

A Rare Pathology Masquerading as Myocardial Infarction

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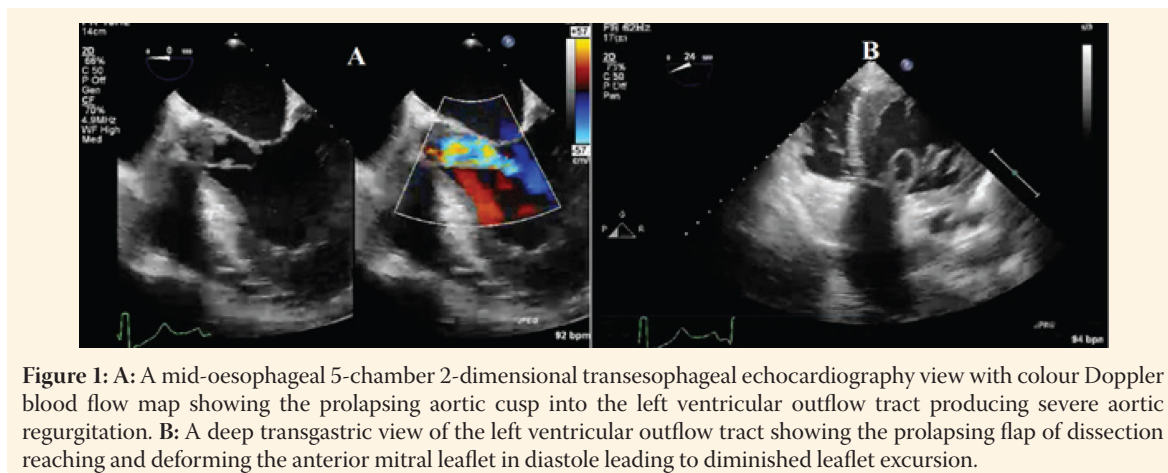


Figure 1: A: A mid-oesophageal 5-chamber 2-dimensional transesophageal echocardiography view with colour Doppler blood flow map showing the prolapsing aortic cusp into the left ventricular outflow tract producing severe aortic regurgitation. B: A deep transgastric view of the left ventricular outflow tract showing the prolapsing flap of dissection reaching and deforming the anterior mitral leaflet in diastole leading to diminished leaflet excursion.

A 36-YEAR-OLD MALE WITH NO REPORTED comorbidities other than chronic alcohol consumption presented to the emergency department at a primary healthcare facility in Muscat, Oman, with acute chest pain. The electrocardiogram demonstrated ST segment elevation in the inferior leads (II, III and aVF) suggesting an inferior wall myocardial infarction. As there was no nearby facility that could provide immediate percutaneous coronary intervention, the primary physician opted for thrombolysis. As the clinical condition deteriorated, the patient was shifted to a secondary healthcare facility where a transthoracic echocardiography and computed tomography angiography demonstrated a bicuspid aortic valve with a dilated ascending aorta (5.1 mm) and an aortic dissection (Type A, DeBakey classification) with severe aortic regurgitation. The patient was transferred to the authors' tertiary care center for further surgical management. Prior to administration of general anaesthesia in preparation for the surgical procedure, the patient was conscious, alert and oriented. He was maintaining arterial oxygen saturation of above 90% on non-invasive ventilation and an inspired oxygen concentration of 60%. Physical examination revealed a blood pressure differential of >20 mmHg between the 2 systolic blood pressure readings of right arm and left arm along with a pulse deficit. There was reduced air entry

at the base of both lungs with crepitations and the chest radiograph demonstrated bilateral pulmonary oedema. Auscultation of the heart revealed an early and mid-diastolic murmur. The patient sustained a severe loss of kidney function with an estimated glomerular filtration rate of 19 mL/min. Intraoperative transoesophageal echocardiography revealed the underlying pathology in real time. The aortic dissection flap was prolapsing into the left ventricular outflow tract [Figure 1A and B; Supplementary videoclips 1 and 2]. The aortic dissection flap was seen excursing away from the right coronary artery origin in systole while in diastole covering the origin which probably may be the reason for the initial presentation of an inferior myocardial infarction [Figure 2A–C]. The dissection flap and the aortic regurgitant jet was impinging onto the anterior mitral leaflet producing and the flap could be visualised under the mitral valve apparatus [Figure 2 C and D; Supplementary videoclips 3 and 4]. The upper oesophageal aortic short axis view could display the true and false lumens of the aortic dissection along with a bicuspid aortic valve [Figure 3A]. The pressure half time measurement by Doppler echocardiography was 157 ms indicating a severe and an acute aortic regurgitation [Figure 3B].

