Features and outcomes of acute aortic dissection in BAV patients

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Differences in demography

Table 1. Patient Population			
Characteristics	Bicuspid Aortic Valve $(n = 72)$	Tricuspid Aortic Valve $(n = 1068)$	P Value
Age, y	54 [46, 67]	63 [53, 73]	<.001
Male	52 (72)	696 (65)	.250
Hyperlipidemia	20 (28)	401 (38)	.101
Hypertension	51 (71)	955 (89)	<.001
Diabetes mellitus	5 (7)	126 (12)	.255
History of stroke	7 (10)	100 (9)	1.000
Chronic renal failure	6 (8)	171 (16)	.092
Chronic obstructive pulmonary disease	4 (6)	120 (12)	.170

Values are median [first quartile, third quartile] or n (%).

Variable	All	TAV	BAV	P-value
Clinical characteristics N (%)				
Number of patients	379 (100)	347 (91.6)	32 (8.4)	<0.001
Age (years, mean ± SD, CI)	60.3 ± 13 (58.9-61.7)	61.6 ± 12 (60.2-62.9)	46.7 ± 13 (42.2-51.2)	< 0.001
Male gender	244 (64.4)	221 (63.7)	23 (71.9)	0.442
Risk factors				
History of hypertension	265 (69.9)	250 (72.0)	15 (46.9)	0.005
Diabetes type 2	32 (8.4)	32 (9.2)	0 (0)	0.093
Smoker	42 (11.1)	37 (10.7)	5 (15.6)	0.378
Hyperlipoproteinaemia	116 (30.6)	107 (30.8)	9 (28.1)	0.843
Coronary artery disease	46 (12.1)	44 (12.7)	2 (6.3)	0.401
Chronic haemodialysis	7 (1.8)	7 (2.0)	0 (0)	1.000
COPD	30 (7.9)	28 (8.1)	2 (6.3)	1.000
Aortic coarctation	3 (0.7)	0 (0)	3 (9.0)	< 0.001
Pregnancy	4 (1.1)	3 (0.9)	1 (3.0) ^a	0.120
Previous aortic procedures ^b	29 (7.7)	27 (7.8)	2 (6)	0.755
Preoperative CPR	25 (6.6)	21 (6.1)	4 (12.5)	0.149

Kreibich et al. 2020

Etz et al. 2015

▶ Huckaby et al. 2022: Higher prevalence of BAV in male (4.4%) vs. Female (2%) patients (p=0.003).

Differences in clinical presentation

Table 2. Clinical and Aortic Characteris	itics		
Characteristics	Bicuspid Aortic Valve	Tricuspid Aortic Valve	P Value
Clinical characteristics			
Tamponade	16 (22)	229 (21)	.881
Aortic regurgitation ^a	24 (33)	299 (28)	.270
Shock	15 (21)	282 (26)	.333
Any organ malperfusion	18 (25)	359 (34)	.191
Dissection extension			
Supraaortic vessel dissection	29 (40)	399 (37)	.899
Descending aorta	38 (53)	649 (61)	.109
Abdominal aorta	30 (42)	560 (52)	.029
Aortic characteristics			
Aortic diameters, mm			
Postdissection	56 [52, 64]	50 [45, 56]	<.001
Calculated predissection	42 [39, 48]	38 [34, 43]	<.001
*Moderate to severe.			

Values are n (%) or median [first quartile, third quartile].

Kreibich et al. 2020

- ✤ Gilon et al.2009 no difference rate of tamponade in BAV
- ✤ Bossone et al. 2016: No difference in rate of shock between BAV and TAV
- ◆ Di Eusanio et al. 2013: BAV no RF for mesenteric malperfusion
- ◆ Angleitner et al. 2021 BAV NO RF for cerebrovascular accident
- ◆ Pape et al. 2007 Higher rate of BAV in Ascending > 5.5cm (6.5%) than <5.5cm (2.6%, p=0.06)

Differences in clinical presentation

Variable	All	TAV	BAV	P-value
Malperfusion				
Preoperative CVA (cerebral)	54 (14.2)	52 (15.0)	2 (6.3)	0.287
Myocardial ischaemia (coronary)	30 (7.9)	29 (8.4)	1 (3.1)	0.494
Visceral ischaemia (including renal)	18 (4.7)	16 (4.6)	2 (6.3)	0.653
Extremity ischaemia (peripheral)	36 (9.5)	33 (9.5)	3 (9.4)	0.755
Aortic pathology				
Aortic regurgitation (≥II°)	262 (69.1)	233 (67.1)	29 (90.6)	0.005
+Aortic stenosis (≥II°)	108 (28.5)	95 (27.4)	13 (40.6)	0.150
Isolated aortic stenosis (≥II°)	35 (9.2)	33 (9.5)	2 (6.3)	0.754
Aorta ascendens diameter ^c (mm, mean ± SD, CI)	54.3 ± 12 (51.1-57.5)	53.2 ± 13 (49.1-57.3)	61.5 ± 9 (56.9-66.2)	0.582
Dissection characteristics				
Primary dissection entry verified	361 (95.3)	329 (94.8)	32 (100)	0.626
Root	32 (8.4)	22 (6.3)	10 (31.3)	< 0.001
Ascending aorta	241 (63.3)	221 (63.4)	20 (62.5)	1.000
Aortic arch	76 (20.1)	74 (21.3)	2 (6.3)	0.039
Descending aorta/not identified	30 (7.9)	30 (8.6)	0 (0)	0.094
DeBakey classification				
Type I	299 (78.9)	275 (79.3)	24 (75.0)	0.650
Type II	47 (12.4)	39 (11.2)	8 (25.0)	0.043
Type III b retrograde	30 (7.9)	30 (8.6)	0 (0)	0.093
Not classified	3 (0.8)	3 (0.9)	0 (0)	1.000
Distal extension of dissection				
Ascending aorta	47 (12.4)	39 (11.2)	8 (25.0)	0.043
Aortic arch	124 (32.7)	109 (31.4)	15 (46.9)	0.080
Thoracic descending	25 (6.6)	23 (6.6)	2 (6.3)	1.000
Abdominal aorta	180 (47.5)	173 (49.9)	7 (21.8)	0.003
Unknown	3 (0.8)	3 (0.9)	0 (0)	1.000

