Conflict of Interest: None

7th Iranian Joint Cardiovascular Congress

Bicuspid Aortic Valve

Any Room for TAVI?

Alireza A. Ghavidel
Professor of Cardiovascular Suregry

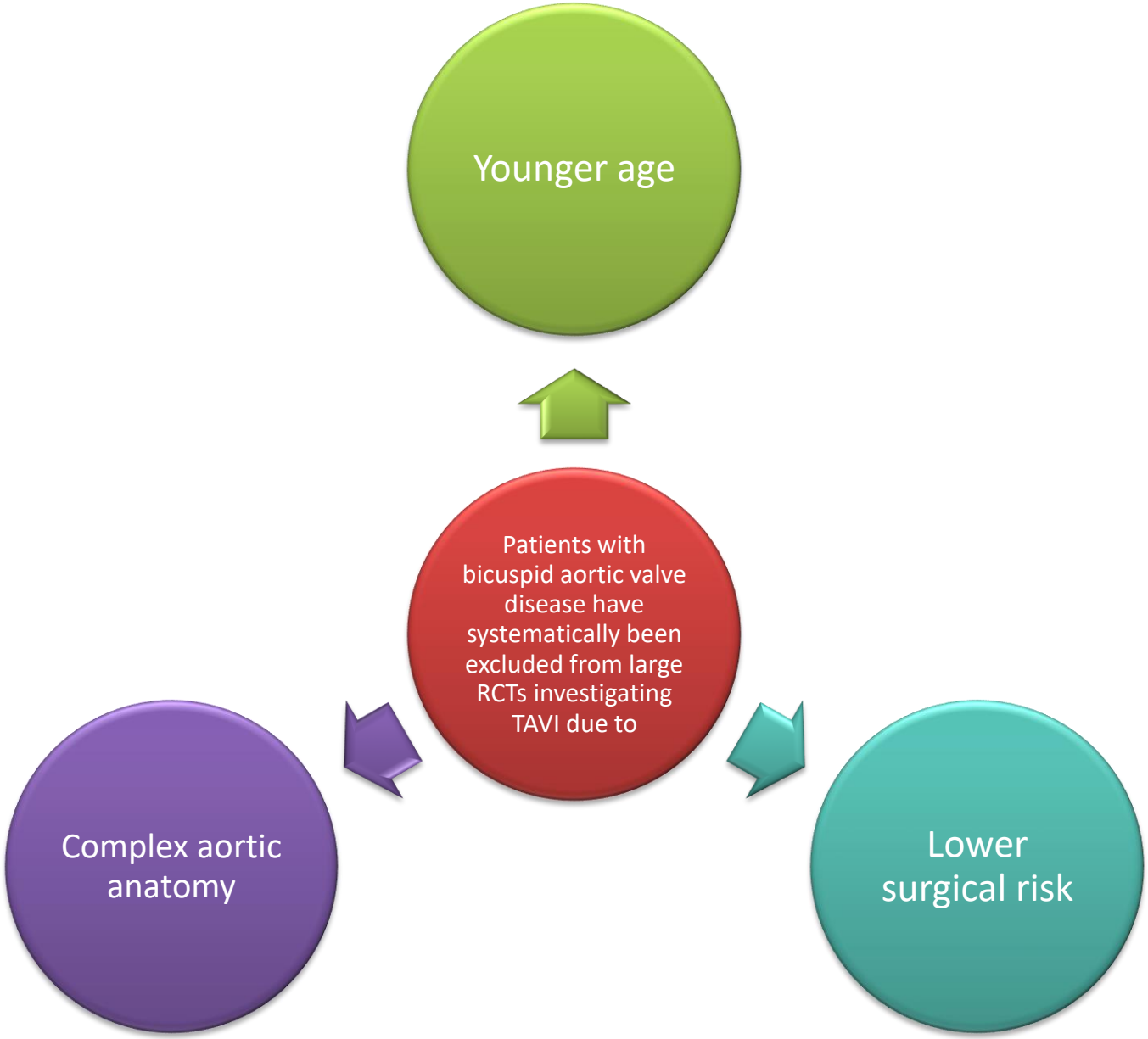
aaghavidel@rhc.ac.ir

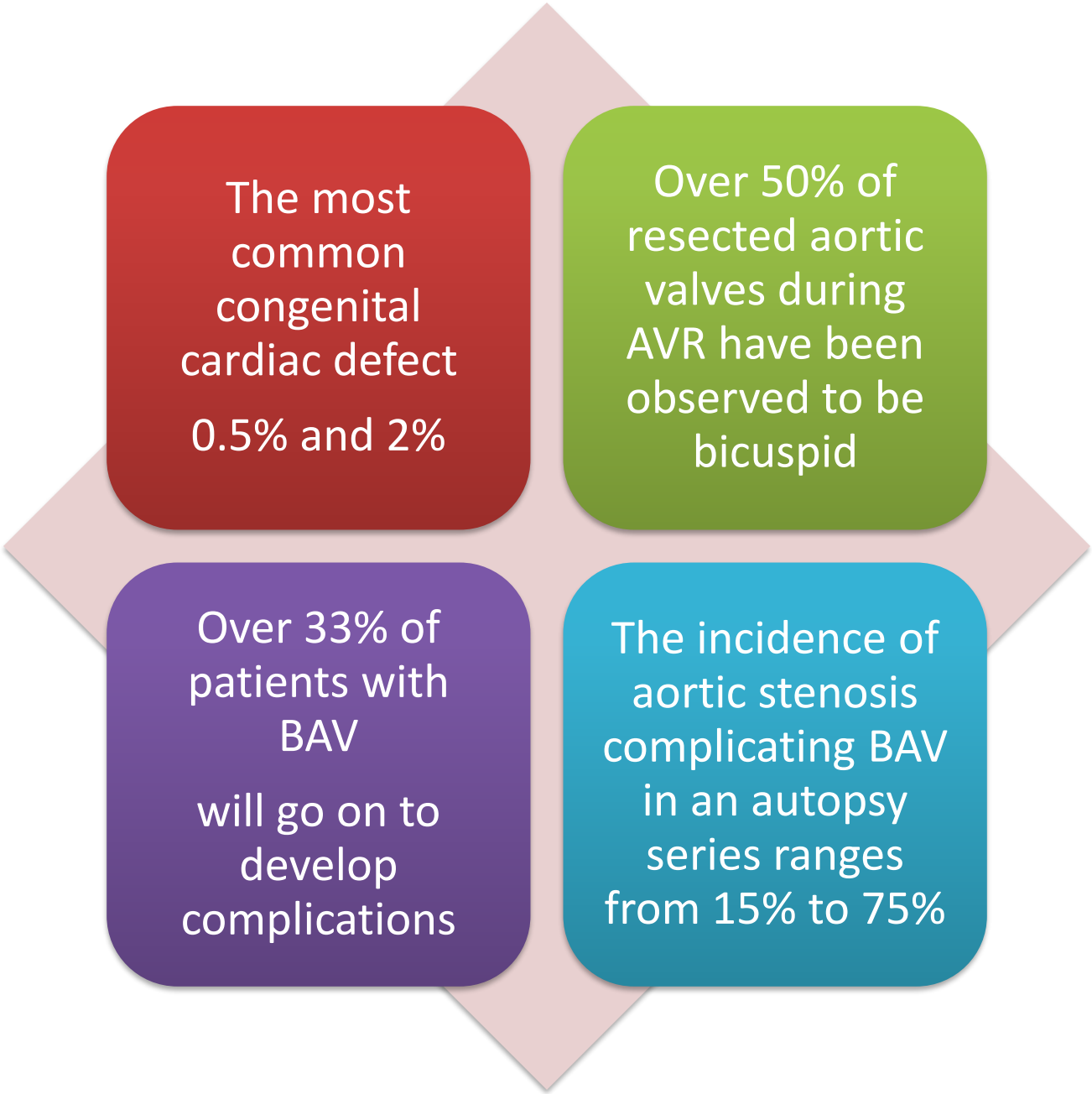
First TAVI technique for aortic stenosis patients in 2002

TAVI as a safe and effective alternative treatment modality for severe aortic stenosis patients ineligible for conventional AVR

SAFE

However, there is limited evidence for the safety and efficacy of TAVI in patients with bicuspid aortic valves (BAV), the most common congenital valve abnormality


Younger age
Patients with bicuspid aortic valve disease have systematically been excluded from large RCTs investigating TAVI due to
Complex aortic anatomy
Lower surgical risk