Patient consent was obtained postoperatively and an institutional ethical committee approval (CR#2023/3) was obtained for reporting the images.

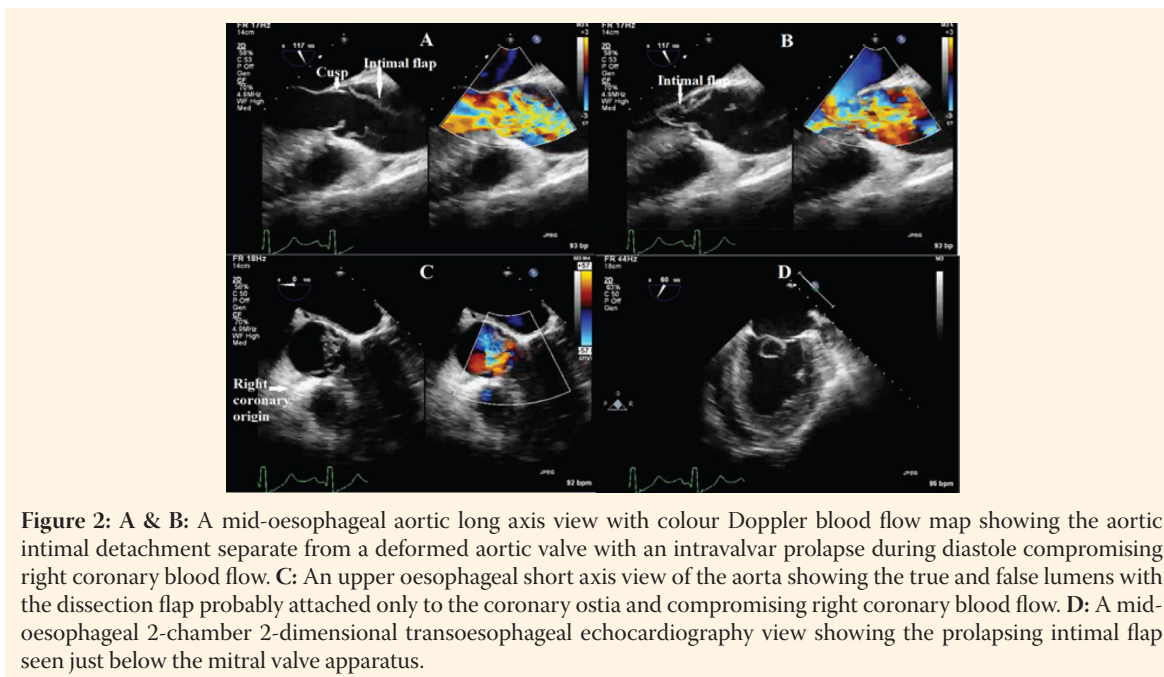


Figure 2: A & B: A mid-oesophageal aortic long axis view with colour Doppler blood flow map showing the aortic intimal detachment separate from a deformed aortic valve with an intravalvar prolapse during diastole compromising right coronary blood flow. C: An upper oesophageal short axis view of the aorta showing the true and false lumens with the dissection flap probably attached only to the coronary ostia and compromising right coronary blood flow. D: A mid-oesophageal 2-chamber 2-dimensional transoesophageal echocardiography view showing the prolapsing intimal flap seen just below the mitral valve apparatus.

