



Not such a benign entity. Cardiogenic shock and mechanical complication in myocardial infarction with no obstructive coronary arteries working diagnosis

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Not such a benign entity. Cardiogenic shock and mechanical complication in myocardial infarction with no obstructive coronary arteries working diagnosis

Short title: Myocardial infarction with non-obstructive coronary arteries is a working diagnosis

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An 82-year-old woman with a history of an ischemic stroke was admitted to hospital with ST-segment elevation myocardial infarction complicated by pulmonary oedema and cardiogenic shock (resistant to pharmacotherapy). Electrocardiography revealed ST-segment elevation in lateral leads and reciprocal denivelation in inferior leads. Urgent coronary angiography demonstrated no significant coronary artery disease. Therefore, the working diagnosis of myocardial infarction with no obstructive coronary arteries (MINOCA) was made. Transthoracic echocardiography revealed: preserved left ventricular ejection fraction, akinesis of mid lateral and mid inferolateral segments of the left ventricle, severe acute mitral regurgitation (MR) due to flail anterior leaflet and anterolateral papillary muscle's head rupture (Figure 1A, B). This dramatic clinical manifestation prompted careful revision of coronary angiography images that disclosed proximal amputation of regressive ramus intermedius

(because of diameter less than 1 mm a conservative approach was applied) (Figure 1C). Therefore, ramus intermedius was assumed as an infarct-related artery (IRA).

The patient was urgently transferred to the cardiac surgery department. Intraoperative findings demonstrated an almost total detachment of both mitral leaflets (Figure 1D); the patient underwent mechanical mitral valve replacement. Due to persistent, severe circulatory and respiratory failure, the patient was hospitalized in the intensive care unit for nearly 3 months, unfortunately died because of sepsis.

The diagnosis of MINOCA should be sequential, with careful assessment of the clinical context and the exclusion of the non-ischemic myocardial damage. Due to the heterogeneity of MINOCA patients, the diagnostic algorithm should be omni-directional and include intracoronary imaging (intravascular ultrasound imaging optical coherence tomography), cardiac magnetic resonance (CMR) and even intracoronary provocative tests in the investigation of coronary spasm and microvascular disease. However, before using advanced diagnostic tools (often invasive), it is recommended to re-review the angiographic images in order to detect overlooked obstructive coronary artery disease (CAD) [1]. In this case the IRA was a small branch, but it supplied the crucial region of myocardium. Acute ischaemic MR resulting from papillary muscle's head rupture is a life-threatening condition. The major treatment strategy is surgical correction (mitral valve repair or valve replacement), characterized by high operative mortality (15.1% in comparison to 1,5% in chronic MR) [2]. Despite the data on better prognosis of patients with MINOCA compared to patients with myocardial infarct with obstructive coronary artery disease (MI-CAD), clinical presentation of MINOCA can be severe. In-hospital mortality in MINOCA patients amounts to 0.9%–1.1%, and the 12-month mortality to 4.7%, which is even more worrying [3]. Therefore, patients with MINOCA require the same careful diagnostic and therapeutic approach as patients with MI-CAD.

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REFERENCES

1. Tamis-Holland JE, Jneid H, Reynolds HR, et al. Contemporary Diagnosis and Management of Patients With Myocardial Infarction in the Absence of Obstructive Coronary Artery Disease: A Scientific Statement From the American Heart Association. *Circulation*. 2019; 139(18): e891–e908, doi: [10.1161/CIR.0000000000000670](https://doi.org/10.1161/CIR.0000000000000670), indexed in Pubmed: [30913893](https://pubmed.ncbi.nlm.nih.gov/30913893/).
2. Watanabe N. Acute mitral regurgitation. *Heart*. 2019; 105(9): 671–677, doi: [10.1136/heartjnl-2018-313373](https://doi.org/10.1136/heartjnl-2018-313373), indexed in Pubmed: [30824479](https://pubmed.ncbi.nlm.nih.gov/30824479/).
3. Pasupathy S, Air T, Dreyer RP, et al. Systematic review of patients presenting with suspected myocardial infarction and nonobstructive coronary arteries. *Circulation*. 2015; 131(10): 861–870, doi: [10.1161/CIRCULATIONAHA.114.011201](https://doi.org/10.1161/CIRCULATIONAHA.114.011201), indexed in Pubmed: [25587100](https://pubmed.ncbi.nlm.nih.gov/25587100/).