The most common congenital cardiac defect
0.5% and 2%
Over 50% of resected aortic valves during AVR have been observed to be bicuspid
Over 33% of patients with BAV
will go on to develop complications
The incidence of aortic stenosis complicating BAV in an autopsy series ranges from 15% to 75%

challenges

The asymmetric nature + heavy regional calcification

- Positioning
- expansion

Risk of TAVI-related complications

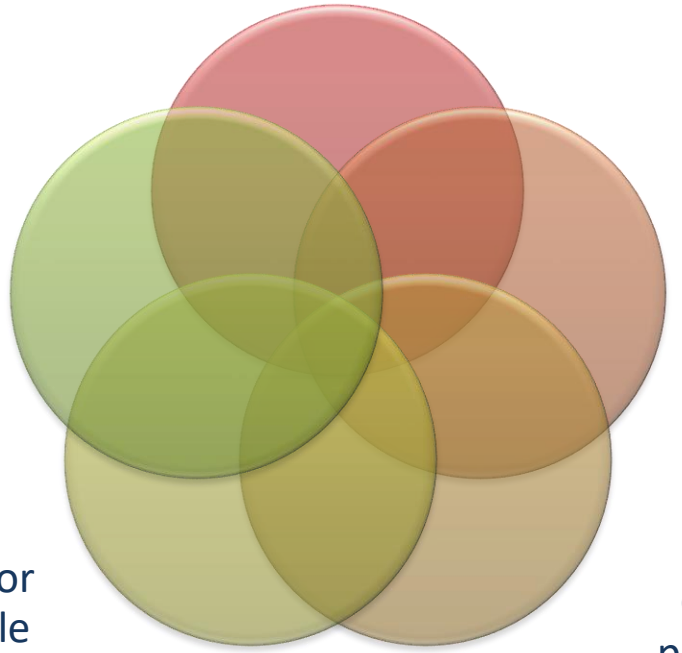
- coronary occlusion
- aortic dissection and annular rupture

Achilles Heel

- PVL
- PPM need

Surgical AVR Remains the standard approach with proven Durability an safety for most patients

Even for Intermediate risk group



TAVI is Transformative

Good Alternative for High risk inoperable group

Cardiologist and patients Want This

NEW Guidelines 2017

SAVR or TAVR for
patients at
Intermediate risk

CLASS II A

CLASS I

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
© 2016 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION
PUBLISHED BY ELSEVIER

VOL. 68, NO. 11, 2016
ISSN 0735-1097/$36.00
http://dx.doi.org/10.1016/j.jacc.2016.06.042

EDITORIAL COMMENT

Transcatheter Aortic Valve Replacement for Bicuspid Aortic Stenosis

Are We Ready for the Challenge?*

Raj Makkar, MD,[a] Tarun Chakravarty, MD,[a] Hasan Jilaihawi, MD[b]

There will be **zero tolerance** for adverse outcomes with TAVR for bicuspid AS in intermediate and low-risk patients, as these patients continue to be excellent candidates for surgery.

As we await FDA approval of TAVR for the younger intermediate-risk population,

Start studies for low risk TAVR, the potential patient population with bicuspid AS requiring TAVR is likely to grow significantly.

The specific concerns regarding TAVR for BAV include:

specific concerns

1. An elliptically shaped annulus that may impair

valve positioning and sealing.

2. Asymmetrical and heavy calcification of leaflets

may impede valve expansion and valve hemodynamics

3. Presence of aortic disease increases the risk of

dissection or rupture during valvuloplasty, post dilatation,

or implantation of balloon-expandable

valves.

4. Fused commissures are susceptible to disruption during balloon valvuloplasty, resulting in severe aortic regurgitation.

5.Underexpansion and/or a non-circular shape of the transcatheter heart valve may affect long-term durability.

1st

JACC: CARDIOVASCULAR INTERVENTIONS
© 2010 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION
PUBLISHED BY ELSEVIER INC.

VOL. 3, NO. 11, 2010
ISSN 1936-8798/$36.00
DOI: 10.1016/j.jcin.2010.08.016

Transcatheter Aortic Valve Implantation in Patients With Bicuspid Aortic Valve Stenosis

Namal Wijesinghe, MBBS, MD,* Jian Ye, MD,* Josep Rodés-Cabau, MD,†
Anson Cheung, MD,* James L. Velianou, MD,‡ Madhu K. Natarajan, MSc, MD,‡
Eric Dumont, MD,† Fabian Nietlispach, MD,* Ronen Gurvitch, MBBS,*
David A. Wood, MD,* Edgar Tay, MBBS,* John G. Webb, MD*

Vancouver, British Columbia, Quebec City, Quebec, and Hamilton, Ontario, Canada

Objectives We evaluated transcatheter aortic valve implantation (TAVI) in high-risk patients with bicuspid aortic valve (BAV) stenosis.

Background TAVI shows promise in the treatment of severe stenosis of triscupid aortic valves, especially in high-risk patients. However, BAV stenosis has been considered a contraindication to TAVI.

Methods Eleven patients (age 52 to 90 years) with symptomatic severe BAV stenosis underwent TAVI at 3 Canadian tertiary hospitals between May 2006 and April 2010. All patients were considered high risk for surgical aortic valve replacement. Edwards-SAPIEN transcatheter heart valves (Edwards Lifesciences, Inc., Irvine, California) were used. Transfemoral or transapical access was selected, depending on the adequacy of femoral access.

Results Access was transfemoral in 7 patients and transapical in 4 patients. There were no intraprocedural complications. Significant symptomatic and hemodynamic improvement was observed in 10 of 11 patients. Baseline aortic valve area of 0.65 ± 0.17 cm^2 and mean transaortic pressure gradient of 41 ± patient system valve r

Conclu formed Intv 20

Conclusions TAVI in selected high-risk patients with severe BAV stenosis can be successfully performed with acceptable clinical outcomes but will require further evaluation. (J Am Coll Cardiol Intv 2010;3:1122–5) © 2010 by the American College of Cardiology Foundation

Sapien valves were implanted successfully in 11 patients,

significant haemodynamic improvement

However, 2 patients (18.2 %) had moderate paravalvular leak.

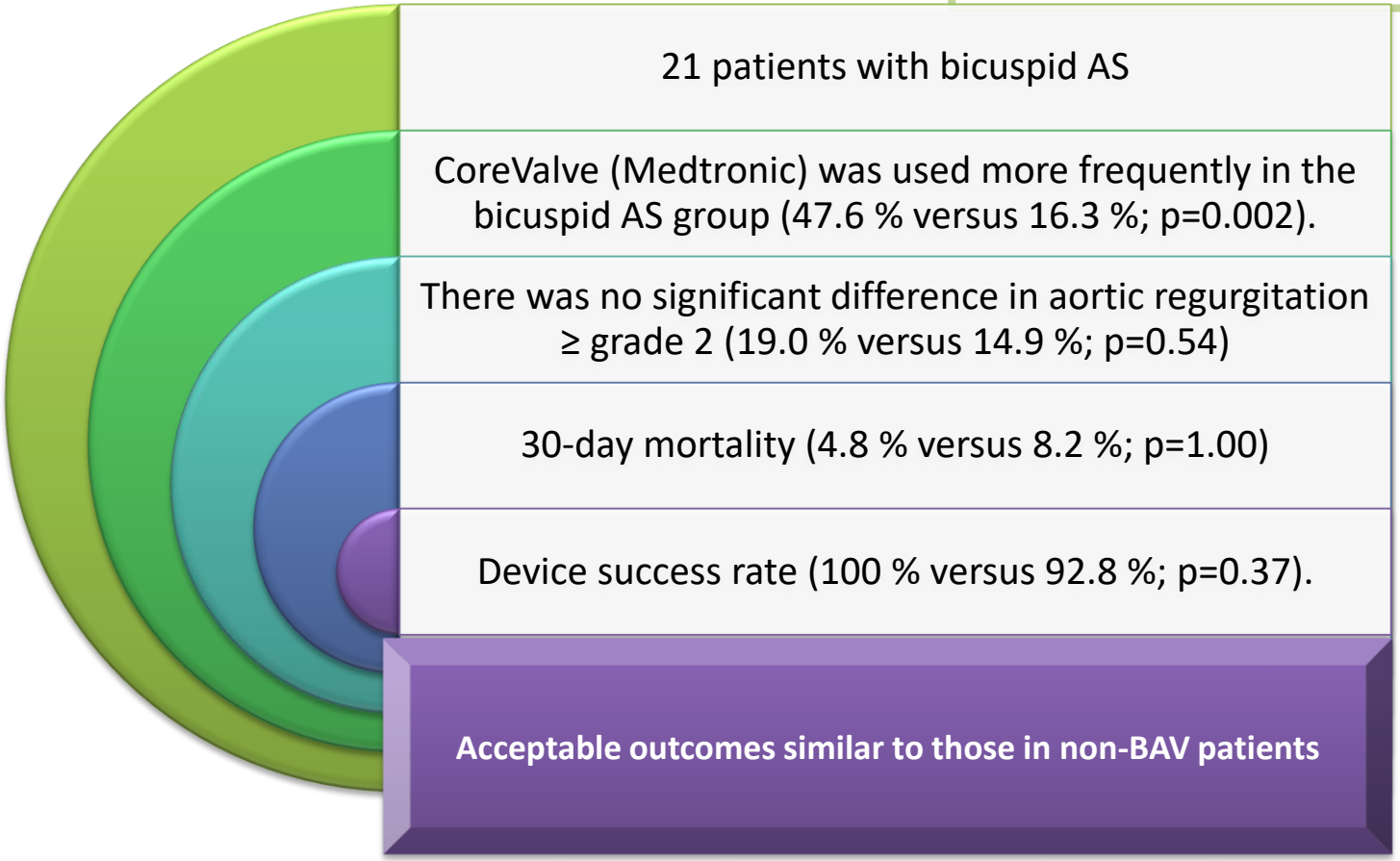
2 deaths at the 30-day

One conversion to open surgery.

