

# ACUTE PROSTHETIC AORTIC VALVE OBSTRUCTION LEADING TO FREE AORTIC INSUFFICIENCY VENO-ARTERIAL EXTRACORPOREAL MEMBRANE OXYGENATION AS A BRIDGE TO SURGERY

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## Abstract

**Introduction:** Mechanical prosthetic valve thrombosis (PVT) and obstruction is a lifethreatening event. The significant morbidity and mortality associated with this condition warrants rapid diagnostic evaluation and treatment.

**Case report:** A 66-year-old female patient with a history of aortic valve replacement 13 years before, was admitted to our intensive cardiac care unit with symptoms and signs of prosthetic aortic valve dysfunction. During cardiac angiography, she collapsed and fluoroscopy showed an immobile disc, stopped in an open position and causing free aortic regurgitation. Cardio-pulmonary resuscitation (CPR) was initiated and a VA-ECMO was inserted as a bridge to emergent cardiac surgery. Surgery was then performed and the patient was successfully discharged with no neurological impairment.

**Discussion:** We present a case where Veno-Arterial Extracorporeal Membrane Oxygenation (VA-ECMO) was successfully used as a bridge to emergent surgery in a cardiac arrest patient due to prosthetic valve thrombosis.

**Conclusions:** This case illustrates how a relative contraindication (severe aortic insufficiency) to VA-ECMO may, in the end, be an indication in a very particular scenario.

## CASE REPORT

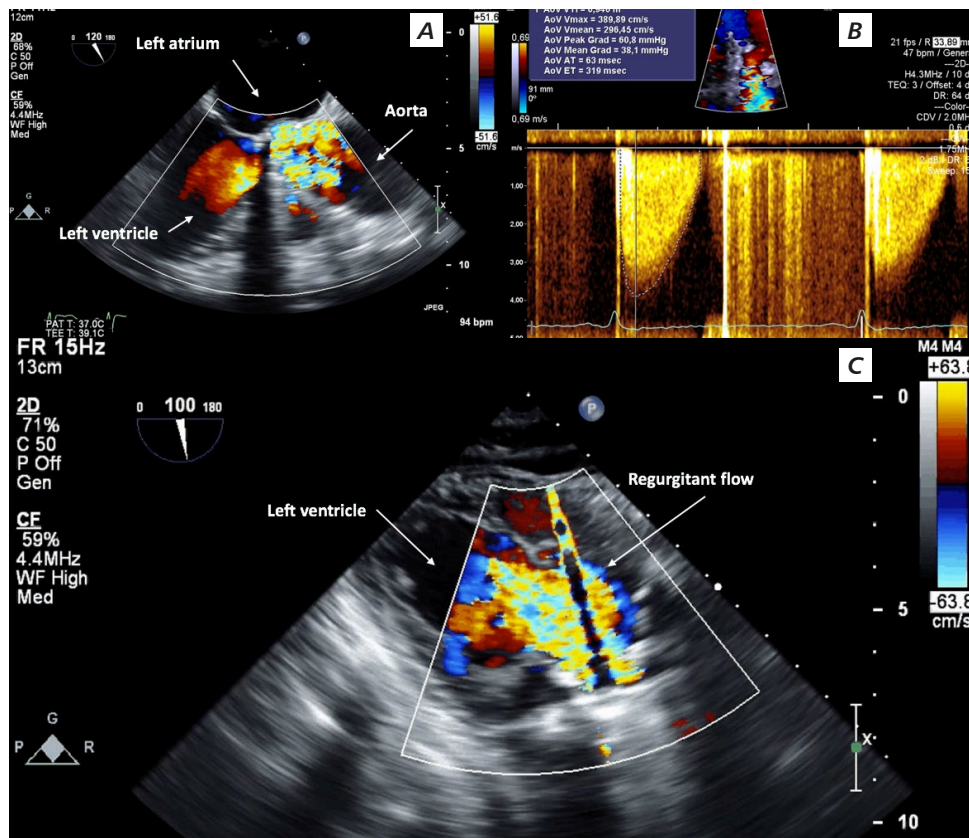
A 66-year-old female patient with a history of aortic valve replacement 13 years before, presented to our emergency department because of syncope. Before sudden loss of consciousness, she felt severe chest pain and dizziness. In the previous week, she developed complains of heart failure with shortness of breath and orthopnea. She was medicated with an angiotensin receptor blocker, beta blocker and warfarin. On physical examination: slightly hypotensive but peripheral perfusion and lactate level were normal.

A holosystolic murmur was heard on cardiac auscultation and bibasal rales on pulmonary auscultation. Electrocardiogram showed sinus rhythm with no ST-T-anomalies; high sensitivity troponin: 0,096 to 0,194 ng/mL. International normalized ratio level was 2,8.

She was admitted to our intensive cardiac care unit with the leading diagnosis of non-STsegment elevation myocardial infarction or prosthetic aortic valve dysfunction.

Transthoracic echocardiogram (TTE) showed intermittently severe prosthetic aortic valve insufficiency with preserved left ventricle dimensions and function. Transesophageal echocardiography (TOE) showed an apparent monodisc valve with an intermittent delay in disc closure resulting in severe aortic regurgitation (AR). Pulsed-wave Doppler at descending thoracic aorta level showed an intermittent pardiastolic reversal flow indicating acute and severe intermittent AR (Figure 1).

