



7 AZERBAIJAN INTERVENTIONAL TH CARDIOLOGY MEETING

Səhiyyə Nazirliyinin Elmi
Tibbi şurası tərəfindən

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17 - 19 October 2025 | The Ritz-Carlton, Baku

Transcatheter Aortic Valve Implantation in bicuspid anatomy

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GETBO

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Bicuspid aortic valve anatomy adds complexity to TAVI because of
asymmetric aortic valve calcification
elliptical annular shape,
the lack of standardization of **valve sizing**.

SAVR remains the **primary mode of treatment** for bicuspid aortic stenosis.

Does **TAVI** have a place in the treatment of bicuspid aortic stenosis?

Anatomical characteristics

Bicuspid aortic valve

It is the **most common** congenital heart malformation, affecting 1 to 2% of the population.

Acceleration of **degeneration of the aortic media**

Negative impact on **aortic elasticity**

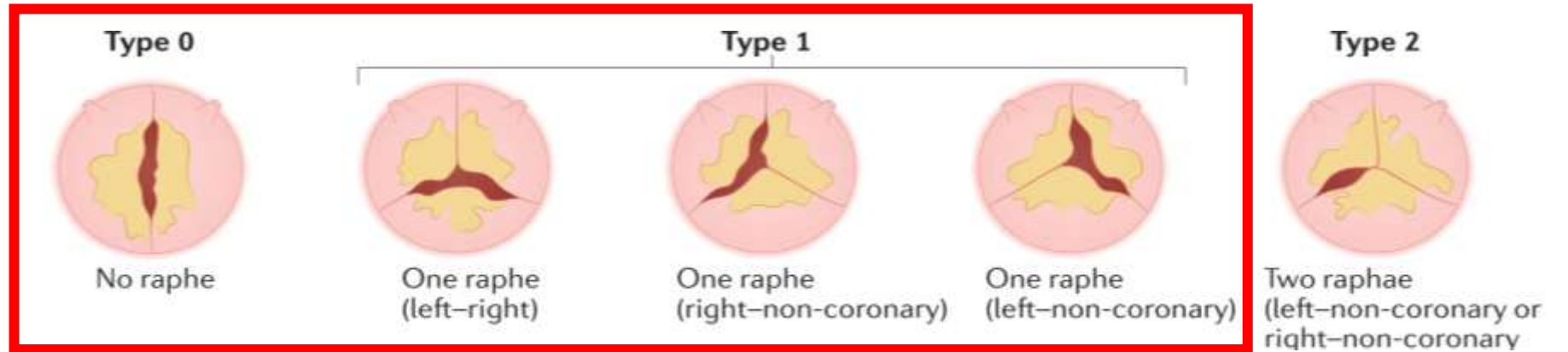
Aortic **dilatation, aneurysm or dissection: 1/3** of patients

Mortality and morbidity rates > other combined cardiac malformations

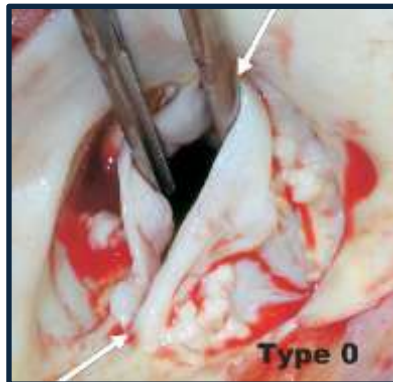
Wilton et al J Cardiothorac Surg 2006;1:7-18
Nkomo et al Arterioscler Thromb vasc Biol 2003;23:351-6
Warren et al Heart 2006;92:1496-1500
Fedak et al Circulation 2002;106:900-4

