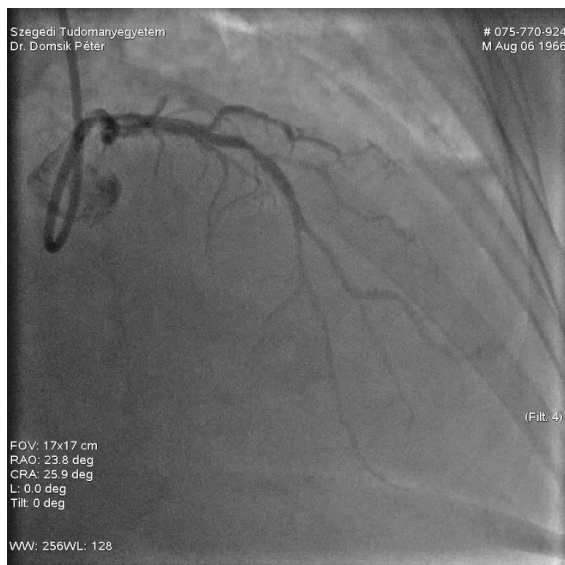


Figure 4. Coronary angiography after embolus aspiration. The flow in the LAD is reestablished

ther investigations and treatment. the haemocultures were positive for *Staphylococcus Aureus*, therefore intravenous Vancomycin and Gentamycin was started based on pathogen sensibility. A transesophageal echocardiography (TEE) was performed, which revealed multiple mobile 8-10 mm vegetations on both leaflets of the mitral valve, moderate to severe mitral regurgitation (MR), and systolic anterior movement of the anterior leaflet (SAM) consistent with hypertrophic cardiomyopathy (HCM). There were smaller (7-8 mm) mobile vegetations on the subaortic septum. The subvalvular gradient was 103 mm Hg (Fig. 1). Based on the dimensions and mobility of the vegetations, the decision was made to perform urgent surgical intervention: mitral valve replacement combined with septal myectomy.

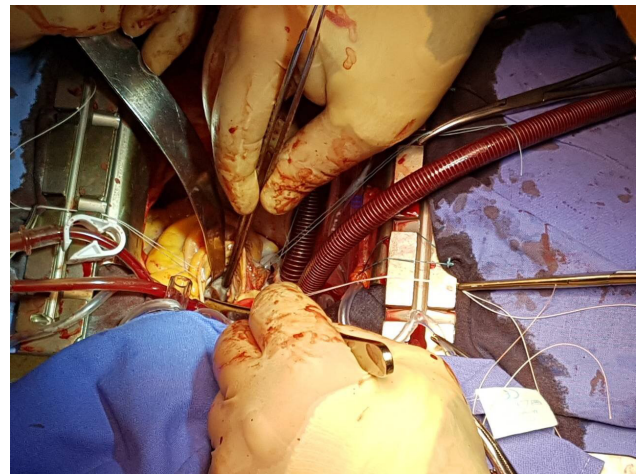


Figure 5. Surgical intervention showing the septal myectomy step

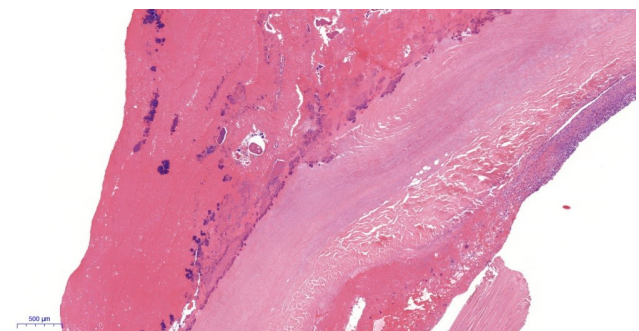


Figure 6. Infective endocarditis of the mitral valve (HE, 6x). Bacterial clouds, fibrin activation and valve necrosis

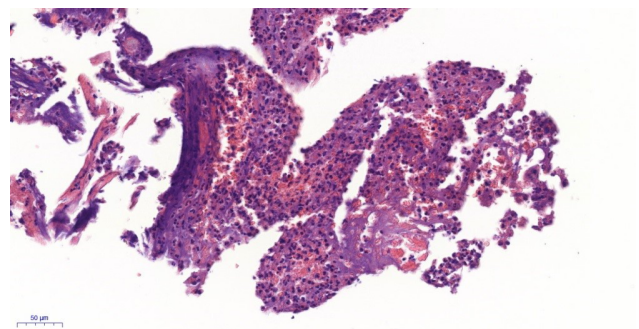


Figure 7. Aspirated embolus (HE, 40x), showing neutrophil granulocytes embedded in fibrin

While the patient was transferred to the ward, she developed chest pain, profuse perspiration and hypotension. The ECG showed 2-5 mm ST segment elevation from V2 to V5 (Fig. 2).

