

Septic coronary embolism treated with manual aspiration thrombectomy

A case report

Luhanda Leonora Cardoso Monti Sousa, MD, Tatiana de Carvalho Andreucci Torres Leal, MD, Alexandre de Matos Soeiro, MD, Paulo Rogério Soares, MD, PhD, Thiago Luis Scudeler, MD, PhD* 

Abstract

Rationale: Systemic embolism is a known complication of infective endocarditis (IE), but it rarely presents as acute myocardial infarction (AMI). Aspiration thrombectomy without stenting is a possible approach in this context. The authors present a rare case of coronary embolism caused by *Aggregatibacter aphrophilus* IE successfully treated with manual aspiration thrombectomy.

Patient concerns: A 19-year-old man with previous valve disease was admitted to the emergency department with fever and dyspnea. The next day, the patient presented with chest pain and hemodynamic instability.

Diagnosis: Transesophageal echocardiography confirmed the presence of infectious endocarditis at the mitro-aortic junction. Blood cultures identified *Aggregatibacter aphrophilus*. Electrocardiogram showed significant ST segment elevation in leads V1 to V5, indicating AMI. Coronary angiography revealed total occlusion of the left anterior descending artery. The histopathological examination of the material aspirated from the coronary artery showed fibrin thrombi containing gram-negative cocci.

Interventions: Manual aspiration thrombectomy was performed without stent implantation. No antithrombotic therapy was needed during and post-procedure. After clinical stabilization, the patient underwent cardiac surgery.

Outcomes: Transesophageal echocardiogram before discharge showed preserved left ventricular function, with no segmental left ventricular wall motion abnormalities, and the aortic metal prosthesis without dysfunction. After discharge, a new transesophageal echocardiogram was performed with 1 month of follow-up. No evidence of recurrence of IE was found in the first postoperative review and the patient remained stable.

Lessons: Manual aspiration thrombectomy without stenting and antithrombin therapy is feasible in patients with AMI due to IE.

Abbreviations: AMI = acute myocardial infarction, IE = infective endocarditis.

Keywords: aspiration thrombectomy, infective endocarditis, myocardial infarction, septic emboli

1. Introduction

Infective endocarditis (IE) is associated with high mortality and a high incidence of embolic events.^[1] Systemic embolism is a common complication of IE, most frequently involving the central nervous system, spleen, kidney, liver, and iliac or

mesenteric arteries, whereas acute myocardial infarction (AMI) is an uncommon complication.^[2] The presentation and clinical course of AMI in patients with IE are similar to those observed in individuals with coronary artery disease.^[3] Due to the low incidence of coronary events in IE, only case reports and small studies have been published. Thus, the current literature is divergent regarding the management of these patients and does not give clear recommendations. We report a rare case of AMI complicated by septic coronary embolism caused by IE treated with manual aspiration thrombectomy.

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Instituto do Coração (InCor), Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, São Paulo, Brazil.

* Correspondence: Thiago Luis Scudeler, Instituto do Coração (InCor), Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, Avenida Doutor Eneas de Carvalho Aguiar 44, AB, Sala 114, Cerqueira César, São Paulo, Brazil 05403-000 (. e-mail: tscudeler@gmail.com).

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1.1. Consent

The patient signed informed consent for the publication of this case report and any accompanying images. This report was granted approval by the ethics committee of the Instituto do Coração (InCor), Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, Brazil.