Bicuspid aortic valve

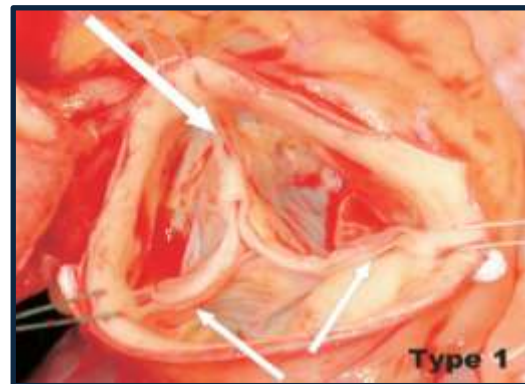
There are 3 types of bicuspid valve, according to:
presence of raphe and its position



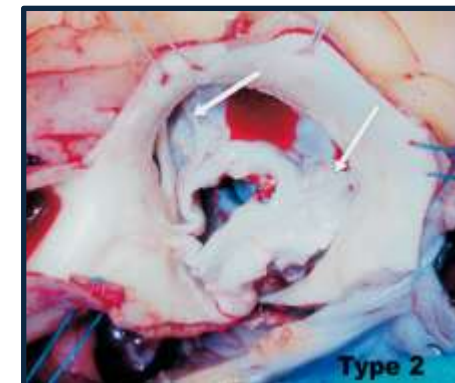
7%



88%



5%



Bicuspid aortic valve

Younger patients: discussion in the 'heart team'

Anatomical particularities

Elliptical annulus

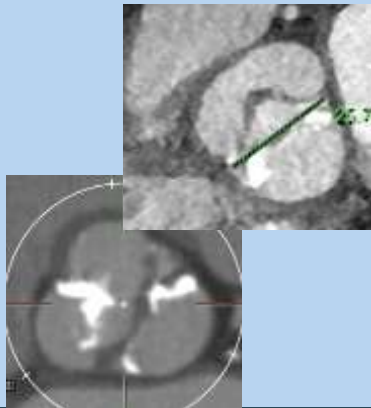
Large annulus

More horizontal



Assymetrical cusps

**Presence of a raphe
(calcified or not)**



Procedural complications

Annulus rupture

Poor expansion

Mismatch

Para valvular leak

Permanent Pacemaker

Sizing of the valve

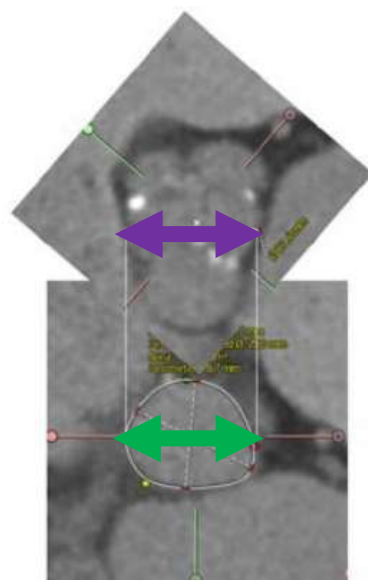
BAVARD

From Bicuspid Aortic Valve Anatomy and Relationship With Devices registry

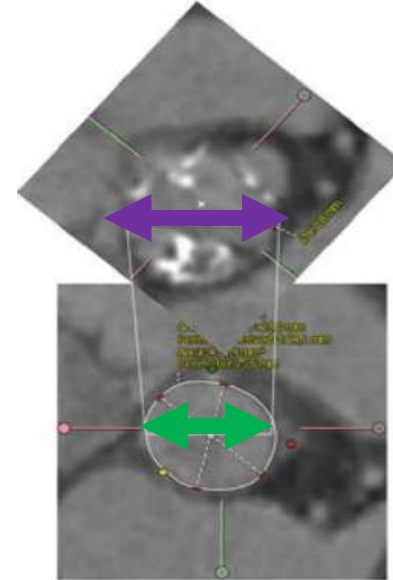
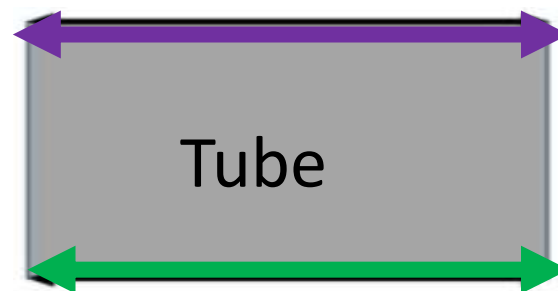
Inter commissural distance

