Oversizing Transcatheter Aortic Valves: Are We Getting it Right?

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UPMC HEART AND VASCULAR

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Disclosure of Relevant Financial Relationships

I, Abbad Sultan, DO NOT have any financial relationships to disclose.

Background

- Transcatheter Heart Valves (THV) are sized based on annular perimeter and/or area along with considerations for sinus segment diameters and coronary heights
- Under sizing may lead to potential paravalvular leak, while oversizing may lead to a pinwheeling effect

Study Objective

Does the degree of oversizing in Transcatheter Aortic Valve Replacements influence clinical or valve related outcomes?

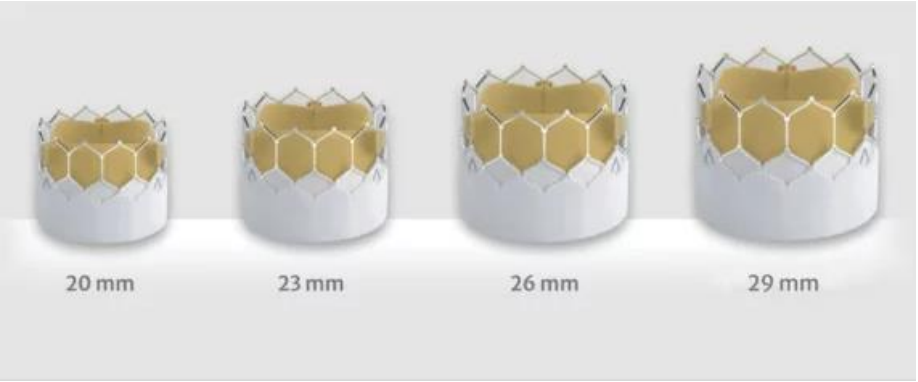


Image source: Cardiovascular Business (2025)

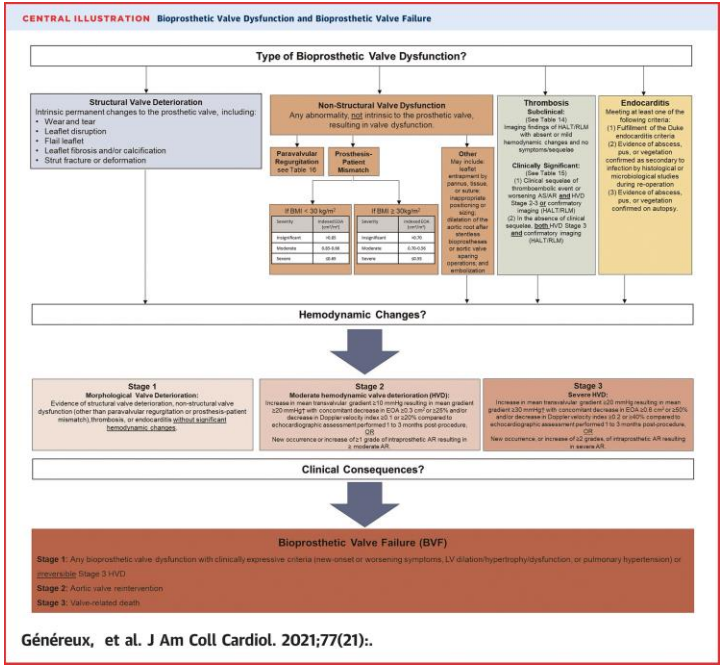
Methods

Primary Outcome:

- All-cause mortality

Secondary Outcomes:

- Procedural and valve-related outcomes
  - Defined according to Valve Academic Research Consortium-3 (VARC-3) criteria



Généreux, et al. J Am Coll Cardiol. 2021;77(21):.

Methods

- Defining “oversizing”
  - Calculating oversizing percentage using annular diameter
    - Diameter calculated using area/perimeter

$$\text{Oversizing (\%)} = \frac{\text{Bioprosthetic annular diameter}}{\text{Native annular diameter}} \times 100$$

- Three patient populations:
  - No oversizing (0-10%)
  - Moderate oversizing (10-20%)
  - Severe oversizing (>20%)

Results: Baseline Characteristics

- **1808 Patients**
  - No oversizing group: 180 (10%)
  - Moderate oversizing group: 433 (24%)
  - Severe oversizing group: 1,195 (66%)

Variable	No Oversizing	Moderate Oversizing	Severe Oversizing	P-value
Age	81.0 (75.0-85.0)	79.0 (73.0-84.0)	80.0(74.0-85.0)	0.04
Female	**55 (30.6%)**	**141 (32.6%)**	**597 (50.0%)**	**<.01**
Body Surface Area	**2.0 (1.8- 2.2)**	**2.0 (1.8- 2.2)**	**1.9 (1.8- 2.1)**	**<.01**
Mean Pressure Gradient	42.5 (36.0-52.0)	42.0 (37.0-51.0)	42.0 (36.0-48.0)	0.58
Aortic Valve Annular Area	**517 (439- 610)**	**507 (431-561)**	**435 (376- 489)**	**<.01**
Diabetes	73 (40.6%)	180 (41.6%)	439 (36.7%)	0.17
Dialysis	3 (1.7%)	10 (2.3%)	40 (3.3%)	0.31
Urgent/Emergent	8 (4.4%)	17 (3.9%)	25 (2.1%)	0.05
Femoral Access	**168 (93.3%)**	**403 (93.1%)**	**1160 (97.1%)**	**<.01**
STS Risk Score	3.3 (2.0- 5.3)	2.9 (1.8- 5.1)	3.0 (1.9- 4.7)	0.32