2. Case presentation

A 19-year-old man with subvalvular aortic stenosis who underwent subsequent surgical resection in 2001, metal prosthetic aortic valve replacement in 2010, and double mitral lesion (predominance of insufficiency) was admitted to the

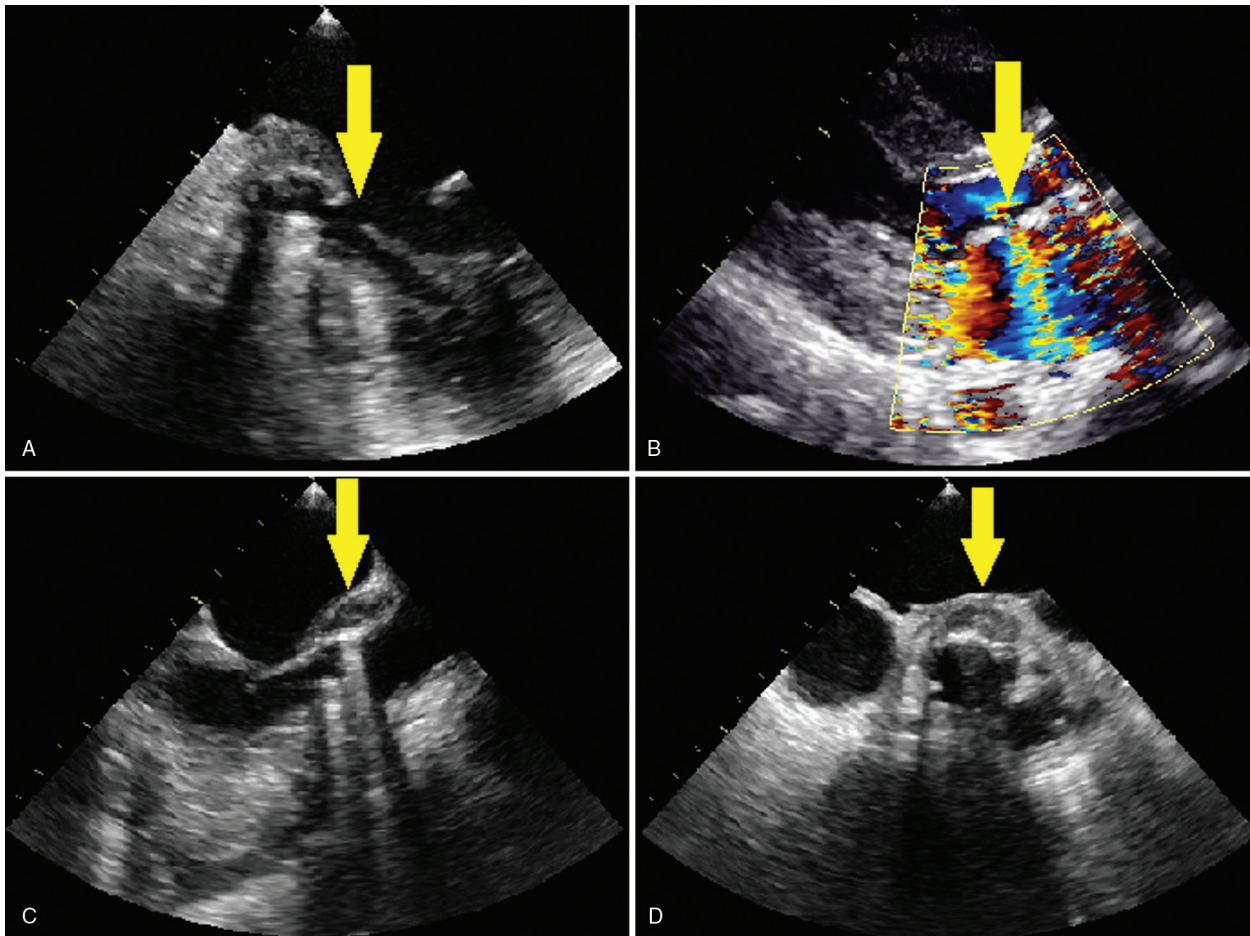


Figure 1. TEE in mid-oesophageal view revealing (A) anterior leaflet discontinuity of the mitral valve; (B) flow on discontinuity of anterior mitral valve leaflet; (C) cavity on the aortic valve; (D) cavity at the mitro-aortic junction compatible with an abscess (yellow arrows).