4 mm

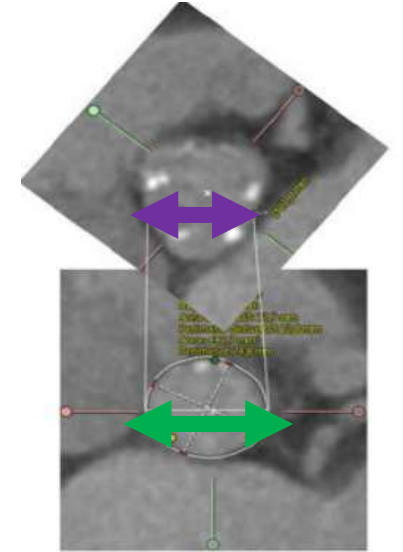
Aortic annulus



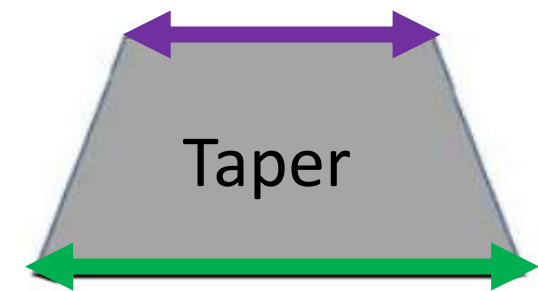
Sizing based on **annulus**



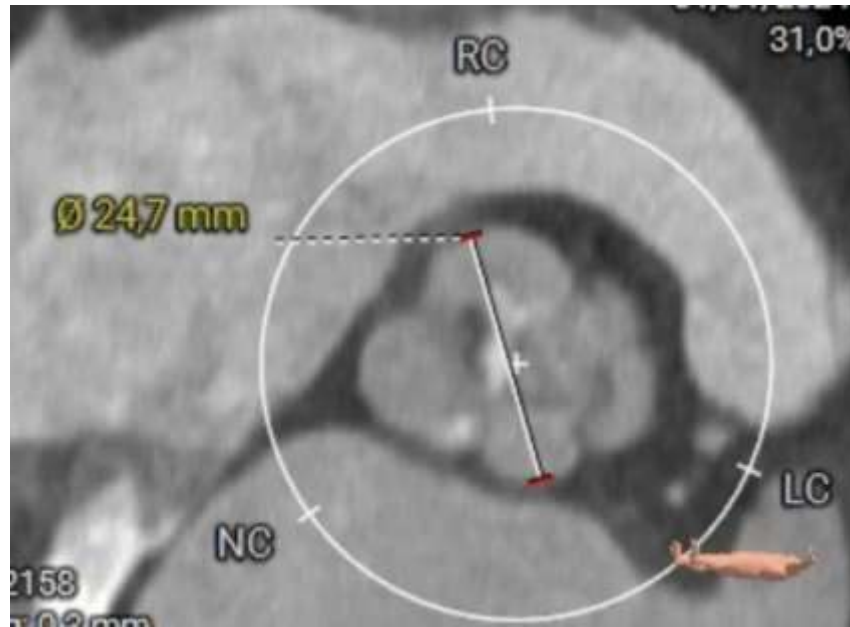
Sizing based on **annulus**



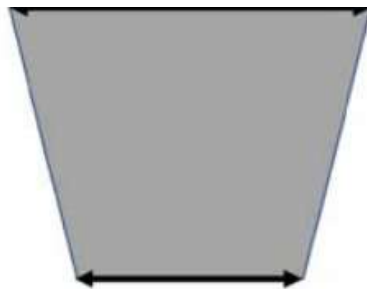
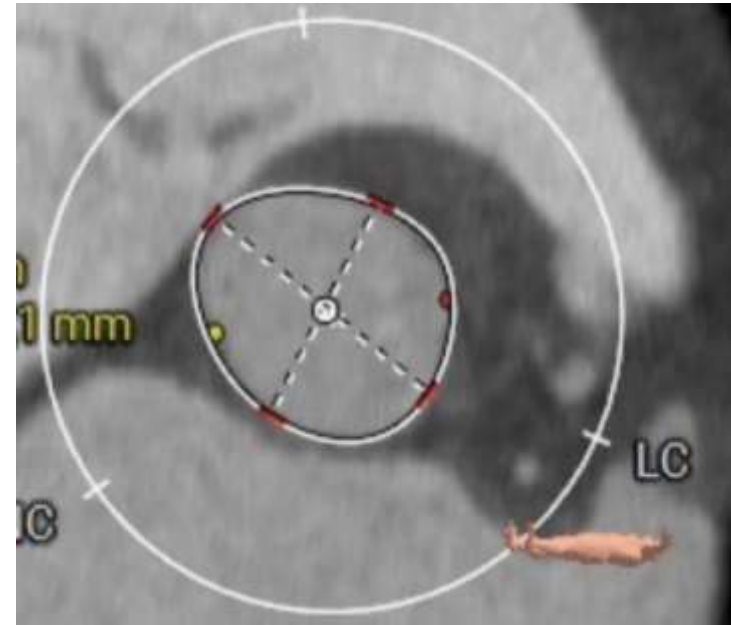
Sizing based on **ICD**