Transcatheter Aortic Valve Implantation for Patients With Severe Bicuspid Aortic Valve Stenosis

Kentaro Hayashida, MD, PhD, FESC; Erik Bouvier, MD; Thierry Lefèvre, MD, FSCAI, FESC; Bernard Chevalier, MD, FSCAI, FESC; Thomas Hovasse, MD; Mauro Romano, MD; Philippe Garot, MD, FESC; Yusuke Watanabe, MD; Arnaud Farge, MD; Patrick Donzeau-Gouge, MD; Bertrand Cormier, MD; Marie-Claude Morice, MD, FESC

(*Circ Cardiovasc Interv*. 2013;6:284-291.)



JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
VOL. 64, NO. 22, 2014

ISSN 0735-1097/$36.00
PUBLISHED BY ELSEVIER INC.
http://dx.doi.org/10.1016/j.jacc.2014.09.039

Transcatheter Aortic Valve Replacement in Bicuspid Aortic Valve Disease

Darren Mylotte, MB, MD,*† Thierry Lefevre, MD,‡ Lars Søndergaard, MD,§ Yusuke Watanabe, MD,‡

Large cohort (n=139) of bicuspid aortic valve stenosis using the first-generation (Sapien [Edwards]; n=48) or self-expanding valves (CoreValve [Medtronic]; n=91).

Mean age was 78.0 ± 8.9, and 56.1 % of patients were male with a mean Society of Thoracic Surgeons (STS) score of 4.9 ± 3.4, indicating intermediate surgical risk.

The type of bicuspid aortic valve was available in 120 patients; type 0 in 26.7 %, type 1 in 68.3 %, and type 2 in 5.0 %.

Paravalvular leak ≥ grade 2 occurred in 28.4 % of patients (19.6 % Sapien versus 32.2 % CoreValve; p=0.11).

A new pacemaker was implanted in 23.2 % of patients (16.7 % Sapien versus 26.7 % CoreValve; p=0.21).

One-year mortality was 17.5 %, without significant difference between the valves (20.8 % Sapien versus 12.5 % CoreValve; p=0.12).

TAV-in-BAV is feasible with encouraging short- and intermediate-term clinical outcomes

JACC: CARDIOVASCULAR INTERVENTIONS
VOL. 9, NO. 8, 2016

ISSN 1936-8798/$36.00
PUBLISHED BY ELSEVIER
http://dx.doi.org/10.1016/j.jcin.2016.01.002

Bicuspid Aortic Valve Stenosis

Favorable Early Outcomes With a Next-Generation Transcatheter Heart Valve in a Multicenter Study

Gidon Y. Perlman, MD,[a] Philipp Blanke, MD,[a] Danny Dvir, MD,[a] Gregor Pache, MD,[b] Thomas Modine, MD,[c]

TABLE 4 30-Day Clinical Events (N = 51)*

Mortality	2 (3.9)
Myocardial infarction	0 (0)
Stroke, total events	1 (1.9)
Disabling stroke	0 (0)
Nondisabling stroke	1 (1.9)
Bleeding, total events	14 (27.5)
Life-threatening	2 (3.9)
Major	3 (5.9)
Minor	9 (17.6)
Vascular complications, total events	7 (13.7)
Major	2 (3.9)
Minor	5 (9.8)
Acute kidney injury ≥2	1 (1.9)
New permanent pacemaker†	12 (23.5)
Device 30-day safety endpoint	6 (11.7)

Heart, Lung and Circulation (2015) 24, 649–659
1443-9506/04/$36.00
http://dx.doi.org/10.1016/j.hlc.2014.12.163

Transcatheter Aortic Valve Implantation (TAVI) in Patients With Bicuspid Aortic Valve Stenosis – Systematic Review and Meta-Analysis

Kevin Phan [a,c,d,e], Sophia Wong [b], Steven Phan [c], Hakeem Ha [d], Pierre Qian [e], Tristan D. Yan [a,f*]

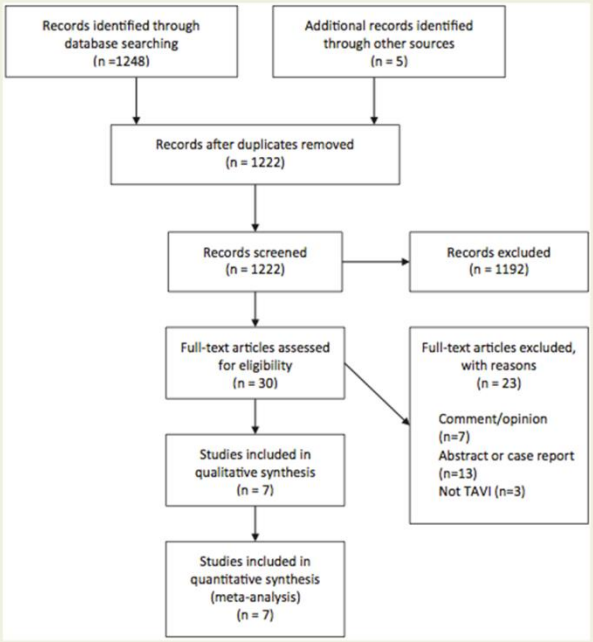


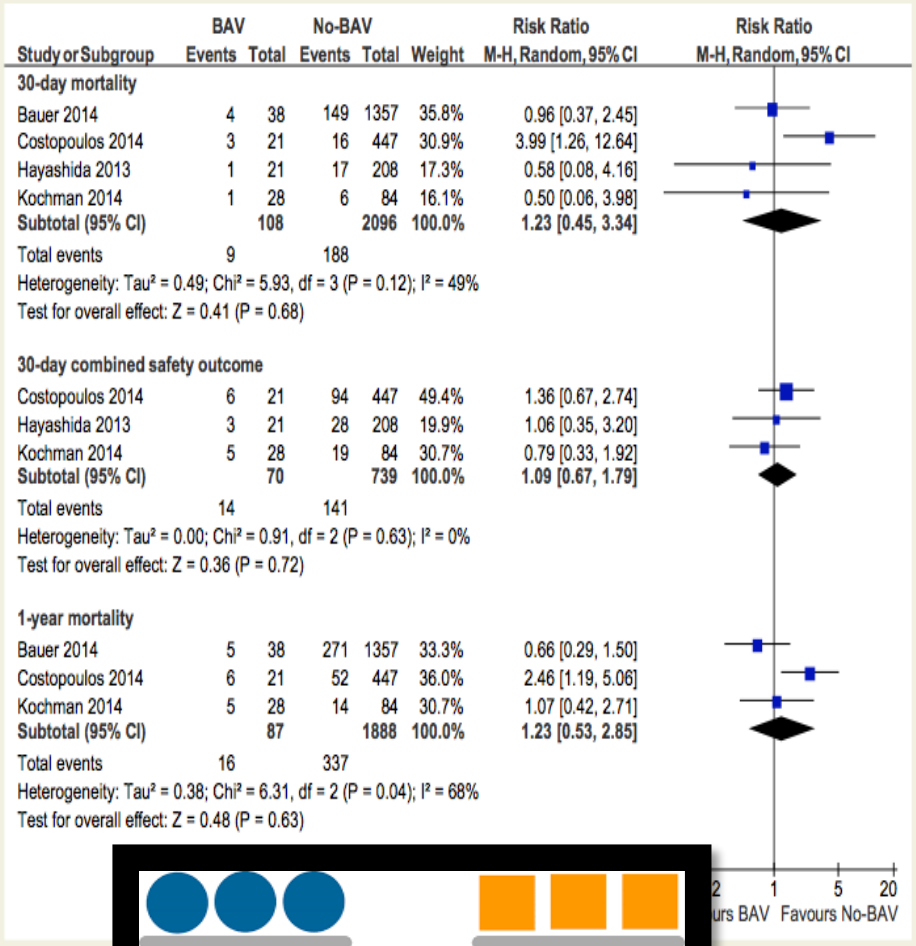
Figure 1 PRISMA flow-chart for systematic literature search of studies investigating transcatheter aortic valve implantation in patients with bicuspid aortic valves.