emergency department with fever and dyspnea of 2 days. On examination, he had heart sounds with a metallic click and aortic focus systolic murmur $++/6$ and systolic murmur $+++/6$ in the mitral focus. His body temperature was 38°C , blood pressure was $100/60\text{ mm Hg}$, and heart rate was 89 beats/min . Respiratory rate was 18 per minute with oxygen saturation of 95% breathing ambient air. Skin examination revealed no changes. No other physical or neurological abnormalities were found. Laboratory results were notable for a white blood cell count of $14,950\text{ cells}/\mu\text{L}$ with 82% segmented neutrophil, a creatinine level of 1.35 mg/dL , an erythrocyte sedimentation rate 49 mm/h , and a C-reactive protein of 212 mg/dL . The diagnostic hypothesis of IE was made and after obtaining 3 sets of blood samples, intravenous administration of oxacillin and ceftriaxone was begun. Blood cultures identified *Aggregatibacter aphrophilus*. The course of intravenous antibiotic with ceftriaxone alone was continued for 6 weeks. Transesophageal echocardiogram (TEE) demonstrated left ventricular ejection fraction of 68% with an anterior mitral valve leaflet discontinuity measuring 0.7 cm with color Doppler flow, suggestive of perforation (Fig. 1A and B), severe mitral regurgitation, and a round area of reduced echodensity at the mitro-aortic junction, with no color Doppler flow, consistent with abscess (Fig. 1C and D), without aortic valve prosthesis

dysfunction. The electrocardiogram (ECG) showed sinus rhythm, normal PR interval and absence of ischemia (Fig. 2A). Cardiac markers were elevated. There was no lesion suggestive of septic emboli in abdominal ultrasound and brain tomography. After 24 hours of antibiotic therapy, the patient developed central chest pain radiating to the neck; the ECG showed significant ST segment elevation in leads V1 to V5 (Fig. 2B). Noradrenaline and dobutamine were initiated due to hemodynamic instability. Coronary angiography revealed total occlusion of the left anterior descending artery (TIMI flow grade 0) with no other angiographic evidence of atherosclerotic disease (Fig. 3A). Manual aspiration thrombectomy (Export XT Aspiration Catheter (Medtronic, Inc., Minneapolis) without stent implantation was performed (Fig. 3B, C, D) with restoration of coronary blood flow (TIMI 3 flow); antithrombotic therapy (antiplatelet and anticoagulant therapy) was not needed during and post-procedure. The embolic material was sent for culture. The procedure was well tolerated, successfully performed (Fig. 3E), and the patient's evolution was favorable, with weaning from vasoactive drugs.

After 10 days of stay in the hospital, the patient underwent cardiac surgery with mitral valve orifice correction, reconstruction of the mitro-aortic junction with a bovine pericardium patch, and implantation of an aortic mechanical prosthesis.

