

Rare Cause of Acute Coronary Syndrome in a Young Female Patient: Coronary Embolism

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SOUHRN

Kontext: Koronární embolizace u pacientů s mechanickou chlopní jako příčina uzávěru koronární tepny je považována za vzácnou příhodu s neznámou incidencí. Kromě toho chybí shoda na účinné léčbě a způsobu odstranění koronárních embolů v dané situaci.

Přehled případu: Šestadvacetiletá žena se dostavila k lékaři s bolestí na hrudi trvající jednu hodinu v důsledku non-ST akutního koronárního syndromu vyvolaného uvolněním embolu z mechanické mitrální chlopně v důsledku nedostatečné adherence k antikoagulační léčbě. U pacientky byla do 60 minut od příjezdu na oddělení akutního příjmu provedena srdeční katetrizace. Angiografické vyšetření prokázalo totální uzávěr středního segmentu první levé marginální větve; po provedení perkutánní angioplastiky této větve došlo ke zlepšení koronární perfuze, okamžitému úplnému ústupu bolesti na hrudi a k ústupu změn úseku ST a vlny T na EKG záznamu. Další den bylo provedeno vyšetření transezofageální echokardiografií, které prokázalo dobře fungující mechanickou mitrální chlopeč s dvěma útvary nasedajícími na atriální stranu mechanické mitrální chlopně. U pacientky se pokračovalo s terapeutickou antikoagulací do dosažení cílové hodnoty mezinárodního normalizačního poměru (INR). Následné transezofageální echokardiografické vyšetření prokázalo zmenšení útvarů.

Diskuse: Tento případ prokázal, že koronární embolizaci může zkomplikovat mechanický trombus se suboptimálními hodnotami INR a lze jej úspěšně léčit perkutánní angioplastikou.

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ABSTRACT

Background: Coronary embolization in patients with mechanical prosthesis as a cause of coronary artery occlusion has been considered a rare condition with unknown incidence. Moreover, there is a lack of consensus for effective treatment and management of coronary emboli in this setting.

Case summary: A 26-year-old female patient presented with chest pain of one hour duration due to non-ST acute coronary syndrome caused by embolization from mitral mechanical prosthesis due to inadequate adherence to anticoagulant therapy. The patient underwent cardiac catheterization within 60 minutes of arrival to emergency room. Angiography revealed total occlusion of the mid segment of first obtuse marginal branch. Percutaneous angioplasty was done to the obtuse marginal branch with improvement of coronary perfusion, immediate complete resolution of chest pain and regression of ST-T wave changes in electrocardiogram. Transesophageal echocardiography was done one day later and revealed well-functioning mitral mechanical prosthesis with two masses seen attached to atrial aspect of mitral mechanical prosthesis. Patient was kept on therapeutic anticoagulation and achieved target international normalized ratio (INR). Follow-up transesophageal echocardiography showed regression of the size of masses.

Discussion: This case demonstrated coronary embolization may complicate mechanical thrombus with suboptimal INR levels and can be successfully treated with percutaneous angioplasty.

Keywords:

Coronary angiography

Mechanical mitral prosthesis

Percutaneous balloon angioplasty

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Introduction

Coronary embolization in patients with mechanical prosthesis as a cause of coronary artery occlusion has been considered a rare condition with unknown incidence. Moreover, there is lack of consensus for effective treatment and management of coronary emboli in this setting. The purpose of this report is to show the successful management of case of coronary embolism with primary angioplasty using balloon without stenting.

Case report

A 26-year-old female with history mitral mechanical prosthesis was admitted to our hospital on May 7, 2022 com-

plaining of sudden onset of severe typical chest pain that began one hour prior to presentation in the emergency room. She had no history of hypertension, diabetes mellitus, or coronary artery disease. She underwent mitral valve replacement in August 2008 for severe mitral regurgitation due to rheumatic heart disease. She had another Redo mitral valve replacement in October 2016 on top of malfunctioning mitral mechanical prosthesis after her 2nd pregnancy. She was not adherent to her anticoagulants, and she stopped warfarin for the past three weeks. On admission to hospital, physical examination revealed that the patient was anxious, pale with heart rate 90/minute and blood pressure of 110/70 mmHg. Cardiac examination revealed well heard click replacing 1st heart sound with no murmurs heard. Chest examination revealed normal vesicular breathing with no adventitious sounds. ECG