7

non-Ranomized

30 day Mortality 1 year Mortality

Post op TAMG



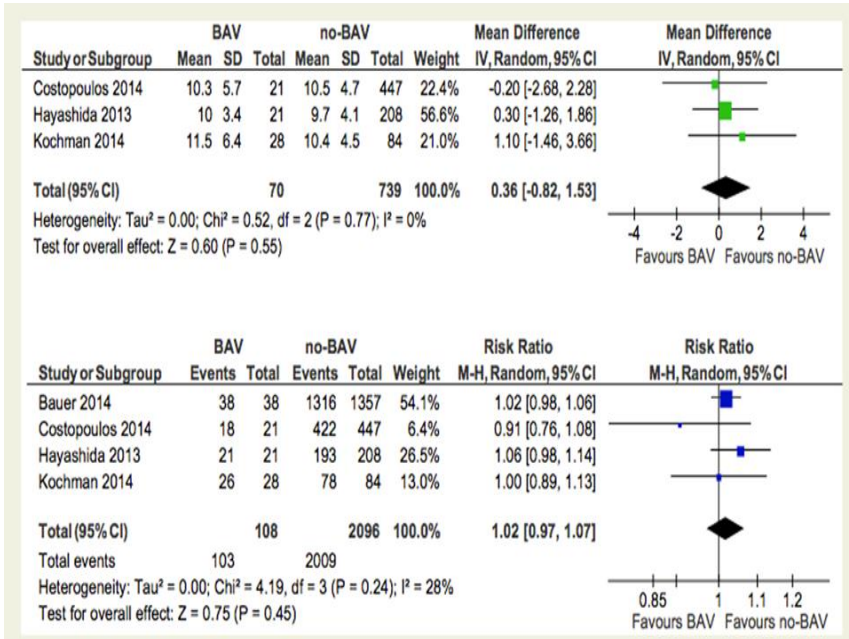
Study or Subgroup	BAV Events	BAV Total	No-BAV Events	No-BAV Total	Weight	Risk Ratio M-H, Random, 95% CI
30-day mortality						
Bauer 2014	4	38	149	1357	35.8%	0.96 [0.37, 2.45]
Costopoulos 2014	3	21	16	447	30.9%	3.99 [1.26, 12.64]
Hayashida 2013	1	21	17	208	17.3%	0.58 [0.08, 4.16]
Kochman 2014	1	28	6	84	16.1%	0.50 [0.06, 3.98]
Subtotal (95% CI)		108		2096	100.0%	**1.23 [0.45, 3.34]**
Total events	9		188			
Heterogeneity: Tau² = 0.49; Chi² = 5.93, df = 3 (P = 0.12); I² = 49%						
Test for overall effect: Z = 0.41 (P = 0.68)						
30-day combined safety outcome						
Costopoulos 2014	6	21	94	447	49.4%	1.36 [0.67, 2.74]
Hayashida 2013	3	21	28	208	19.9%	1.06 [0.35, 3.20]
Kochman 2014	5	28	19	84	30.7%	0.79 [0.33, 1.92]
Subtotal (95% CI)		70		739	100.0%	**1.09 [0.67, 1.79]**
Total events	14		141			
Heterogeneity: Tau² = 0.00; Chi² = 0.91, df = 2 (P = 0.63); I² = 0%						
Test for overall effect: Z = 0.36 (P = 0.72)						
1-year mortality						
Bauer 2014	5	38	271	1357	33.3%	0.66 [0.29, 1.50]
Costopoulos 2014	6	21	52	447	36.0%	2.46 [1.19, 5.06]
Kochman 2014	5	28	14	84	30.7%	1.07 [0.42, 2.71]
Subtotal (95% CI)		87		1888	100.0%	**1.23 [0.53, 2.85]**
Total events	16		337			
Heterogeneity: Tau² = 0.38; Chi² = 6.31, df = 2 (P = 0.04); I² = 68%						
Test for overall effect: Z = 0.48 (P = 0.63)						

Risk Ratio M-H, Random, 95% CI

0.2 1 5 20

Favours BAV Favours No-BAV

Figure 2 Forest pl ty, showing summary relative risk (RR) using ra



Study or Subgroup	BAV Mean	BAV SD	BAV Total	no-BAV Mean	no-BAV SD	no-BAV Total	Weight	Mean Difference IV, Random, 95% CI
Costopoulos 2014	10.3	5.7	21	10.5	4.7	447	22.4%	-0.20 [-2.68, 2.28]
Hayashida 2013	10	3.4	21	9.7	4.1	208	56.6%	0.30 [-1.26, 1.86]
Kochman 2014	11.5	6.4	28	10.4	4.5	84	21.0%	1.10 [-1.46, 3.66]
Total (95% CI)			70			739	100.0%	**0.36 [-0.82, 1.53]**
Heterogeneity: Tau² = 0.00; Chi² = 0.52, df = 2 (P = 0.77); I² = 0%								
Test for overall effect: Z = 0.60 (P = 0.55)								

Mean Difference IV, Random, 95% CI

-4 -2 0 2 4

Favours BAV Favours no-BAV

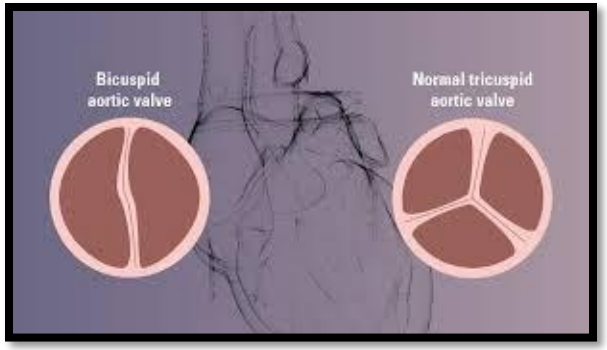
Study or Subgroup	BAV Events	BAV Total	no-BAV Events	no-BAV Total	Weight	Risk Ratio M-H, Random, 95% CI
Bauer 2014	38	38	1316	1357	54.1%	1.02 [0.98, 1.06]
Costopoulos 2014	18	21	422	447	6.4%	0.91 [0.76, 1.08]
Hayashida 2013	21	21	193	208	26.5%	1.06 [0.98, 1.14]
Kochman 2014	26	28	78	84	13.0%	1.00 [0.89, 1.13]
Total (95% CI)		108		2096	100.0%	**1.02 [0.97, 1.07]**
Total events	103		2009			
Heterogeneity: Tau² = 0.00; Chi² = 4.19, df = 3 (P = 0.24); I² = 28%						
Test for overall effect: Z = 0.75 (P = 0.45)						

Risk Ratio M-H, Random, 95% CI

0.85 1 1.1 1.2

Favours BAV Favours no-BAV

Figure 3 Forest plot mean different (WMD) and relative udies.



No difference in Short term mortality (8.3% & 9%)

- Success rate
- Conversion to open Surgery

No difference in Long term mortality (18.4% & 17.8%)

- PPM
- Major Bleeding

Study limitations

TAVI in BAV is

Feasible
Safe & Efficacious
In Selected patients

- Small sample sizes of the BAV cohorts
- Lack of randomization
- Lack of long-term safety and durability data
- Heterogeneity of TAVI prosthesis and routes
- Heterogeneity of BAV types (functional bicuspid valves rather than true bicuspid disease).

JACC: CARDIOVASCULAR INTERVENTIONS
© 2016 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION
PUBLISHED BY ELSEVIER
VOL. 9, NO. 8, 2016
ISSN 1936-8798/$36.00
http://dx.doi.org/10.1016/j.jcin.2016.01.002

Bicuspid Aortic Valve Stenosis

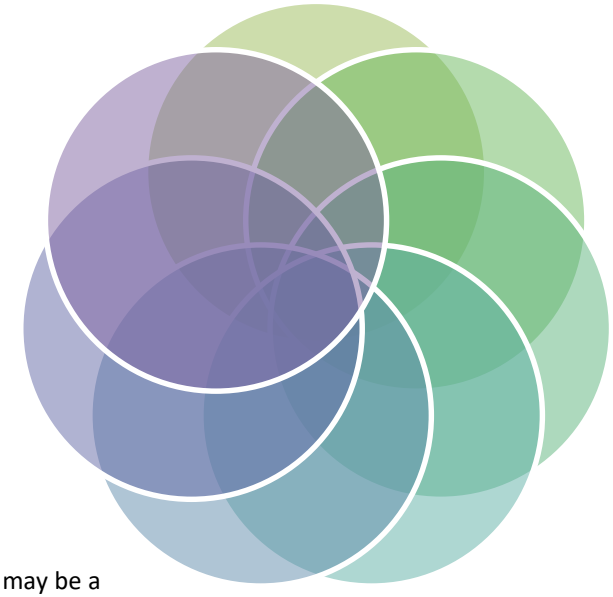
Favorable Early Outcomes With a Next-Generation Transcatheter Heart Valve in a Multicenter Study

Gidon Y. Perlman, MD,[a] Philipp Blanke, MD,[a] Danny Dvir, MD,[a] Gregor Pache, MD,[b] Thomas Modine, MD,[c]

A 51 new-generation balloon-expandable valve (Sapien 3)

Future studies can clarify the association of valve haemodynamics and selection of device size.