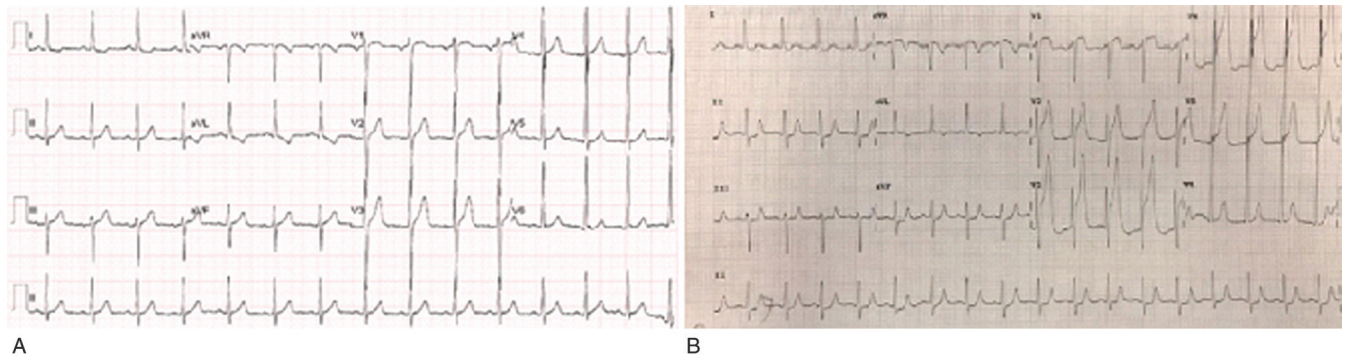


Figure 2. (A) Electrocardiogram on admission showed the absence of ischemia; (B) Twenty-four hours later, a new electrocardiogram showed ST-elevation in anterior leads (V1-V5).

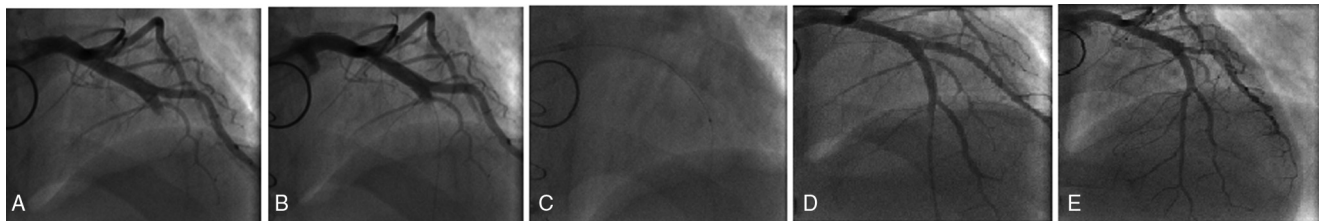


Figure 3. (A) Coronary angiography showing total occlusion of the middle left anterior descending artery; (B) Guide wire crossing with the support of thrombo-aspiration catheter into the distal left ascending coronary artery; (C) Coronary aspiration with a thrombectomy catheter; (D) The vessel following partial aspiration thrombectomy; (E) The vessel following final aspiration thrombectomy.

The material aspirated from the coronary artery showed fibrin thrombi containing gram-negative cocci (Fig. 4).

One week after the surgical procedure, the patient was discharged from the hospital. A repeat transesophageal echocardiogram before discharge showed left ventricular function of 60%, with no segmental left ventricular wall motion abnormalities, mild mitral regurgitation, and the aortic metal prosthesis without dysfunction. After 1 month of follow-up, the patient remained stable.

3. Discussion

This report describes a rare case of *Aggregatibacter aphrophilus* IE complicated by AMI. Moreover, this report illustrates the feasibility of performing manual aspiration thrombectomy without stenting and the use of antithrombin therapy in this context.

The incidence of systemic embolism is known to be 22% to 50% of patients with IE, the majority (up to 65%) in the central nervous system, but other major arterial beds may be involved, including