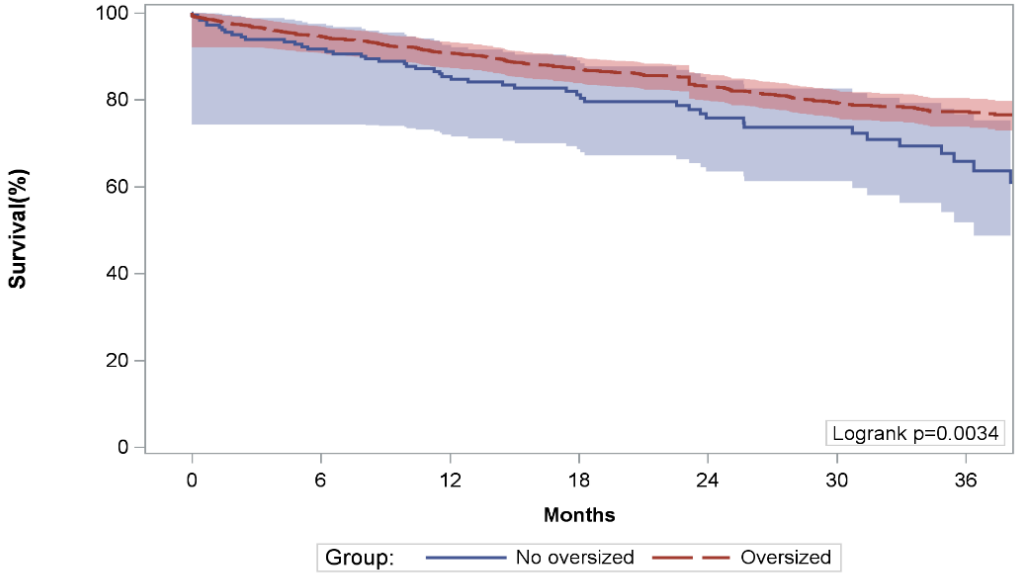
Results: Procedural Outcomes

Variable	No Oversizing	Moderate Oversizing	Severe Oversizing	P-value
30 day Mortality	6 (3.3%)	9 (2.1%)	33 (2.8%)	0.63
Stroke	2 (1.1%)	5 (1.2%)	16 (1.3%)	0.94
Length of Stay	1.0 (1.0- 1.0)	1.0 (1.0- 1.0)	1.0 (1.0- 1.0)	N/A
Major Bleeding Events	0 (0.0%)	0 (0.0%)	0 (0.0%)	N/A
Permanent Pacemaker	6 (3.3%)	14 (3.2%)	40 (3.3%)	0.99
Aortic Valve Mean Gradient	**14.0 (11.0-18.0)**	**13.0 (9.0-17.0)**	**10.0 (7.0-14.0)**	**<.01**
Device Embolization	0 (0.0%)	2 (0.5%)	2 (0.2%)	0.43
Coronary Artery Obstruction	0 (0.0%)	0 (0.0%)	2 (0.2%)	0.59
Annular Rupture	0 (0.0%)	0 (0.0%)	0 (0.0%)	N/A

Results: PVL

Paravalvular Leak (PVL)	No Oversizing	Moderate Oversizing	Severe Oversizing	P-Value
30 Day				
Mild PVL	**45 (25.0%)**	**80 (18.5%)**	**338 (28.3%)**	**<0.01**
Moderate or Severe PVL	2 (1.1%)	1 (0.2%)	16 (1.4%)	<0.01
1 Year				
Mild PVL	17 (9.4%)	24 (5.5%)	70 (5.9%)	0.162
Moderate or Severe PVL	2(1.1%)	0 (0.0%)	5 (0.4%)	0.162

Results: Survival



No oversized	180	165	140	102	78	57	32
Oversized	1628	1541	1371	1060	778	552	350

Results: Cox PH Model For Mortality

Parameter	HR (95% CI)	P- Value
Moderate Oversizing	***0.63 (0.43–0.89)***	***0.02***
Severe Oversizing	***0.82 (0.52–1.25)***	0.35
Balloon Expandable Valve	*1.18 (0.84–1.66)*	0.33
Femoral Access	*0.69 (0.44–1.12)*	0.14
Five-Minute walk Test: Unable to Walk	***1.91 (1.36–2.66)***	***<.01***
Urgent/Emergent Procedure	*1.60 (0.98–2.59)*	0.06
Atrial Fibrillation	***1.48 (1.19–1.85)***	***<.01***
COPD	***1.68 (1.35–2.10)***	***<.01***
Diabetes	***1.31 (1.04–1.64)***	***0.02***
Dialysis	***3.97 (2.66–5.94)***	***<.01***
Hypertension	***2.51 (1.40–4.49)***	***<.01***
Left Ventricle Ejection Fraction	*0.99 (0.98–1.01)*	0.17
BMI	***0.98 (0.96–0.99)***	***0.02***
Age	***1.04 (1.03–1.06)***	***<.01***

Limitations

- Valve selection patterns
  - Self-expandable valves accounted for 86% of the implants in the severe oversizing group

Conclusion

- **Oversizing of 10 to 20% during TAVR was associated with reduced all-cause mortality** compared to other cohorts without an increase in complication rate.