Windsock in the heart

A 47 year old female with a history of untreated hypertension presented via ambulance to the emergency department (ED) with 2 hours of central chest pain. Initial electrocardiography demonstrated inferior ST elevation and pre-hospital activation of the cardiac catheterisation laboratory was initiated. On arrival to ED, she developed an evolving right sided hemiplegia with reducing conscious state and subsequent pulmonary oedema. She was emergently intubated and a BELS scan performed. This demonstrated an abnormal aortic valve with severe aortic regurgitation and independently mobile, parallel echogenicities arising from the aortic annulus and prolapsing into the LVOT during diastole, similar to the appearance of a 'windsock' (**Figure 1a**). No clear dissection plane was noted in the ascending aorta. Sonographer performed TTE confirmed these findings and immediate computed tomography (CT) demonstrated an extensive aortic dissection (AoDx) arising at the aortic annulus extending into the head and neck vessels as well in a retrograde direction to both coronary ostia. She was transferred for urgent operative intervention and intraoperative transoesophageal echocardiography was consistent with BELS assessment (Figure 1b,c). Visual evaluation of the aorta confirmed a transverse AoDx above the annulus with prolapsing intimal tissue across the aortic valve. The aortic valve itself was structurally normal. The dissection was repaired with a 28mm Dacron graft with complete resolution of aortic regurgitation.

AoDx is often misdiagnosed due to its varied clinical presentation. Traditional diagnosis requires CT, however transthoracic echocardiography (TTE) does have a place for the bedside assessment of AoDx. BELS is fast becoming an important tool within emergency medicine that can facilitate rapid diagnosis of life-threatening conditions including AoDx.

The incidence of type A AoDx is approximately 30 cases per million people per annum. Left to run its natural course, AoDx has an initial mortality rate of about 1% per hour with around 50% of patients dead after 3 days, rising to almost 80% mortality after two weeks(1). Differential diagnoses that involve the aortic root that could mimic a 'windsock' is rupture of the sinus of Valsalva(2) or complete destruction of the aortic valve leaflets due to endocarditis resulting in multiple leaflet prolapse.

Little information exists in the literature about the use of BELS in AoDx. This may reflect clinician inexperience due to varied presentation and diagnostic assessment of AoDx, as well as the infrequency of this disease process. Comprehensive TTE has a sensitivity approaching 90% for aortic dissection(3) and in a high volume BELS centre with comprehensive education and accreditation, clinicians may become more familiar with the approach to diagnosis of

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this significant condition. Formal studies are warranted to obtain the diagnostic accuracy of BELS and establish its use as an acceptable and rapid diagnostic aid as a suitable alternative to comprehensive TTE, especially in patients with undifferentiated chest pain. Možina et al highlighted that BELS does not impact on the time to discharge from the ED and is used more often in patients with atypical presentations who were hemodynamically unstable(4).

As BELS becomes more frequently utilised in ED, clinicians need to become familiar with its utility and various pathology image presentations. Type A AoDX should be one of those pathologies due to its high mortality and varied symptomatology. Secondary indicators of type A dissection such as pericardial effusion or significantly dilated aortic root could aid in risk stratification of patients presenting with clinical signs of dissection. The presence of indicators could guide additional investigative procedures e.g. CT. Comprehensive TTE and BELS should not be used as a definitive rule out of dissection but rather as a confirmatory tool to expedite definitive treatment. Our case highlights the invaluable use of BELS facilitating rapid and appropriate management without delaying definitive treatment.

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Figure 1a Single frame BELS parasternal long axis, showing the windsock shaped tissue prolapsing from the ascending aorta into the left ventricular outflow tract in diastole. Fig 1b Single frame TOE transverse above the aortic valve, highlighting the round dissection plane. Figure 1c Single frame TOE long axis 3 chamber view, highlighting the dissection flap about to prolapse through the aortic valve into the left ventricular outflow tract

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