The strong suspicion of myocardial infarction prompted an acute coronary angiography, which revealed a proximally occluded LAD (Fig. 3).

In order to facilitate myocardial revascularization, the heart team (cardiac surgeon, interventional cardiologist, echocardiographer, anaesthesiologist) performed a transcatheter coronary thrombectomy followed by emergent surgical intervention.

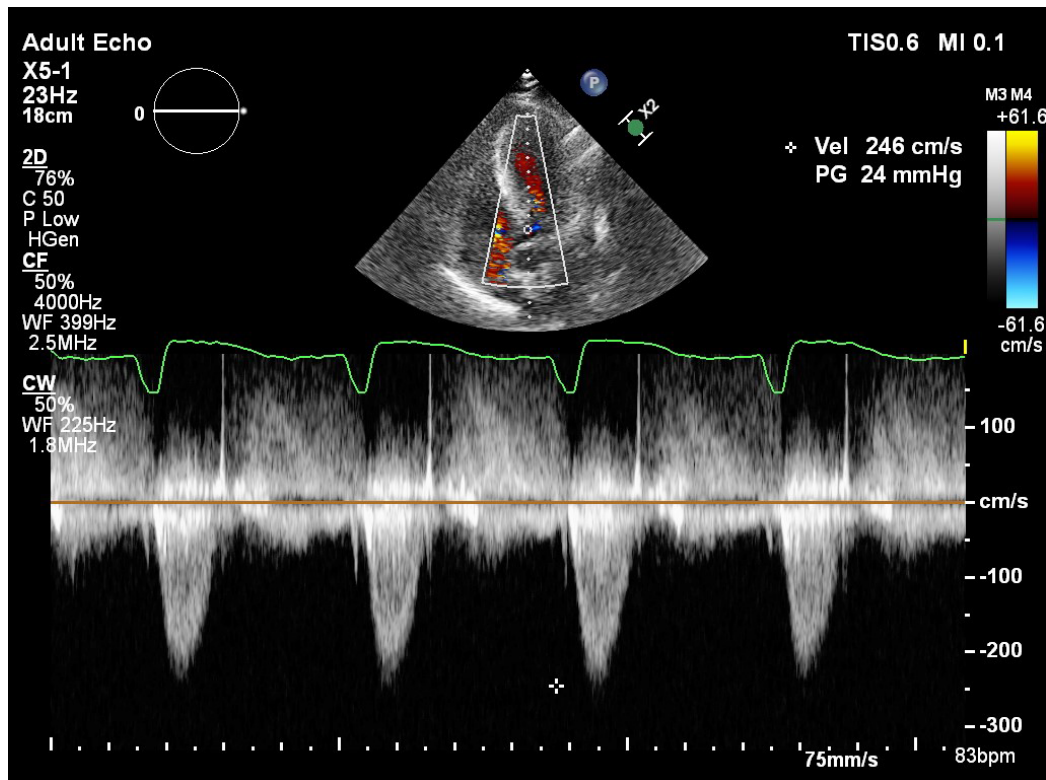


Figure 8. Postoperative transthoracic echocardiography which demonstrated a significantly reduced subvalvular peak gradient.

A fair amount of emboli was aspirated with a 7 French aspiration catheter and sent to histopathology. The coronary angiography resulted (Fig. 4) with a nonsignificant mid LAD stenosis that didn't require further treatment.

During surgery, the infected mitral valve and chordae were removed and a septal myectomy was performed using a biological prosthetic mitral valve size 29 with interrupted pledgeted sutures. (Fig. 5). The postoperative period was uneventful.