None had second valve implantation or paravalvular leak ≥ moderate.



However less oversized devices could be a potential cause of future deterioration in valve function.

PPM need in 23.5 %, a relatively higher rate than in tricuspid AS.

Less oversized devices may be a reasonable option because of no moderate or greater paravalvular leak was observed in this study, and the fact that using more oversizing devices may carry the risk of annulus rupture or aortic injury,

Less oversized devices (area oversizing < 10 %) tended to have more frequent paravalvular leak >mild (48%)

Journal of Cardiology 70 (2017) 220–224

Contents lists available at ScienceDirect

Journal of Cardiology

journal homepage: www.elsevier.com/locate/jjcc

Original article

The feasibility of transcatheter aortic valve implantation using the Edwards SAPIEN 3 for patients with severe bicuspid aortic stenosis

Takahide Arai (MD)[a], Thierry Lefèvre (MD, FESC, FSCAI)[a,*], Thomas Hovasse (MD)[a], Marie-Claude Morice (MD, FACC, FESC)[a], Mauro Romano (MD)[a], Hakim Benamer (MD)[a], Philippe Garot (MD)[a], Kentaro Hayashida (MD, PhD, FESC)[a,b], Erik Bouvier (MD)[a], Bernard Chevalier (MD, FESC, FSCAI)[a]

[a] Ramsay Générale de Santé, Institut Cardiovasculaire Paris Sud, Hôpital Privé Jacques Cartier, Massy, France
[b] Department of Cardiology, Keio University School of Medicine, Tokyo, Japan

ARTICLE INFO

Article history:
Received 20 September 2016
Received in revised form 2 December 2016
Accepted 13 December 2016
Available online 10 February 2017

Keywords:
Severe symptomatic aortic stenosis
Transcatheter aortic valve implantation
Bicuspid aortic valve
SAPIEN 3

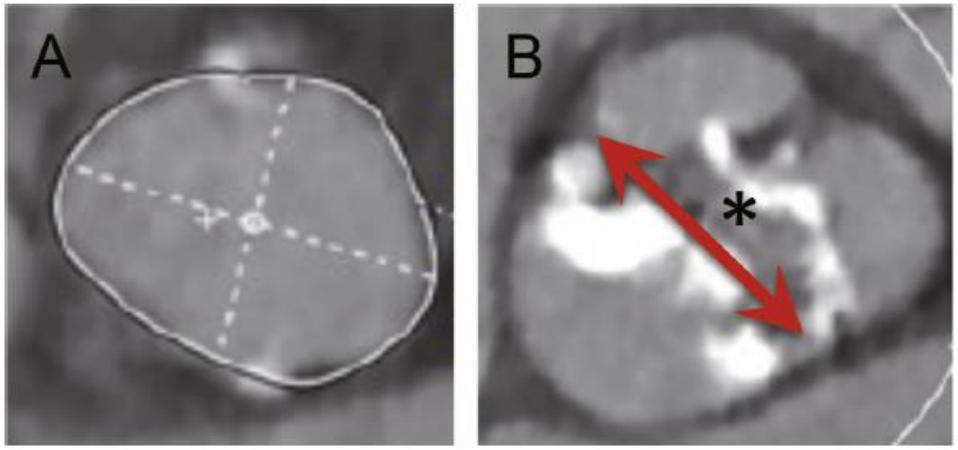
ABSTRACT

Background: There are currently only limited data focusing on transcatheter aortic valve implantation (TAVI) for bicuspid aortic valves (BAV) patients using the Edwards SAPIEN (Irvine, CA, USA) 3 (S3) valve. The aim of this study was to evaluate the feasibility and efficacy of TAVI using the S3 in patients with BAV.

Methods: A total of 153 TAVI cases performed with the S3 were included. BAV was detected by multidetector computed tomography (MDCT) in 10 (7%) patients. The other patients had tricuspid aortic valves (TAV). The BAV and TAV groups were compared.

Results: Patient age and logistic EuroSCORE were similar in the BAV and TAV groups. The calculated annulus average diameter (CAAD) by MDCT was significantly larger in the BAV group (26.5 mm vs 23.7 mm, $p = 0.036$) as was the annular area by MDCT (562 mm^2 vs 446 mm^2, $p = 0.033$). On the other hand, the valve diameter/CAAD ratio was significantly lower in the BAV group (1.01 vs 1.06, $p = 0.010$) as was the annular area oversizing percentage (3% vs 11%, $p = 0.033$). There were no significant differences between the two groups regarding the frequency of paravalvular aortic leakage (PVL) ≥2 (0% vs 6%, $p = 0.492$) and the 30-day mortality rate (0% vs 1%, $p = 0.799$).

Conclusions: Although TAVI for BAV tended to be carried out with a less oversized valve compared to TAVI for TAV, the frequency of post-procedural PVL ≥2 was similarly low in the two groups. TAVI using the S3 in patients with BAV seems to be feasible.



A total of 153 TAVI cases performed with the S3

Table 1
Baseline clinical characteristics.

	BAV ($n = 10$)	TAV ($n = 143$)	p-value
Baseline characteristics			
Age, years	81.3 ± 5.1	82.6 ± 6.2	0.547
Gender, male	61 (43%)	7 (7%)	0.046
BMI (kg/m^2)	24.6 ± 5.2	26.5 ± 5.4	0.316
BSA (m^2)	1.57 ± 0.61	1.74 ± 0.22	0.439
NYHA classification (III/IV)	9 (90%)	142 (99%)	0.723
Prior PCI, *n*	1 (10%)	21 (15%)	0.731
Prior CABG, *n*	1 (10%)	9 (6%)	0.575
Prior stroke, *n*	1 (10%)	1 (1%)	0.409
Diabetes mellitus, *n*	2 (20%)	37 (26%)	0.809
Hypertension, *n*	8 (80%)	100 (70%)	0.138
Dyslipidemia, *n*	3 (30%)	66 (46%)	0.475
COPD, *n*	0 (0%)	3 (3%)	0.663
Logistic EuroSCORE, %	19.0 ± 12.5	18.1 ± 11.0	0.840
Creatinine clearance (ml/min)	54.0 ± 26.7	62.5 ± 29.4	0.402
Echocardiographic data			
LVEF, %	52.6 ± 18.5	56.4 ± 13.0	0.566
AVA (cm^2)	0.67 ± 0.16	0.65 ± 0.14	0.707
Mean gradient (mmHg)	46.4 ± 20.0	48.3 ± 13.5	0.789
AR grade (0–4)	1.00 ± 0.86	1.02 ± 0.57	0.912
PAP (mmHg)	41.2 ± 18.6	44.2 ± 14.3	0.576

Table 3
Post-procedural characteristics.

	BAV ($n=10$)	TAV ($n=143$)	p-value
Post-procedural variables			
Procedural success	10 (100%)	141 (98%)	0.737
30 day mortality	0 (0%)	1 (1%)	0.799
30 day combined safety endpoint	0 (0%)	9 (7%)	0.462
Major stroke	0 (0%)	0 (0%)	–
AKI	0 (0%)	2 (2%)	0.736
Major vascular complication	1 (10%)	7 (5%)	0.425
Life-threatening bleeding	0 (0%)	1 (1%)	0.813
Annulus rupture	0 (0%)	1 (1%)	0.813
Pacemaker implantation	0 (0%)	12 (8%)	0.394
2 valve implantation	0 (0%)	1 (1%)	0.813
Post AR ≥grade 2	0 (0%)	8 (6%)	0.492

Values are number (%) or mean ± SD.
BAV, bicuspid aortic valve; TAV, tricuspid aortic valve; AKI, acute kidney injury; AR, aortic regurgitation.

