

sexes in age (47±17 vs 49±17; *p*: ns), in the presence of raphe (83.3% vs 70.4%; *p*=0.084) and morphotypes (type I: 74.2% vs 60.1%; *p*: ns; type II: 23.0% vs 24.8%; *p*: ns; type III: 2.8% vs 3%; *p*: ns). Sigmoid prolapse: 13.4% vs 11.8%; *p*: ns; and valve calcification 26.3% vs 20.8%; *p*: ns. However, moderate-severe dysfunctional valve was more frequently found in males than in females (49.7% vs 34.6%; *p*<0.001) mainly due to the higher prevalence of aortic regurgitation (AR) in males (28.3% vs 12.6%; *p*<0.001). No differences were found in the presence of significant aortic stenosis (AS) 21.4% vs 22.0%; *p*: ns. In addition, no differences were found in the prevalence of aorta dilation (79.8% vs 76.3%; *p*: ns). However, aortic root dilation morphotype was more prevalent in males than in females (18.0% vs 5.9%; *p*<0.001) and ascending aorta dilation morphotype was more prevalent in females (61.7% vs 70.0%; *p*<0.001).

Table 1

n: 1020	Men 716 (70.2%)	Women 304 (29.8%)	p-value
Normofunctional	360 (50.3)	199 (65.4)	0.001
AS-dominant	153 (21.4)	56 (22.0)	0.79
AR-dominant	169 (28.3)	32 (12.6)	0.001
Aortic root morphotype	128 (18.0)	18 (5.9)	0.001
Ascending aorta morphotype	443 (61.7)	213 (70.0)	0.001

Conclusions: BAV is not only more prevalent in men but there are sex differences in valvular dysfunction and aorta dilation morphology. Aortic regurgitation and aortic root dilation morphotype is more frequent in men, however normofunctional valve and ascending aorta dilation morphotype are more frequent in women.

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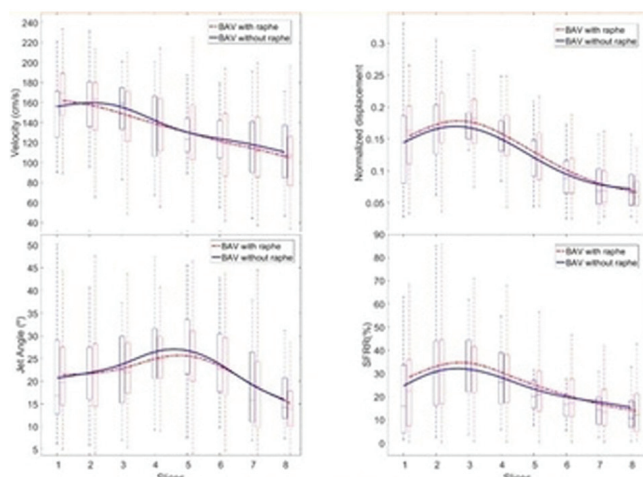
Are there flow dynamics implications of raphe in bicuspid aortic valve patients?

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Introduction: Recent investigations have reported that raphe, which is a common finding in bicuspid aortic valve (BAV), is related to higher prevalence of aortic valve diseases and to higher rate of aortic surgery. Nonetheless, whether the presence of raphe is related to abnormal hemodynamics beyond those associated with bicuspid aortic valve it is not being investigated so far.

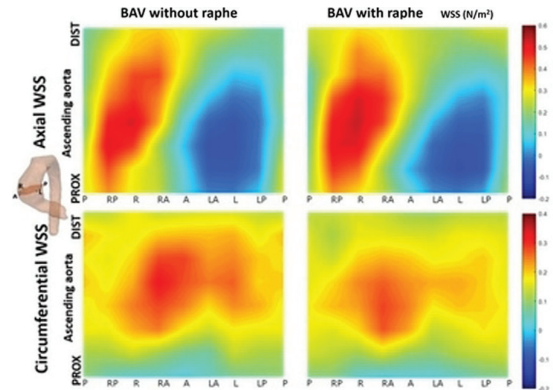
Purpose: The aim of the present study is to exploit 4D flow MRI to investigate the fluid dynamics impact of the presence of raphe which may eventually suggest the need of advanced imaging modalities in this BAV patients group.