ICD 24 mm



Annulus: 20 mm



« FLARE »

Sapien 20 mm or Evolut 23 mm

Level of Implantation at the Raphe measurement: LIRA

Measurement of the perimeter at the level of the raphe

LIRA measurement

Perimeter: internal border of the leaflets,

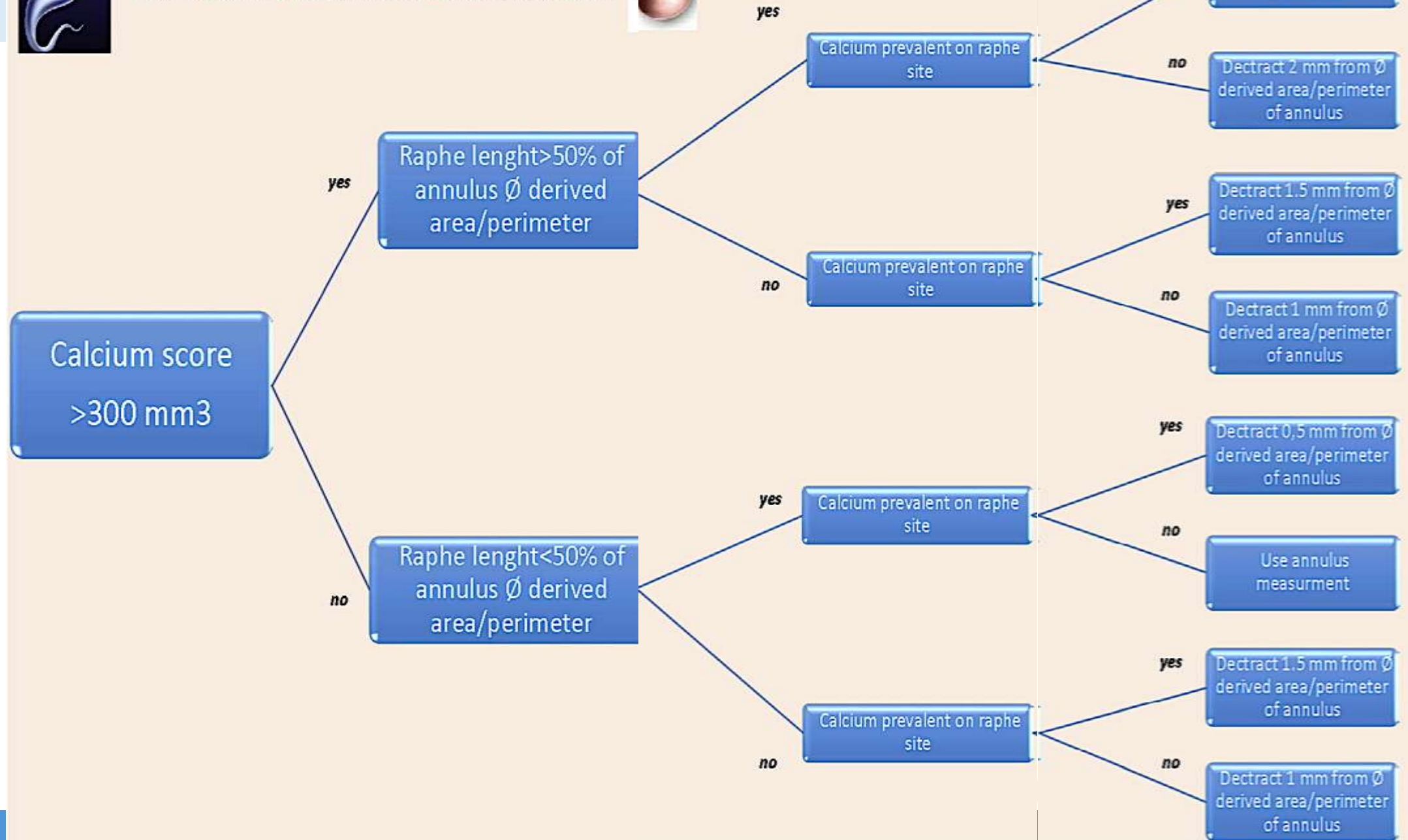
excluding all structures at this level:

fused commissures

heavy calcification

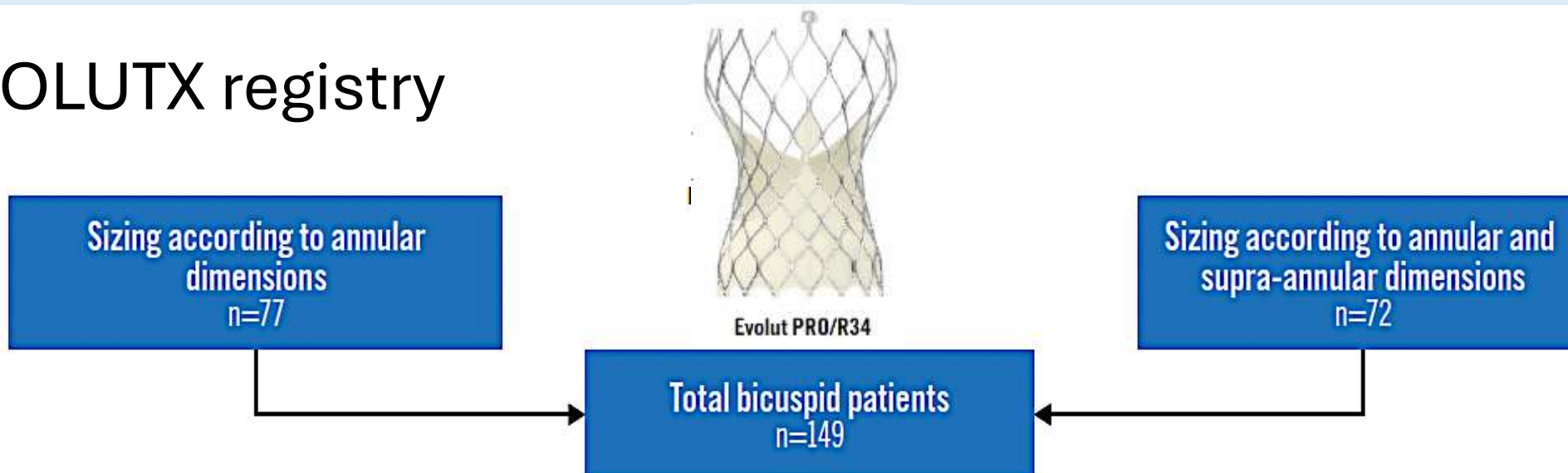
calcific or fibrotic raphe





Impact of sizing algorithms

BIVOLUTX registry



n (%) or median (IQR)	Total (n=149)	Annular sizing (n=77)	Combined sizing (n=72)
Device success	136 (91.3%)	70 (90.9%)	66 (91.6%)
1-year mortality	15 (10.0%)	9 (12.9%)	6 (9.1%)
1-year disabling stroke	6 (4.0%)	4 (6.0%)	2 (3.2%)
30-day valve performance	142 (95.3%)		
1-year mean gradient, mmHg	8.1 (6.2-11.1)	8.7 (6.4-11.3)	8.0 (5.3-10.9)
1-year moderate to severe AR	1 (1.6%)	0 (0%)	1 (3.2%)
1-year severe PPM	3 (3.8%)	1 (2.2%)	2 (6.0%)

Clinical data

Randomized trials

PARTNER 3

ORIGINAL ARTICLE

Transcatheter Aortic-Valve Replacement with a Balloon-Expandable Valve in Low-Risk Patients

M.J. Mack, M.B. Leon, V.H. Thourani, R. Makkar, S.K. Kodali, M. Russo, S.R. Kapadia, S.C. Malaisrie, D.J. Cohen, P. Pibarot, J. Leipsic, R.T. Hahn, P. Blanke, M.R. Williams, J.M. McCabe, D.L. Brown, V. Babaliaros, S. Goldman, W.Y. Szeto, P. Genereux, A. Pershad, S.J. Pocock, M.C. Alu, J.G. Webb, and C.R. Smith, for the PARTNER 3 Investigators*

Mack et al N Engl J Med 2019;380:1695-705.

Evolut Low risk

ORIGINAL ARTICLE

Transcatheter Aortic-Valve Replacement with a Self-Expanding Valve in Low-Risk Patients