Retrospective observational study

Mean follow-up period was 41 days

INTERVENTIONAL CARDIOLOGY

VIA MEDICA

ORIGINAL ARTICLE

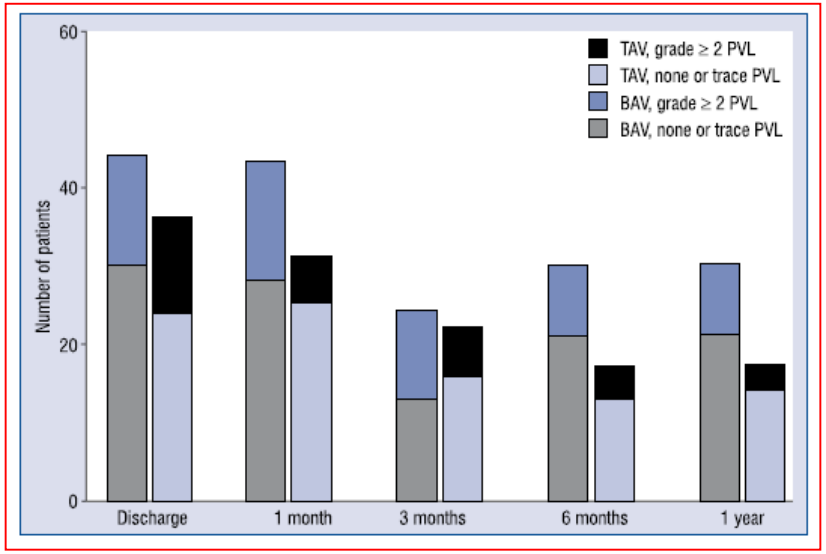
Cardiology Journal
2017, Vol. 24, No. 4, 350–357
DOI: 10.5603/CJ.a2017.0020
Copyright © 2017 Via Medica
ISSN 1897–5593

Hemodynamic changes after transcatheter aortic valve implantation during sequential follow-ups in patients with bicuspid aortic valve compared with tricuspid aortic valve

Tian-Yuan Xiong, Ming-Xia Zheng, Xin Wei, Yi-Jian Li, Yan-Biao Liao, Zhen-Gang Zhao, Yuan-Ning Xu, Hong Tang, Yuan Feng, Mao Chen

Department of Cardiology, West China Hospital, Sichuan University, China

85 patients Corevalve



In this cohort, BAV does not seem to alter hemodynamic changes when compared with its TAV counterparts after TAVI with the self-expanding THV

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
VOL. 69, NO. 21, 2017
ISSN 0735-1097
http://dx.doi.org/10.1016/j.jacc.2017.03.017

ORIGINAL INVESTIGATIONS

Outcomes in Transcatheter Aortic Valve Replacement for Bicuspid Versus Tricuspid Aortic Valve Stenosis

Sung-Han Yoon, MD,[a] Sabine Bleiziffer, MD,[b] Ole De Backer, MD,[c] Victoria Delgado, MD,[d] Takahide Arai, MD,[e]

546 pairs of patients with bicuspid and tricuspid AS were created for propensity matched score

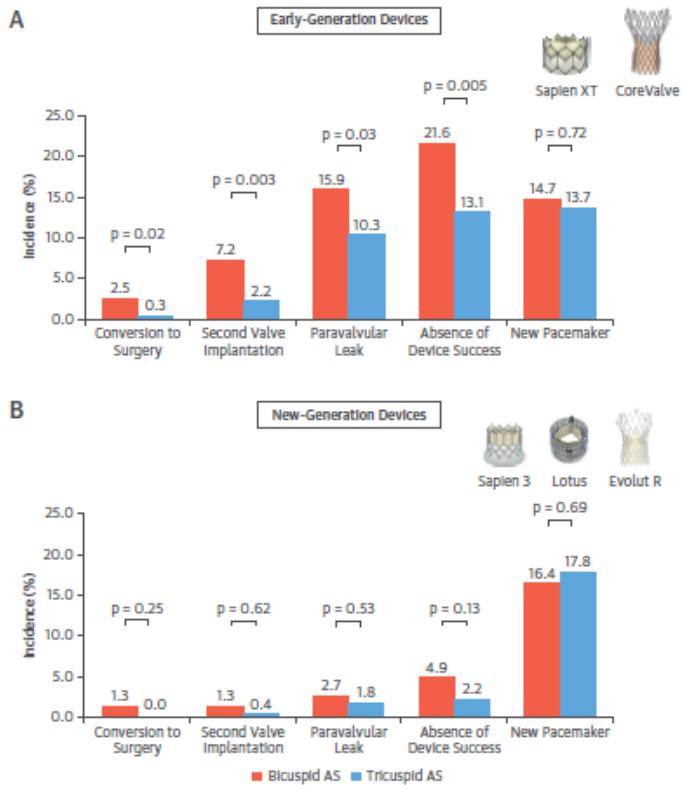
TABLE 2 Procedural and Clinical Outcomes

	Propensity Score Matched Cohort			
	Bicuspid AS (n = 546)	Tricuspid AS (n = 546)	p Value	OR (95% CI)
Procedural outcomes				
Procedure-related death	7 (1.3)	6 (1.1)	>0.99	1.17 (0.39–3.47)
Conversion to surgery	11 (2.0)	1 (0.2)	0.006	11.00 (1.42–85.20)
Coronary obstruction	5 (0.9)	3 (0.5)	0.73	1.67 (0.40–6.97)
Aortic root injury	9 (1.6)	0 (0.0)	0.004	–
Implantation of 2 valves	26 (4.8)	8 (1.5)	0.002	3.71 (1.61–8.56)
New permanent pacemaker	84 (15.4)	84 (15.4)	>0.99	1.00 (0.72–1.39)
Echocardiographic findings				
Mean gradient, mm Hg	10.8 ± 6.7	10.2 ± 4.4	0.18	
LVEF, %	54.2 ± 13.6	54.7 ± 13.9	0.79	
Moderate or severe paravalvular leak	57 (10.4)	37 (6.8)	0.04	1.61 (1.04–2.48)
Device success	466 (85.3)	499 (91.4)	0.002	0.54 (0.37–0.80)
All-cause mortality	20 (3.7)	18 (3.3)	0.87	1.11 (0.59–2.10)
Stroke	16 (2.9)	10 (1.8)	0.33	1.60 (0.73–3.53)
Nondisabling	7 (1.3)	6 (1.1)	>0.99	1.17 (0.39–3.47)
Disabling	9 (1.6)	4 (0.7)	0.27	2.25 (0.69–7.31)
Bleeding				
Major	20 (3.7)	22 (4.0)	0.88	0.91 (0.50–1.67)
Life-threatening	11 (2.0)	19 (3.5)	0.20	0.58 (0.28–1.22)
Major vascular complication	16 (2.9)	16 (2.9)	>0.99	1.00 (0.50–2.00)
Acute kidney injury (stage 2 or 3)	11 (2.0)	5 (0.9)	0.21	2.20 (0.77–6.33)

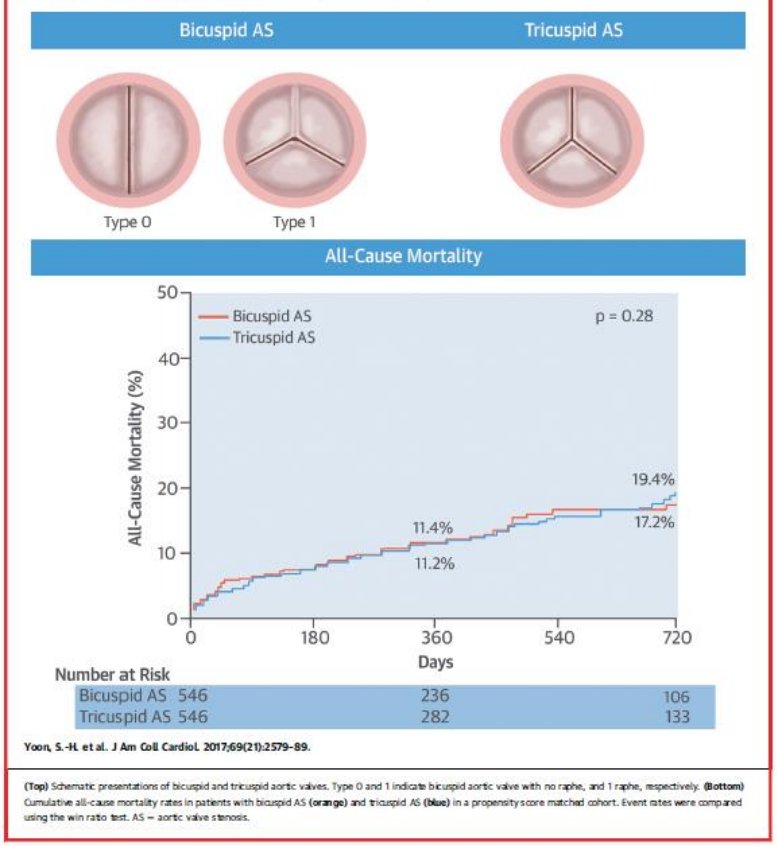
Values are n (%) or mean ± SD, unless otherwise indicated.

CI = confidence interval; OR = odds ratio; other abbreviations as in Table 1.

FIGURE 2 Procedural Outcomes in Bicuspid and Tricuspid AS With Early- and New-Generation Devices



CENTRAL ILLUSTRATION TAVR for Bicuspid Versus Tricuspid Aortic Valve Stenosis



Yoon, S.-H. et al. J Am Coll Cardiol. 2017;69(21):2579–89.

(Top) Schematic presentations of bicuspid and tricuspid aortic valves. Type 0 and 1 indicate bicuspid aortic valve with no raphe, and 1 raphe, respectively. **(Bottom)** Cumulative all-cause mortality rates in patients with bicuspid AS **(orange)** and tricuspid AS **(blue)** in a propensity score matched cohort. Event rates were compared using the win ratio test. AS = aortic valve stenosis.