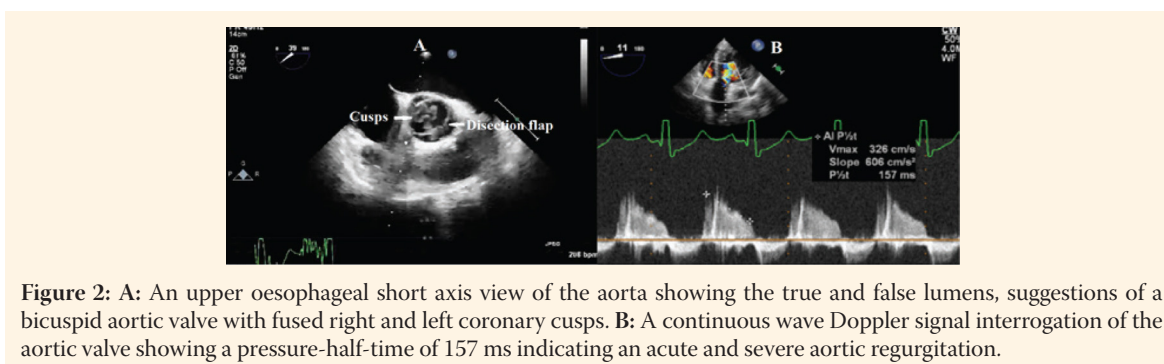


Figure 2: A: An upper oesophageal short axis view of the aorta showing the true and false lumens, suggestions of a bicuspid aortic valve with fused right and left coronary cusps. B: A continuous wave Doppler signal interrogation of the aortic valve showing a pressure-half-time of 157 ms indicating an acute and severe aortic regurgitation.

Comment

Type A aortic dissection manifesting as acute myocardial infarction is relatively rare but could have catastrophic consequences due to delayed recognition.¹ In patients with persistent ST-segment elevation and are candidates for reperfusion therapy (either pharmacological or catheter-based), the recommendation is to restore coronary flow promptly in the occluded infarct related artery. The delay from patient contact with the healthcare system to balloon inflation [door to balloon] should be less than 90 minutes (Class 1, level of evidence: B).² In recent times, this benchmark time limit was modified as an ‘as-soon-as-possible’ standard for saving myocardial muscle.³ In order to curtail delays in reperfusion techniques, often a patient presenting with electrocardiogram changes are managed in accordance with the suggested guidelines with minimal non-invasive investigations being undertaken. In the process, other aetiological factors for myocardial ischaemia such as aortic dissections may be missed. This report is about a

young patient who presented to the hospital with angina and based on the electrocardiogram findings, the initial management was undertaken. As the patient did not respond to the initial management further non-invasive investigations revealed the underlying pathology. This report suggests that a brief bedside non-invasive echocardiography evaluation may be incorporated into the initial evaluation of patients who are candidates for reperfusion therapies.

SUPPLEMENTARY VIDEOCLIPS

Videoclip 1: A mid-oesophageal 5-chamber 2-dimensional transoesophageal echocardiography videoclip with colour Doppler blood flow map showing the prolapsing aortic cusp.

Videoclip 2: A deep transgastric 2-dimensional transoesophageal echocardiography videoclip of the left ventricular outflow tract showing the prolapsing flap of dissection reaching and deforming the anterior mitral leaflet.

Videoclip 3: A mid-oesophageal aortic long axis

2-dimensional transoesophageal echocardiography videoclip with colour Doppler blood flow map showing the aortic intimal detachment separate from a deformed aortic valve with an intravalvar prolapse onto the anterior mitral leaflet during diastole.

Videoclip 4: A mid-oesophageal 2-chamber 2-dimensional transoesophageal echocardiography videoclip showing the prolapsing intimal flap seen just below the mitral valve apparatus.

AUTHORS' CONTRIBUTION

MMM contributed towards conception of the work; acquisition of images and interpretation of images; drafting of manuscript; intellectual content; final agreement of manuscript and agreement to be accountable for all aspects of the report. AC contributed towards interpretation of images; data collection and agreement to be accountable for all aspects of the report. PSK contributed towards interpretation of images; data collection and agreement to be accountable for all aspects of the report. MAM contributed towards interpretation of images; final agreement of the manuscript and agreement to be

accountable for all aspects of the report. All authors approved the final version of the manuscript.

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