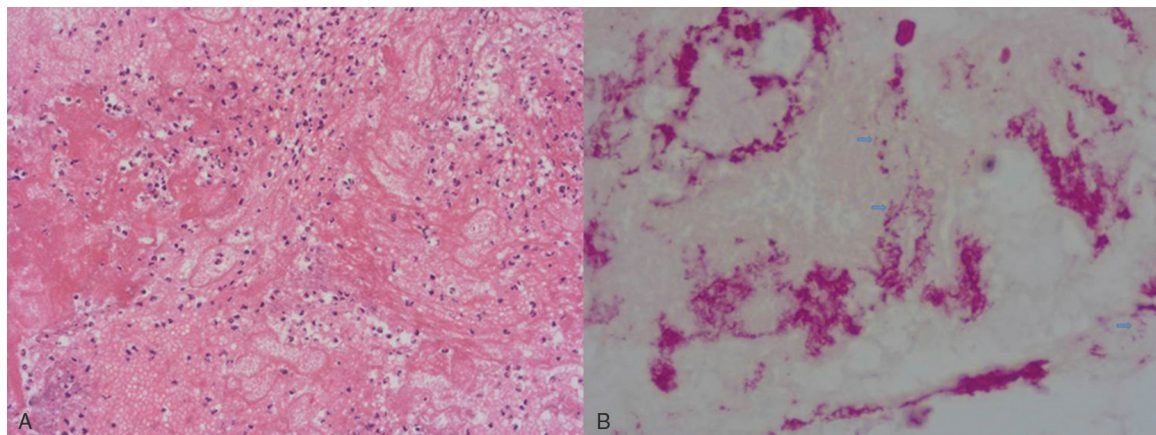


Figure 4. Histological sections of the material aspirated from the coronary artery. (A) The material is constituted mostly of fibrin and inflammatory cells (hematoxylin & eosin staining; objective magnification - 20x); (B) Presence of cocci stained as Gram-negative - some of which are pointed out by blue arrows (staining by Brown & Brenn method; objective magnification - 100x).

the coronary arteries.^[4] However, AMI is an early and uncommon complication of IE.^[2] Most coronary embolisms occur in the left descending coronary artery because of the downward course of the left ascending coronary artery compared with the right coronary artery or left circumflex artery, which originate at 90° to the aortic cusp.^[2] Septic emboli are more frequent with mitral valve infection (25%) than with aortic valve infection (10%),^[5] but study by Manzano and colleagues suggest aortic valve involvement increases the risk of septic coronary emboli.^[2]

The treatment of AMI caused by septic coronary embolism is challenging and controversial, with no consensus in the literature. The content of septic emboli differs from other emboli and requires a different treatment strategy than conventional AMI.^[6] In addition to infectious control with antibiotics, surgical treatment of the affected valve is usually indicated. Many of these patients have systemic embolization, are at high risk for bleeding complications, and fatal outcomes with any strategy used, especially if antiplatelets, anticoagulants, and thrombolytics are required.^[7]

Fibrinolytic therapy is generally contraindicated in these settings due to the higher risk of intracerebral hemorrhage due to mycotic aneurysms and cerebral infarcts (common sequelae of IE) militates against the use of such agents.^[8] Also, septic conditions can increase the risk of intracranial hemorrhage leading to hemostasis disorders. Balloon angioplasty alone showed mixed results due to the greater likelihood of distal and no-reflow embolization, mycotic aneurysm formation, and reocclusion by mobile embolic material.^[9] Stenting may prevent some of these complications, but it carries the theoretical risk of continuous infection by entrapment of septic material between the stent and the vessel wall.^[9] Also, in these cases, localized mycotic aneurysm can originate from the stent implanted area.^[10] The use of drug eluting stents predisposes to a higher risk of reinfection compared to bare metal stents due to their immunomodulatory properties.^[11] In contrast, aspiration thrombectomy in AMI caused by coronary embolism from IE is an alternative approach to thrombolysis and percutaneous angioplasty and may avoid the complications mentioned above.^[12]

In this case, coronary angiography was performed because of hemodynamic instability after AMI. The decision to perform aspiration thrombectomy was due to total occlusion of the left anterior descending artery without apparent atherosclerotic disease. Surgical treatment was performed after the coronary event, when the patient was clinically stable.

In conclusion, this current case report has shown that Manual aspiration thrombectomy can be successfully performed without the need for thrombotic agents in patients with AMI caused by septic embolism

Author contributions

Methodology: Luhanda Leonora Cardoso Monti Sousa.

Resources: Luhanda Leonora Cardoso Monti Sousa, Tatiana de Carvalho Andreucci Torres Leal, Alexandre de Matos Soeiro, Paulo Rogério Soares.

Supervision: Thiago Luis Scudeler.

Writing – original draft: Thiago Luis Scudeler.

Writing – review & editing: Thiago Luis Scudeler.

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