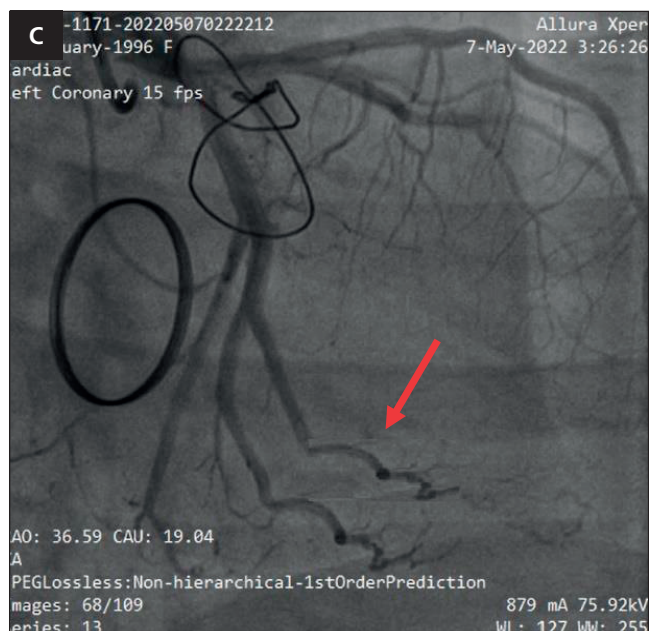
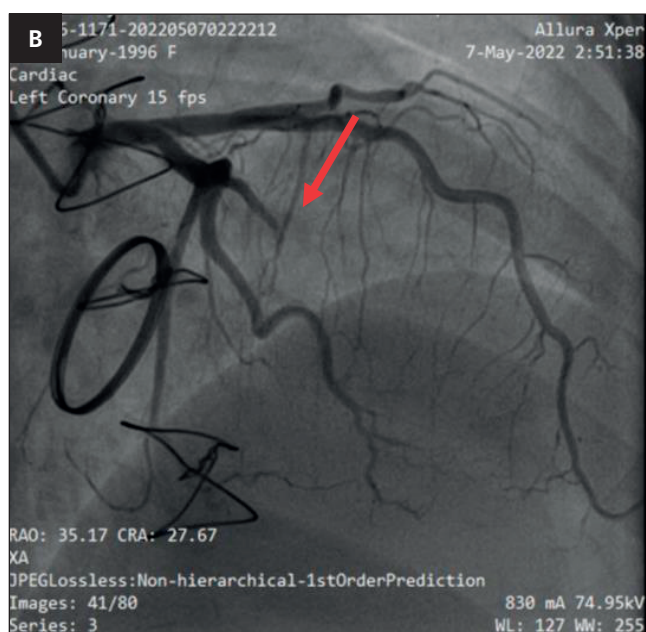
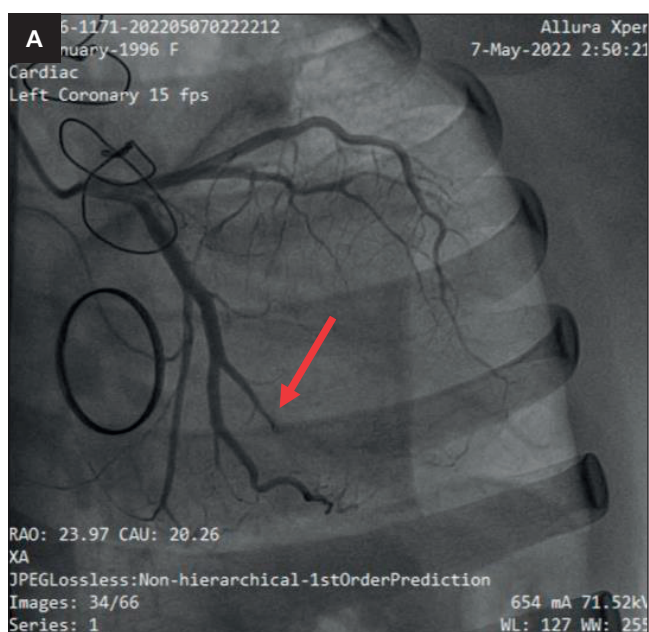


