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Poster presentation

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Imaging aortic root and aortic valve stenosis in percutaneous aortic valve implantation candidates

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Introduction

Percutaneous aortic valve implantation (PAVI) is an evolving interventional treatment modality. Aortic geometry, including aortic annulus size, is crucial for technical selection of PAVI (aortic root - prosthesis match). The role of non-invasive imaging techniques needs further validation.

Purpose

We aimed to compare aortic valve area (AVA) and aortic root dimensions using catheterization and non-invasive imaging techniques.

Methods

In 38 consecutive high risk elderly (82 ± 6 years) symptomatic patients with severe aortic stenosis scheduled for potential PAVI, AVA was determined by direct planimetry (steady state free precession CMR and 3D echocardiography) and calculated by the Gorlin equation (cardiac catheterization) and continuity equation (Doppler).

Diameter of left ventricular outflow tract (LVOT), aortic annulus, sinus and sinotubular junction were measured using steady state free precession CMR, 2D echocardiography and invasive aortography. In addition, aortic annulus was measured using transoesophageal echocardiography.

Results

Mean differences and 95% CI in AVA were 0.03 cm2 (0, 0.06) (p = NS) for catheterization versus Doppler echocardiography, 0.03 cm2 (-0.02, 0.08) (p = NS) for catheterization versus 3D echocardiography and 0.01 cm2 (-0.02, 0.05) (p = NS) for catheterization versus CMR.

LVOT and aortic root dimensions are displayed in Table 1. In 5 individual patients, aortic annulus size fell beyond PAVI range/size (< 2.0 and > 2.7 cm) when using transoesophageal echocardiography (TEE), as compared to 2D echocardiography, although as a group no difference was found between these both techniques.

Conclusion

1. CMR planimetry, Doppler and 3D echocardiography provide an accurate estimate of AVA in comparison with catheterization.

2. Catheterization underestimates aortic annulus dimensions, while CMR overestimates aortic root dimensions in comparison with 2D echocardiography.

3. Transoesophageal echocardiography is crucial to assess aortic annulus requirements.

Table 1:

LVOT and aortic root dimensions († P < 0.05)			
	mean difference and 95% CI (cm) 2D echocardiography versus		
	TEE	**invasive**	**CMR**
annulus	-0.02 (-0.1, 0.1)	0.42 (0.31, 0.52)†	-0.03 (-0.13, 0)†
sinus		0.06 (-0.06, 0.17)	-0.11 (-0.21, 0) †
sinotubular junction		0.01 (-0.08, 0.11)	-0.16 (-0.25, -0.08)†
LVOT			-0.04 (-0.09, -0.01)