Jeffrey J. Popma, M.D., G. Michael Deeb, M.D., Steven J. Yakubov, M.D., Mubashir Mumtaz, M.D., Hemal Gada, M.D., Daniel O'Hair, M.D., Tanvir Bajwa, M.D., John C. Heiser, M.D., William Merhi, D.O., Neal S. Kleiman, M.D., Judah Askew, M.D., Paul Sorajja, M.D., Joshua Rovin, M.D., Stanley J. Chetcuti, M.D., David H. Adams, M.D., Paul S. Teirstein, M.D., George L. Zorn III, M.D., John K. Forrest, M.D., Didier Tchétché, M.D., Jon Resar, M.D., Antony Walton, M.D., Nicolo Piazza, M.D., Ph.D., Basel Ramlawi, M.D., Newell Robinson, M.D., George Petrossian, M.D., Thomas G. Gleason, M.D., Jae K. Oh, M.D., Michael J. Boulware, Ph.D., Hongyan Qiao, Ph.D., Andrew S. Mugglin, Ph.D., and Michael J. Reardon, M.D., for the Evolut Low Risk Trial Investigators*

Popma et al N Engl J Med 2019;380:1706-15.

Exclusion criteria

Frailty

Bicuspid

Severe CAD

Cardiogenic choc

Acute MI < 30 days

Other alvulopathy

HOCM...

Not candidate for 2 arms

Randomized trials

NOTION-2

370 patients with severe symptomatic aortic stenosis ≤ 75 years



72.7%



25.7%



Intention-to-treat



68.8%

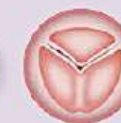
270 pts



Tricuspid AS

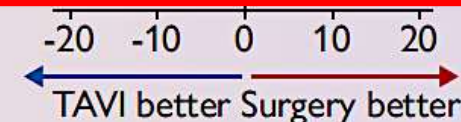
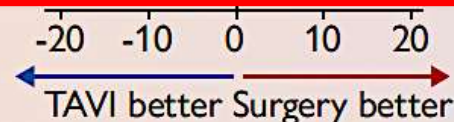
TAVI vs surgery-risk difference
Percentage points (95% CI)