Fig. 1 – Coronary angiography images. (A) Right anterior oblique caudal view showed total occlusion of the 1st obtuse marginal branch (red arrow). **(B)** Right anterior oblique cranial view confirmed total occlusion of the 1st obtuse marginal branch (red arrow). **(C)** Right anterior oblique caudal view showed adequate distal flow (red arrow) of the occluded obtuse marginal branch after percutaneous transluminal angioplasty.

showed normal sinus rhythm and dynamic ST segment depression and T wave inversion in leads II, III, avF and ST segment depression in V₄-V₆. Laboratory tests revealed hs troponin level of 11 ng/mL (upper limit 0.06 ng/mL). INR level of patient was 0.9 on emergency admission.

Urgent coronary angiography was performed one hour after admission. Coronary angiography revealed normal coronaries except total occlusion of mid segment of the 1st obtuse marginal branch as shown in **Figure 1**. Percutaneous angioplasty was done using 1.5 × 15 mm balloon inflated at 14 atmosphere and infusion of eptifibatide (glycoprotein IIb/IIIa antagonist) at rate of 9 ml/hour after bolus dose was started and continued for 24 hours.

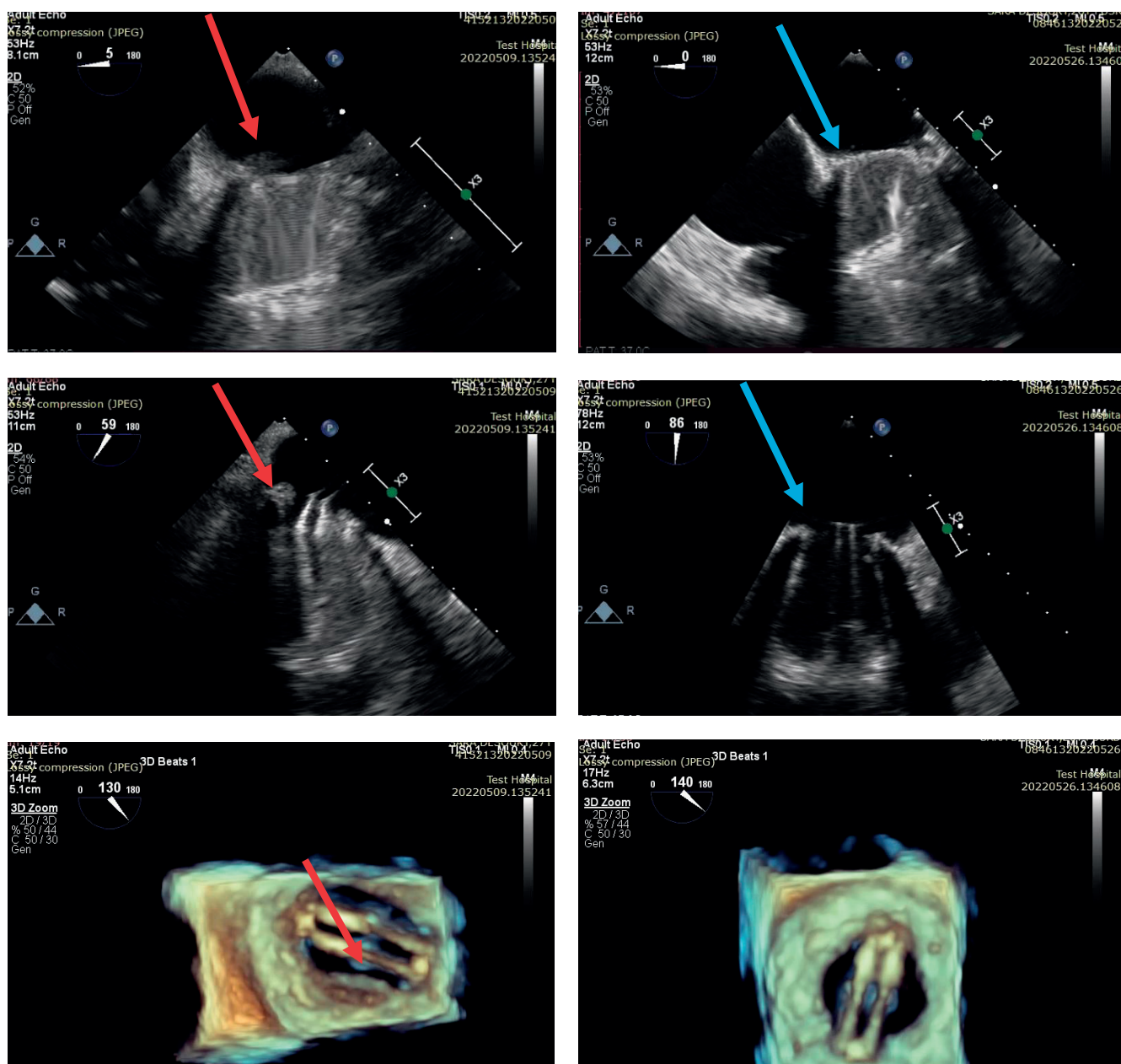


Fig. 2 – Transoesophageal images. Left panel images showed thrombus (red arrows) related to one of the occluder of mitral mechanical prosthesis. Right panel images showed follow-up transoesophageal echocardiography images revealing resolution of the thrombus (blue arrows) after anticoagulation therapy

Angiogram after percutaneous angioplasty revealed TIMI III coronary blood flow was restored as shown in **Figure 1**. The patient was shifted to the coronary care unit where transthoracic echocardiography was done showing normal left ventricle dimensions and mildly impaired systolic function; in addition, there were suspicious masses attached to mitral prosthesis. On the second day, transoesophageal echocardiography (TEE) was done and revealed well-functioning mitral mechanical prosthesis with two masses seen attached to atrial aspect of mitral mechanical prosthesis, largest measure 1.3×0.6 cm as shown in **Figure 2** (left panel). Infective endocarditis was excluded with clinical, and lab work up. Heparin infusion was administered for three days, and warfarin 4 mg was

started. Follow-up transesophageal echocardiography was done two weeks later and revealed resolution of the thrombus after achieving INR of 3.0 as shown in **Figure 2** (right panel). The patient was discharged on warfarin, aspirin, bisoprolol, and proton pump inhibitor therapy. The patient was informed about the importance of adherence to anticoagulant and timing of next coagulation profile.