Methods: One hundred and seventeen BAV patients (74.4% RL-BAV) with no severe valvular disease underwent 2D cine MRI and 4D-flow (PC-VIPR sequence) in a GE 1.5T scanner. Aortic valve condition (fusion phenotype, raphe and calcification) was determined by echo. Demographics and cardiovascular risk factors (hypertension, diabetes, dyslipidemia) were collected from clinical records. Aortic diameters by 2D cine MRI were used to obtain z-score for both sinuses (zsinus) and AAO (zAAo). AAO morphotype was classified in non-dilated (zsinus <2 and zAAo <2), root (zsinus >2 and zsinus >zAAo) or ascending (zAAo >2 and zAAo >zsinus). The thoracic aorta was semi-automatically segmented from a blood velocity-enhanced angiogram (PC-MRA) derived from the 4D-flow data. AAO flow field was investigated at eight equidistant planes, which were orthogonal to the centreline. Through in-house Matlab code peak velocity, jet angle and normalized displacement were extracted at each plane. Moreover, axial and circumferential wall shear stress (WSS) maps were computed and systolic flow reversal ratio (SFRR), i.e. the ratio of backward to forward flow during systole, was quantified.



1a: flow variables distribution (mean value and boxplots) along the ascending aorta
Figure 1

Results: The majority of BAV patients (69.2%) presented raphe, which was more prevalent in RL the RN phenotype (73.6 vs 56.7%, respectively). BAV patients with and without raphe did not differ in term of demographic and clinical variable, aortic valve regurgitation (*p*=0.39) and stenosis (*p*=0.26) and AAO dilation morphotype (*p*=0.81). No differences were found comparing BAV with and without raphe in any of the flow parameter (peak velocity, jet angle, normalized displacement and SFRR) at any investigated plane (figure 1a). Similarly, no differences in neither absolute value nor distribution of axial and circumferential WSS were detected (figure 1b).



1b: mean regional axial and circumferential WSS
Figure 1 (continued)

Conclusions: In the absence of severe valvular disease, the presence of raphe is not related to changes in blood dynamics in the ascending aorta. Thus, the clinical impact of raphe is limited by its influence on aortic valve pathology, indicating that conventional follow-up with transthoracic echocardiography seems sufficient for these patients.

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Reshaping bicuspid aortic valve stenosis with an hourglass-shaped balloon for transcatheter aortic valve replacement: a pilot study

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Background: Transcatheter aortic valve implantation (TAVI) has been increasingly performed in patients with a bicuspid aortic valve (BAV), however, technical challenges remain and procedural results are to be improved owing the unfavorable valvular anatomies which are lacking of sufficient preparation.

Purpose: The aim of this feasibility study was to evaluate outcomes following BAV reshaping with a novel hourglass-shaped valvuloplasty balloon followed by transcatheter implantation of a new self-expanding bioprosthesis. Both clinical and procedural end points were recorded for purposes of comparison to BAV patients predilated with a cylindrical balloon.

Methods: Eligible patients with BAV stenosis were sequentially enrolled from June to November 2017 in those undergoing aortic valve predilation with the hourglass-shaped balloon followed by TAVI using a self-expandable valve. Procedural details and outcomes were compared to a sequential group of BAV patients obtained from our institution's prospective TAVI database who satisfied the same eligibility criteria but underwent aortic valve predilation with a standard cylindrical balloon. A uniform procedural methodology was established for use of the hourglass-shaped balloon to carry out TAVI predilation. Clinical and procedural outcomes were tracked out to 30 days for purposes of comparison.

Results: Fifteen sequential BAV patients were included in the study (hourglass-shaped balloon) group, and 53 patients were included in the control (cylindrical balloon predilation) group. Hourglass-shaped balloons had significantly larger effective dilatation diameters along the short distal inflated bulb (23.4±1.7 mm vs. 20.4±1.9 mm; *p*=0.001). Valve downsizing was significantly less common in the study group (40.0% vs. 69.8%; *p*=0.035) resulting from more effective reshaping. Stable valve release and optimal implant depth were consistently achieved in the study group, resulting in the substantial trend toward significantly higher device success rates (100.0% vs. 77.4%; *p*=0.055). The composite of post-procedural aortic regurgitation ≥ mild or requirement for valve-in-valve was significantly less common in the study group (13.3% vs. 54.7%; *p*=0.004). All-cause mortality was similar (0 vs. 3.8%; *p*=1), and there were no major/disabling strokes or conversion to open-heart surgery in either group within 30 days.

Conclusions: Compared with cylindrical balloon predilation, preparatory reshaping with the hourglass-shaped balloon prior to self-expandable TAVI in BAV patients appears to be associated with significantly better procedural results in the absence of significant complications.