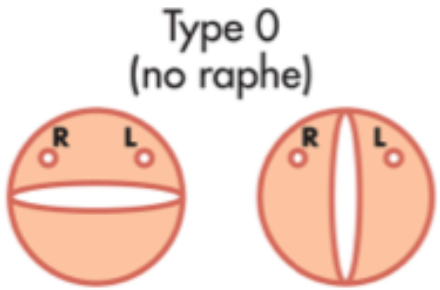
Compared with tricuspid AS, TAVR in bicuspid AS was associated with a similar prognosis, but lower device success rate.

Procedural differences were observed in early-generation devices,

no differences were observed in new-generation devices.

Dose the BAV type affect the outcome?

CLASSIFICATION SYSTEMS FOR BICUSPID AORTIC VALVE DISEASE
Sievers and Schmidtke;



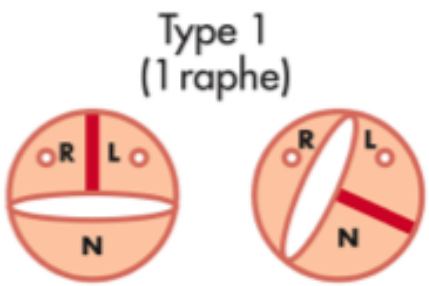


FIGURE 2 | The Sievers and Schmidtke classification system for bicu id aortic valve [Adapted from Sievers al. (33)].

higher rates of PVL in Sievers type 1 morphology (34.2%) than in Sievers type 0 (13.3%)

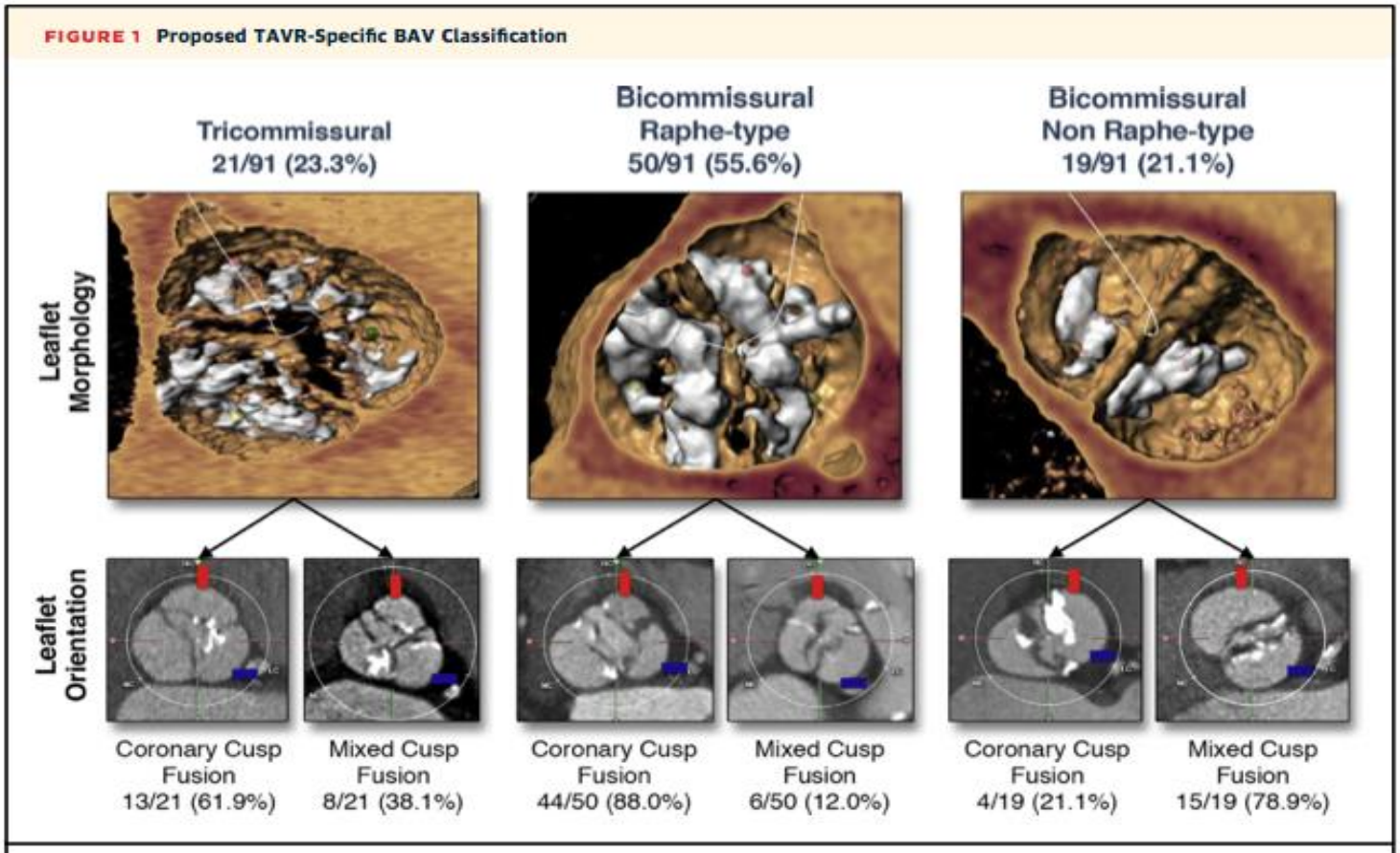
JACC: CARDIOVASCULAR IMAGING
© 2016 BY THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION
PUBLISHED BY ELSEVIER

VOL. 9, NO. 10, 2016
ISSN 1936-878X/$36.00
http://dx.doi.org/10.1016/j.jcmg.2015.12.022

A Bicuspid Aortic Valve Imaging Classification for the TAVR Era

Hasan Jilaihawi, MD,[a] Mao Chen, MD,[b] John Webb, MD,[c] Dominique Himbert, MD,[d] Carlos E. Ruiz, MD,[e]

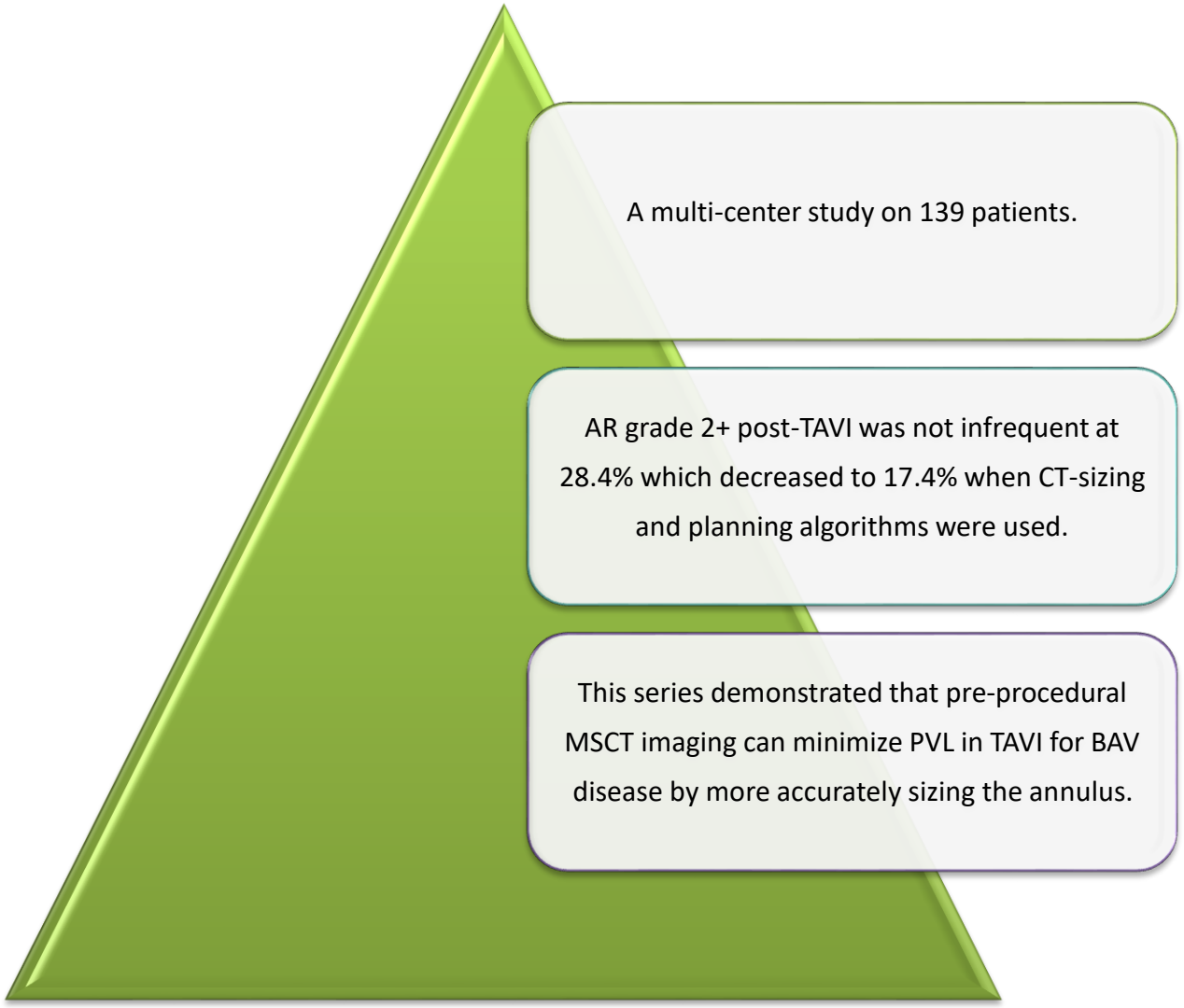
FIGURE 1 Proposed TAVR-Specific BAV Classification



It was noted that the presence of a calcified raphe may impact on TAVI expansion and device apposition at the annulus.