Discussion

Virchow described the first case of coronary embolism in 1856.¹ In earlier studies, diagnosis was based on auto-

psy or coronary angiography findings, reported that 4% to 7% of AMI patients did not have atherosclerotic coronary disease.² Another autopsy study reported that 55 of 419 patients (13%) had coronary artery embolic infarcts.³ Infective endocarditis was considered the most common cause of coronary embolism in earlier studies,⁴ while atrial fibrillation was the most common underlying cause followed by cardiomyopathy and valvular heart disease in recent series.⁵ Prosthetic cardiac valves were considered new disease process with the first case of coronary embolism arising from a mitral prosthesis in 1964.⁶ The size of embolus and size of the lumen of the artery were the most important predictors of consequences of coronary embolism.⁷ There is no consensus for the treatment of coronary embolism. Different treatment options as percutaneous interventions like catheter-aspiration embolectomy, percutaneous transluminal coronary angioplasty, stent placement, and medical approach with thrombolytic agents may be considered for management of coronary embolism.^{8,9} Steinwender et al. reported success of intravenous application of bivalirudin for resolution of coronary embolus.¹⁰ Quinn et al. reported successful management with intracoronary urokinase and intravenous abciximab following angioplasty procedure in complete resolution of the thrombus in a coronary embolism case.¹¹ Atmaca et al. reported the successful management of coronary embolism with half-dose tissue-type plasminogen activator (tPA) and tirofiban given intravenously in a patient with mitral valve prosthesis.¹² We experienced restoration of TIMI III coronary blood flow with percutaneous transluminal angioplasty and continued glycoprotein IIb/IIIa antagonist for 24 hours.

Conclusion

Coronary embolism secondary to prosthetic valve is a rare cause of myocardial infarction. Percutaneous balloon angioplasty without stenting and eptifibatide administered intravenously may be an effective treatment of this condition.

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Conflict of interest

The authors had no conflict of interest to declare.

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Ethical statement

This case report was conducted in accordance with the principles of the Declaration of Helsinki.

Informed consent

The patient provided an informed consent to present this case report.

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