Rupture of a thoracic aorta pseudoaneurysm: rare presentation and role of real-time 3D transoesophageal echocardiography

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A 59-year-old man presented with cardiogenic shock caused by acute right ventricular failure due to extrinsic compression of the right coronary artery by a thoracic aorta pseudoaneurysm. Angiography and real-time 3D transoesophageal echocardiography (TEE) were performed and enough diagnostic accuracy was achieved to operate on the patient without further image techniques and consequent delay. Three-dimensional TEE is a new technology that combines high-quality anatomic and colour Doppler information with bedside performance, essential in emergent clinical scenarios.

KEYWORDS
Transoesophageal echocardiography; 3D echocardiography; Aortic pseudoaneurysm; Right ventricle myocardial infarction

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A 59-year-old man, who had a history of mechanical aortic valve replacement 1 year before, was admitted to our hospital with cardiogenic shock. The patient complained of exertion dyspnoea for the last 20 days and denied chest pain, febrile episodes, or infection symptoms. He showed marked jugular ingurgitation and slight head and neck cyanosis. The electrocardiogram showed sinus tachycardia and ST-elevation in the inferior leads, V1 and V2. A transthoracic echocardiogram (TTE) demonstrated no pericardial effusion, normal aortic prosthesis movement and gradients, normal global left ventricular systolic function, and severe right systolic dysfunction. Acute right ventricle myocardial infarction was suspected and he underwent emergent coronary angiography. It revealed a proximal narrowing in the right coronary artery with no signs of atheromatosis, suggesting an extrinsic compression. The aortogram confirmed the compression by an anterior cavity in the proximal ascending aorta, with inward and outward contrast flow (Figure 1).

A real-time 3D transoesophageal echocardiography (RT-3DTEE) was immediately performed, showing an aortic rupture at the proximal ascending aorta, with an anterior orifice of 2 cm coming out into a saccular cavity of 5 cm in diameter (Figures 2 and 3; Supplementary data online, Movies SI and SII). Laminar thrombus partially covered the cavity. Doppler images showed blood flow in and out the cavity (Figure 4 and Supplementary data online, Movie SIII). The aortic diameter was normal, and there were no signs of dissection. Other findings were similar to the TTE (Supplementary data online, Movie SIV).

A contained rupture of a pseudoaneurysm (PA) created after prior valve surgery was suspected, and therefore the patient was taken to the operating room. Under complete circulatory arrest, the PA was opened revealing a 3 x 2 cm defect on the anterior aortic wall at the previous aortic cannulation site (Figure 5). The defect was primary sutured. The patient recovered without any neurological defect and was discharged 2 weeks later. The post-operative echocardiogram showed improvement of the right ventricular systolic function, normal prosthesis function and improvement of periaortic hematoma. The histological study demonstrated PA tissue with polymorphonuclear infiltration and small areas of necrosis. Blood cultures and serologies were negative; however an empiric antibiotic treatment was given to the patient.

Thoracic aortic PAs (TA-PAs) or false aneurisms are a rare complication of aortic surgery. Estimated incidence is lower than 0.5%. TA-PAs are caused by partial disruption of the aortic wall limited by remaining layers and adjacent structures and usually occurs at aortic manipulation sites. Infection is usually demonstrable, although there are reported cases with no evidence of infection. The clinical spectrum of TA-PA is broad and goes from dysphagia, stridor, or symptoms of infection up to chest pain or myocardial...
ischaemia. Our case illustrates the most severe complication, which is the TA-PA rupture, with the complexity of a clinical picture mimicking an acute coronary syndrome. This complication usually leads to sudden death, haemome-diastinum, or cardiac tamponade. Emergent surgery is the treatment of choice. Reported mortality in aortic PA surgery is superior to 20% and is certainly higher in TA-PA rupture.

Diagnosis of TA-PA is usually made upon clinical suspicion with different image modalities (CT, MR, TEE, and angiography), CT being very useful for cardiac surgeons before operating. In our particular case, although the diagnosis
could have been made from conventional multiplane TEE, 3DTEE enhanced the former with high-quality images and new vision angles that previously could only be seen by CT or MR. This approach gave the surgeons a very accurate anatomical information (Figure 5) and avoided further patient transfers and delays, allowing us to send the patient to the operating room without further techniques.

Supplementary data

Supplementary data are available at European Journal of Echocardiography online.

Conflict of interest: none declared.

References