Tricommisural BAV type was not found to be associated with aortopathy and has widely been termed functional or acquired BAV disease

There was also no difference in new permanent pacemaker implantation rates between the BAV subtypes.



Mylotte D, Lefevre T, Søndergaard L, Watanabe Y, Modine T, Dvir D, et al. Transcatheter aortic valve replacement in bicuspid aortic valve disease. *J Am Coll Cardiol.* (2014) 64:2330–9. doi: 10.1016/j.jacc.2014.09.039

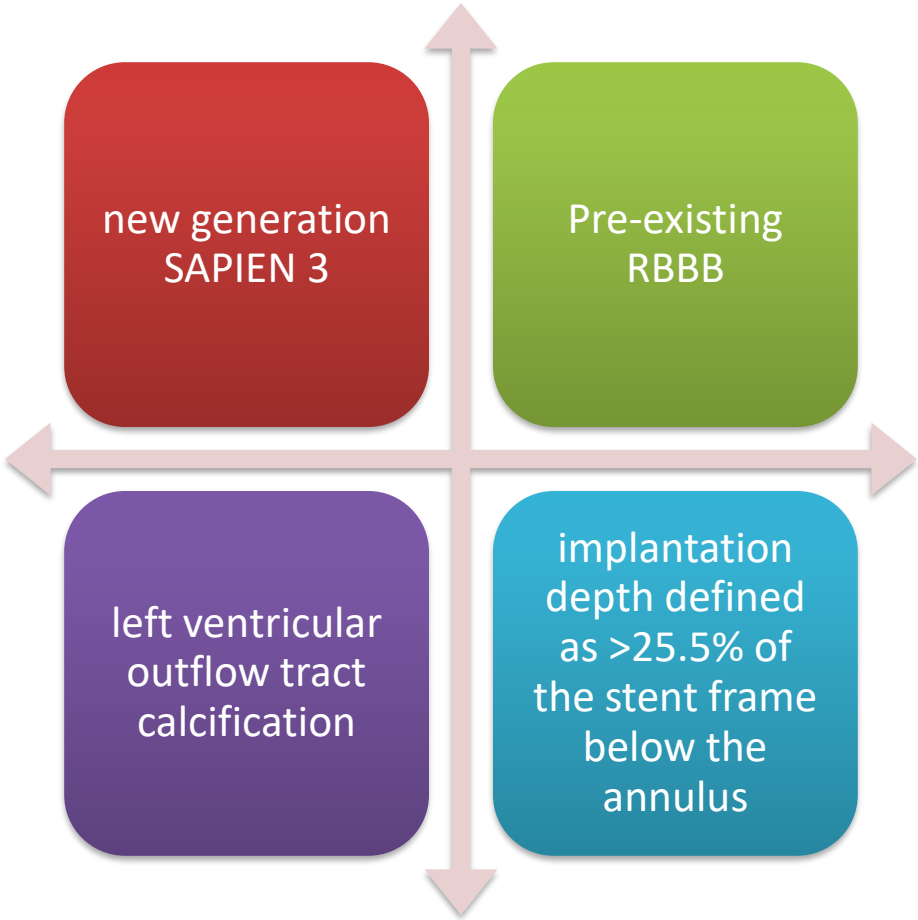
PROSTHESIS CHOICE IN BICUSPID VALVE?!

Balloon-expandable valves have greater radial force and may circularize the native annulus minimizing potential sites for paravalvular leaks.

A greater incidence of PVL ≥2 with self- expanding valves (19.6% with Sapien XT and 32.2% with CoreValve).

Conversely, no significant differences between the new generation

Predictors for New PPM



Balance these with the risk of THV embolization with higher implants

CORONARY OCCLUSION AND ANNULAR RUPTURE

0.22 %

0.1-1.5 %

Female sex

Coronary ostia height of <10 mm

sinus of Valsalva dimensions

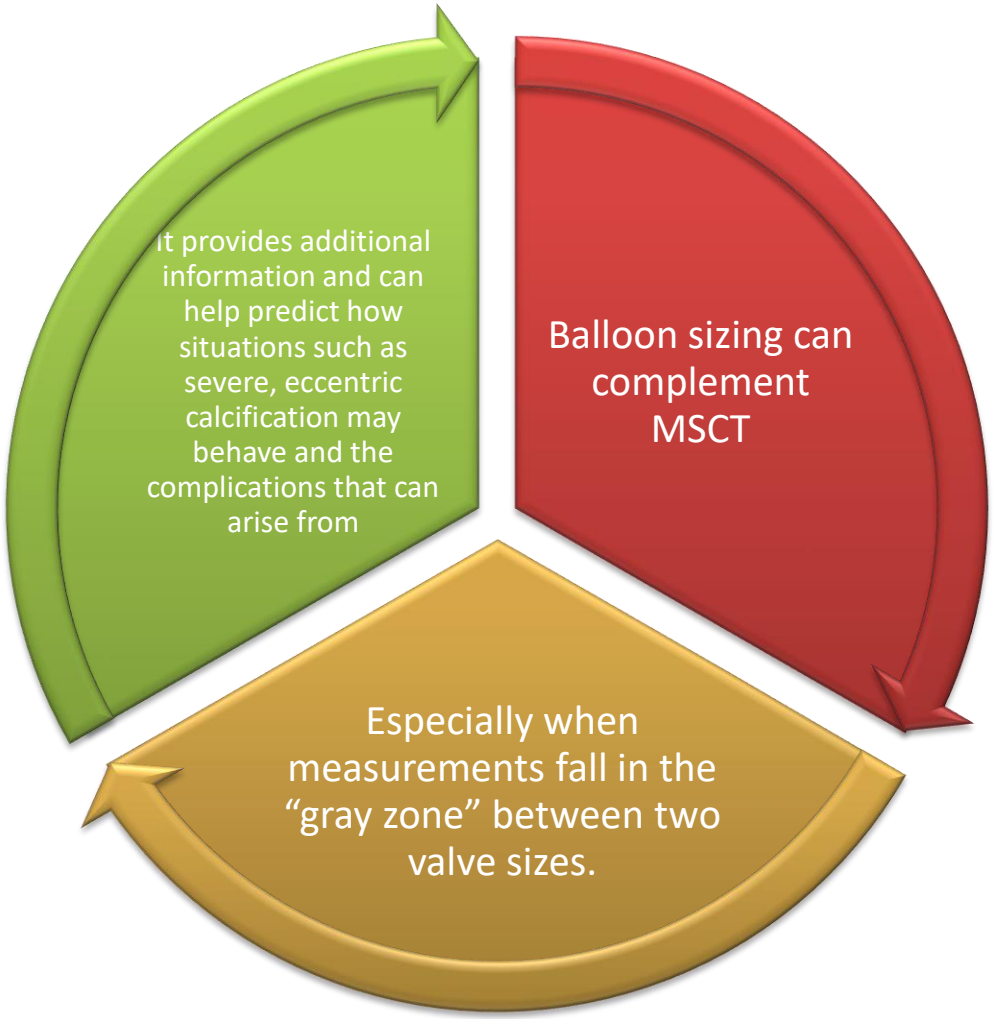
severe valve calcification

Balloon-expandable THV.

TECHNICAL CONSIDERATIONS FOR TAVI IN BAV

Adversely affect valve hemodynamics and durability

Balloon sizing



*Take home message

WHAT IS KNOWN? Bicuspid aortic valve stenosis is often considered a relative contraindication to transcatheter aortic valve implantation. Initial reports have shown feasibility, but higher rates of paravalvular regurgitation than observed for tricuspid aortic valves.

WHAT IS NEW? Implantation of a new-generation device was associated with minimal paravalvular regurgitation and good clinical outcomes.

WHAT IS NEXT? Rates of pacemaker implantation after TAVR in bicuspid AS were relatively high and require further study to understand the mechanism.