The microbiological results showed infected vegetation with *Staphylococcus lugdunensis* and *Propionibacterium acnes*, which were sensitive to the initiated antibiotic treatment.

The histopathological examination of the mitral valve showed signs of IE (Fig. 6). The coronary aspirate confirmed the suspicion of embolism with a vegetation fragment without bacterial cloud (Fig. 7).

The patient was discharged from ITU on postoperative day 2, and to the district general hospital on day 12 for further intravenous antibiotic therapy. The postoperative TTE showed a well-functioning prosthetic mitral valve, left ventricular function, and a nonsignificant subvalvular peak gradient (Fig. 8).

3. Discussion

Coronary artery embolization in infective endocarditis is a rare, but serious complication with high mortality rates. Three studies evaluated more than 500 patients showed an incidence of CASE in IE between 0.31% and 0.51% among all cases of IE and 1.5% to 3.5% among patients with embolic events (Fabri et al., 2015; Manzano et al., 2007; Thuny et al., 2005) (Table 1).

Coronary thromboembolic events in patients with bacteremia, with or without infective endocarditis were mentioned in litera-

ture since the mid-19th century. These findings were mostly post-mortem, but not always clearly documented as septic embolization (Menzies, 1961; Brunson, 1953). The case presented in 2000 by Perera et al was a postmortem finding of a LAD occlusion by a septic embolus in an aortic valve endocarditis (Perera et al., 2000). Since then, several cases were reported, which were treated conservatively with antibiotic therapy, where neither the valve, nor the coronary occlusion were addressed, or with coronary transcatheter intervention for the acute coronary syndrome, without resolving the source of embolization. These strategies also proved to have high mortality rates (Hunter et al., 2001; Maqsood et al., 2014). Surgical intervention was feasibly performed for both valve replacement and coronary revascularization, but the procedure was technically more challenging due to difficulties in finding an appropriate site for coronary grafting (Baek et al., 2008).

Although complex, the case presented with MVE, HOCM and LAD embolization had a straightforward post intervention course due to an early, successful transcatheter myocardial revascularization with aspiration thrombectomy followed by a combined mitral valve replacement and septal myectomy. The hybrid approach used in patients with CASE in IE was also reported by other authors in a few case presentations with similar success (Maqsood et al., 2014; Fiedler et al., 2017).

In this case, the small mobile vegetation that adhered to the subaortic septum at the mitral anterior leaflet touched the septal endocardium due to the systolic anterior movement. Intraoperatively, this was not present suggesting that this was the source of embolization. Both the European Society of Cardiology and European Association for Cardio-Thoracic Surgery IE guidelines consider a class I B indication for early surgical intervention the pres-

Table 1. Studies on larger patient cohorts show a low incidence of coronary septic embolization in infective endocarditis, even among patients with embolic events.

Author	Number of patients	Number of CASE	Incidence (%)	Incidence among systemic embolization (%)
Thuny et al., 2005	384	2	0.52	1.5
Fabri et al., 2015	629	2	0.31	3.5
Manzano et al., 2007	586	3	0.51	No data

ence of mobile vegetation larger than 10 mm. However in this case, the presence of multiple, highly mobile smaller vegetations, after an embolic event was considered a clear indication for surgery.

Neither the American nor the European IE guidelines mention coronary embolization as a possible complication of infective endocarditis most probably due to its low incidence (Habib et al., 2015; Mohananey et al., 2018; Baddour et al., 2015). However, the devastating effects of an ACS in a severe clinical setting of infective endocarditis requires specific cardiological and cardiac surgical interventions. This alone makes this case worth mentioning in the IE guidelines as a separate entity. The successful hybrid treatment of such complications, mentioned in multiple case reports including ours suggests that the transcatheter aspiration thrombolectomy followed by emergent surgical intervention to address the infected valve might be the strategy of choice for this type of pathology.

4. Conclusion

Based on this case and other presented in the literature, we consider the hybrid transcatheter coronary embolus aspiration followed by surgical intervention a successful strategy in infective endocarditis complicated with coronary artery septic embolization.

Our opinion is that coronary embolization could be mentioned as a complication of infective endocarditis in future guidelines with the hybrid intervention as the therapy of choice. Larger studies may be necessary to confirm this theory.

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Conflict of Interest

The authors declare no competing interests.

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