Etz et al. 2015

Difference in surgical treatment and initial outcome

Characteristics	Bicuspid Aortic Valve $(n = 72)$	Tricuspid Aortic Valve $(n = 1068)$	P Value
Cardiopulmonary bypass time, min	223 [190, 283]	205 [171, 251]	.008
Aortic cross-clamp time, min	169 [128, 211]	130 [99, 166]	<.001
Hypothermic circulatory arrest time, min	36 [25, 46]	34 [26, 45]	.957
Proximal repair			
Valve resuspension	17(24)	835 (78)	<.001
Valved conduit	50 (69)	173 (16)	<.001
Valve-sparing aortic root replacement	0 (0)	27 (3)	.253
Wheat procedure	5 (7)	32 (3)	.078
Distal repair			
Isolated ascending	10 (14)	149 (14)	1.000
Hemiarch	55 (76)	798 (75)	.782
Total arch	7 (10)	121 (11)	.710
Overall stroke	6(8)	133(12)	.357
Dissection related	2 (3)	55 (5)	.575
Surgery related	4 (6)	78 (7)	.813
Renal replacement therapy	6 (8)	122 (11)	.560
Tracheostomy	6 (8)	94 (9)	1.000
Intensive care unit stay, days	4 [2, 7]	4 [2, 7]	.859
In-hospital stay, days	12 [7, 17]	12 [8, 19]	.467
In-hospital mortality	6 (8)	142 (13)	.278

Kreibich et al. 2020

Values are median [first quartile, third quartile] or n (%).

Etz et al. 2015: No difference in CPB time and crossclamp time BAV vs. TAV.
But also higher rate of composite root replacement in BAV

Difference in long term survival



Etz et al. 2015

Kreibich et al. 2020: No difference in long term survival in BAV patients vs. TAV
Mehta et al. 2002 BAV NO RF for Hospital mortality

Difference in longterm survival compared with nonsyndromic thoracic aortic aneurysm



NS-TAA (red) + Marfan (blue)

BAV

Nonsyndromic thoracic aortic aneurysm (NS TAA):

Aortic dilatation or dissection at <60a, cystic media degeneration or positive family history absence of connective tissue syndromes (Ehlers- Danlos, Turner, Loeys-Dietz, aneurysms-osteoarthritis)

Sherrah et al. JACC 2016

BAV is NOT a risk factor of recurrent aortic dissection

Table 1. History and Demographics of Patients With Initial and Recurrent Aortic Dissection						
	Total (n=3828)	Initial Aortic Dissection (n=3624)	Recurrent Aortic Dissection (n=204)	<i>P</i> Value		
Demographics	Demographics					
Age (mean±SD), y	62.1±14.5	62.3±14.4	58.6±15.7	<0.001		
Age ≥70 y, n (%)	1242 (32.4)	1190 (32.8)	52 (25.5)	0.029		
Male sex, n (%)	2551 (66.6)	2410 (66.5)	141 (69.1)	0.441		
White race, n (%)	3127 (86.1)	2978 (86.6)	149 (77.2)	<0.001		
Patient history, n (%)						
History of hypertension	2886 (75.8)	2724 (75.5)	162 (79.8)	0.168		
Known of aortic aneurysm	551 (14.5)	443 (12.3)	108 (54.3)	<0.001		
Diabetes mellitus	268 (7.1)	249 (6.9)	19 (9.6)	0.150		
Bicuspid aortic valve	108 (3.2)	102 (3.2)	6 (3.6)	0.770		
Marfan syndrome	153 (4.0)	111 (3.1)	42 (21.5)	<0.001		
Atherosclerosis	907 (24.1)	844 (23.6)	63 (32.0)	0.008		
Prior cardiac surgery (any)	537 (14.6)	390 (11.2)	147 (72.8)	<0.001		
History of aortic valve replacement	172 (4.6)	123 (3.5)	49 (24.5)	<0.001		
History of mitral valve replacement	26 (0.7)	23 (0.7)	3 (1.5)	0.164		
History of coronary artery bypass graft	152 (4.1)	135 (3.9)	17 (8.5)	0.001		
History of aneurysm/acute aortic dissection surgery	330 (8.9)	187 (5.3)	143 (71.1)	<0.001		

5% of patients (IRAD) have a history of prior aortic dissection

Conclusions:

- There are several differences in the presentation of BAV vs TAV in a ortic dissection
- BAV patients:
- ✓ are younger and have less history of hypertension
- May dissect at larger diameters
- ✓ have less distal extension of aortic dissection esp. into abdominal aorta, higher rate of deBakey Type II dissections
- ✓ Have higher rate of entry tear within aortic root
- ✓ Require more often aortic root replacement and aortic valve replacement
- ✓ Have comparable early and long term survival vs TAV
- ✓ Have better longterm survival vs. Marfan and Nonsyndromic thoracic aortic aneurysm
- ✓ Have no increased risk of recurrent aortic dissection