Fluoroscopy was performed to identify the leaflet excursion and confirm the valve type; coronary angiography to exclude coronary artery disease. During this procedure, the patient suddenly collapsed and cardio-pulmonary

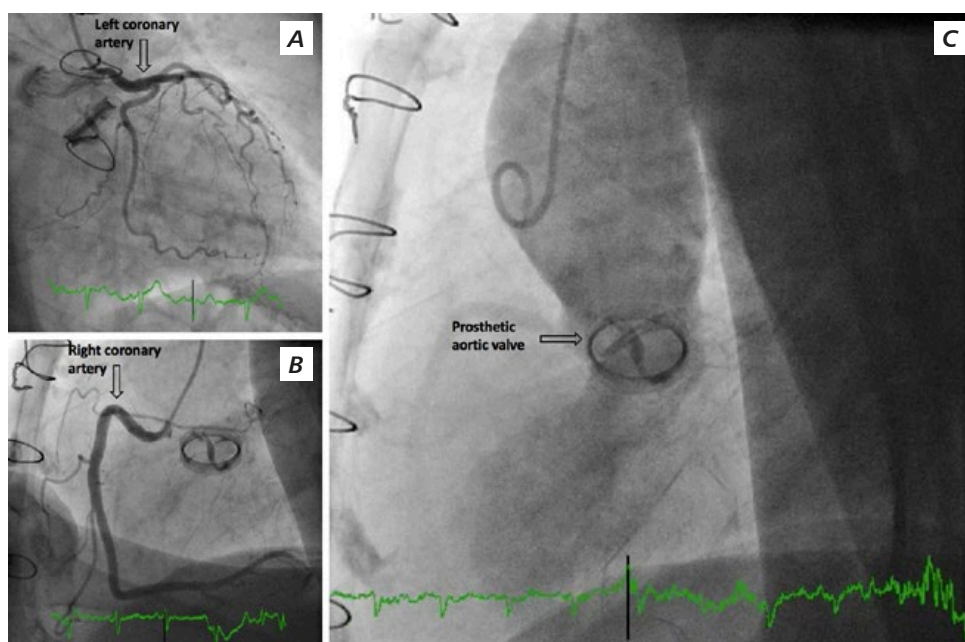


**Figure 1**

**A** - Transesophageal echocardiography (TOE) showing turbulent flow across prosthetic aortic valve; **B** - Apical four chamber view on transthoracic echocardiography with spectral continuous Doppler demonstrating a peak gradient of 60 mmHg and a mean gradient of 36 mmHg; **C** - TOE displaying a large aortic regurgitation jet.

resuscitation (CPR) was initiated. Fluoroscopy showed an immobile disc, stopped in an open position and causing free aortic regurgitation, (Figure 2).

Cardiac surgery was immediately contacted but the operating room was only available in 60 minutes. As a life treating measure it was decided to put a VA-ECMO while



**Figure 2**

**A** and **B** - Coronary angiography showing normal coronary arteries; **C** - Severe aortic insufficiency due to disc immobilization in an open position.

waiting definitive treatment. VA-ECMO was inserted, during CPR, in 20 minutes, and patient hemodynamic condition quickly improved. Forty-five minutes later the patient was operated. Intra-operatively there was thrombus in the valve. The valve was explanted and a biologic aortic valve was inserted. VA-ECMO was also removed during the surgery due to hemodynamic and electrical stability.

The patient fully recovered and 10 days later was discharged with no neurological impairment.

## DISCUSSION

Prosthetic valve obstruction (PVO) is a rare and serious complication, most often found with mechanical prosthesis. Due to the different clinical presentations of these patients, diagnostic and treatment is often delayed, conferring to this entity a high morbidity and mortality risk.<sup>1</sup>

The possible causes of obstruction include thrombus formation, pannus and rarely vegetations. The differentiation between pannus and thrombus by TTE is challenging; duration of symptoms, state of anticoagulation, and ultrasound mass intensity may aid in the differentiation of these entities.<sup>2</sup> Fluoroscopy and TOE are also recommended in diagnostic workup of PVO.

Obstruction requires aggressive treatment (surgery or fibrinolysis), as anticoagulant treatment will usually be insufficient. According to the American College of Cardiology/ American Heart Association guidelines, surgery is the preferred treatment for left-sided PVT. Fibrinolysis should be reserved for patients with poor functional class (New York Heart Association (NYHA) III or IV), with high surgical risk or contraindications to surgery. It can also be considered in patients with good functional class (NYHA I or II) and a small

thrombus, after failure of heparin treatment.<sup>3,4</sup>

In our case surgery became emergent during left heart catheterization when disk suddenly stopped. Free aortic regurgitation lead to cardiac arrest and an emergent VA-ECMO, during CPR, was implanted as a bridge to cardiac surgery. Use of VA-ECMO as a bridge to surgical valve replacement is a rare procedure, even more when the main dysfunction is due to aortic insufficiency.

With this case report the authors pretend to alert how important is this entity and how serious it can become. Although severe aortic insufficiency is, generally, a contraindication for VA-ECMO, this case illustrates that in very specific situations this support may gain time for other interventions.

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