DRAMATIC REVERSAL OF ISCHAEMIA INDUCED BY CORONARY OBSTRUCTION DUE TO TAVI SKIRT BY STENTING INTO AN ANGIOGRAPHICALLY NORMAL CORONARY ARTERY: WHEN YOU HAVE TO TRUST THE TOE RATHER THAN THE ANGIOGRAM

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HISTORY AND PHYSICAL

A 72 year-old female was referred to clinic with exertional dyspnoea and bilateral pedal oedema. There was no chest pain or syncope. Physical examination demonstrated severe aortic stenosis and bilateral pitting oedema. Electrocardiography revealed sinus rhythm at 70 bpm.

IMAGING

Transthoracic echocardiography demonstrated a calcific, trileaflet aortic valve with severe stenosis (AVA 0.7 cm2 by continuity, gradients 80/43mmHg) without regurgitation. Normal left ventricular cavity size, mild concentric hypertrophy, preserved systolic function, and grade I diastolic dysfunction. Normal right ventricular size and systolic function. Normal mitral and tricuspid valve function. Mild left atrial dilatation.

CT aorta: Sinus of Valsalva (SoV): perimeter 547mm; area 457mm^2, area-derived diameter 25mm. Aortic annulus 23x19, perimeter 67mm, area 342mm^2. Aortic valve moderately calcified. Coronary ostia to annular plane distances: RCA borderline 10mm, left main stem 13-14mm. Left subclavian artery borderline at ~ 6mm in mid-segment.

INDICATION FOR INTERVENTION

Severe, symptomatic aortic stenosis declined for surgical valve replacement due to obesity and high risk.

INTERVENTION

Under general anaesthesia transoesophageal echocardiography (TOE) demonstrated normal biventricular size and systolic function, and severe, calcific stenosis of a trileaflet aortic valve (gradients 72/45mmHg, calculated AVA 0.5cm^2). The TOE and CT annular dimensions and perimeter were compatible with the 26mm Evolut R valve. Although the SoV diameter and height (14mm) were borderline for this valve size, there were no other suitable TAVI valves (low RCA ostium precluding other prostheses with coronary height requirements). The heart team therefore decided to proceed with TAVI via the subclavian route (poor femoral access) and a 26mm Medtronic Evolut R valve implanted. Fluoroscopy demonstrated moderate paravalvular regurgitation and under-expansion of the valve with the LVOT end of the valve measuring just 11mm. The valve was therefore balloon-expanded with a good imaging result on fluoroscopy and TOE, trace regurgitation, and an increased diameter of the valve at the LVOT end to 17mm. Post-implant aortic valve gradients were significantly reduced (peak 23, mean 10mmHg). Biventricular wall motion and electrocardiography were normal. While in recovery still under general anaesthesia, inferior ST-elevation and severe hypotension developed (systolic 50mmHg). Emergency coronary angiography demonstrated a normal angiogram with a prosthetic cusp overlapping the ostium (figure). Emergency TOE demonstrated severe right heart dilatation, RV akinesia, LV inferior wall akinesis and LV inferobasal dyskinesis (video). TAVI valve position and function were normal. Intermittent ostial occlusion by the valve skirt was considered

the likely mechanism of the acute RCA-territory ischaemia with normal coronary angiography. Emergency PCI to the RCA ostium through the valve struts was undertaken with the final stent position crossing the valve stent frame into the SoV, and the coronary stent tip deployed against the valve skirt. This achieved rapid normalisation of haemodynamics and ventricular wall motion.

LEARNING POINTS OF THE PROCEDURE

- Not all patients have anatomy that perfectly fits into one prosthetic valve category.
- TOE offers rapid assessment of wall motion and diagnosis of acute ischaemia.
- TOE has an important role particularly in complex or borderline sizing in TAVI implantation: initial assessment, positioning, and diagnosing possible complications such as ischaemia.