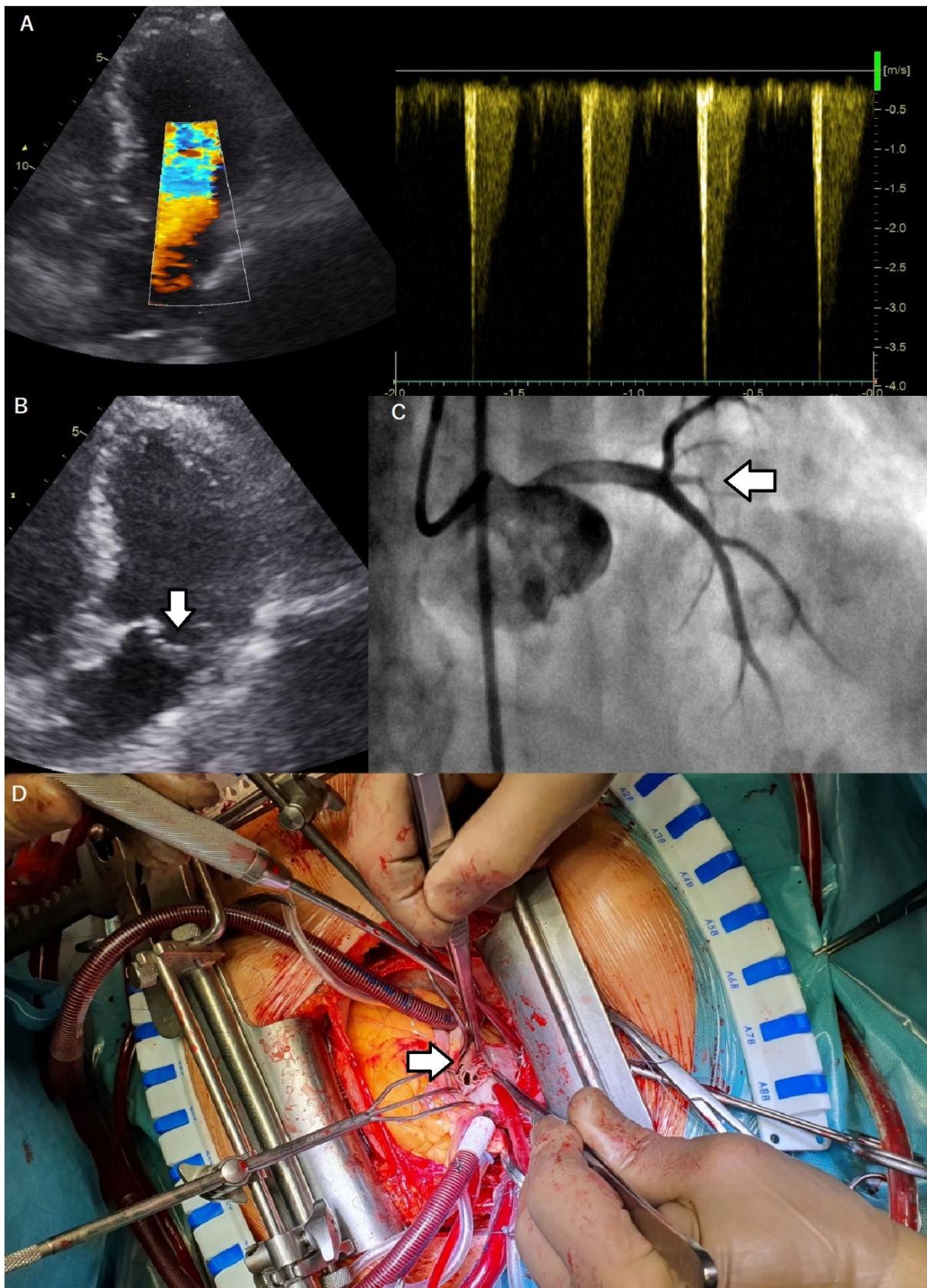


Figure 1. A. 4chamber view transthoracic echocardiography: doppler spectrum of acute severe mitral regurgitation. B. 4chamber view transthoracic echocardiography: no coaptation because of flail anterior leaflet (the arrow). C. Proximal amputation of regressive ramus intermedius

(arrow) — found during revision of coronary angiography. **D.** Intraoperative image of the detached anterior mitral leaflet (the arrow)