Bicuspid AS

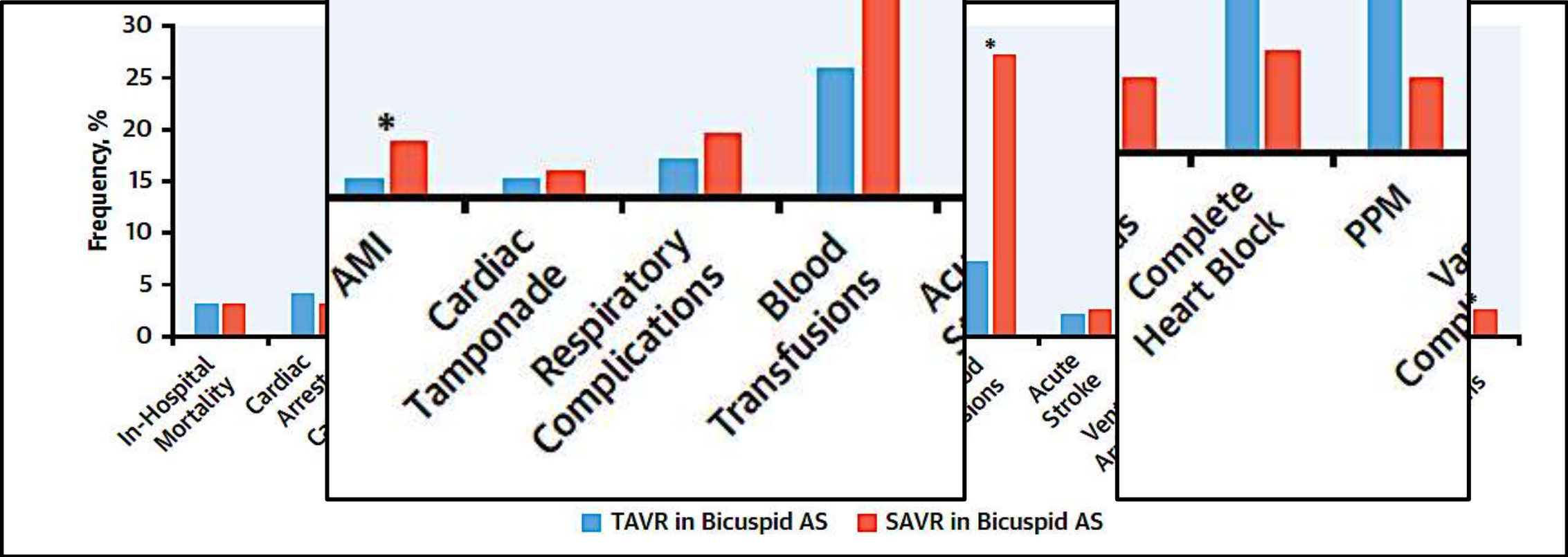


100 pts

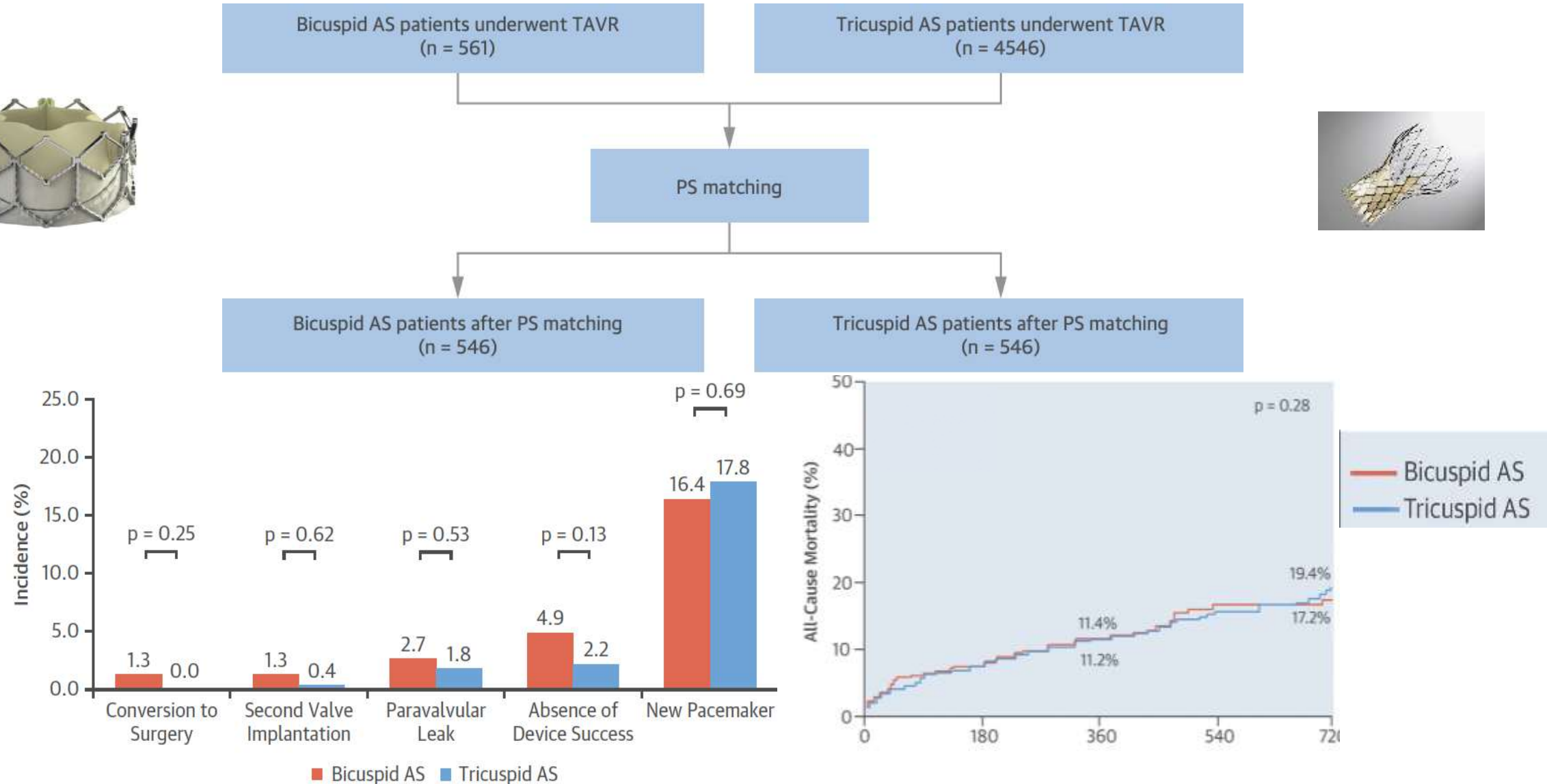
Death, stroke, or rehospitalization	0.4 (-6.3 to 7.0)	10.4 (-0.8 to 21.5)
Death or disabling stroke	0.7 (-2.5 to 3.9)	4.1 (-3.6 to 11.9)
Death from any cause	0.7 (-1.8 to 3.2)	2.1 (-4.6 to 8.8)
Stroke	2.8 (-1.7 to 7.3)	6.1 (-0.6 to 12.8)
Disabling stroke	0 (-3.0 to 2.8)	2.0 (-1.9 to 6.0)
Rehospitalization	-2.5 (-7.6 to 2.7)	2.2 (-4.6 to 8.8)
Paravalvular regurgitation $\geq$ moderate	3.1 (0.1 to 6.1)	9.1 (0.6 to 17.6)



31 895
remplacement
isolé bicuspidie



Registry of BAV: 1034 pts - 9 countries



Registry of BAV



SAPIEN series

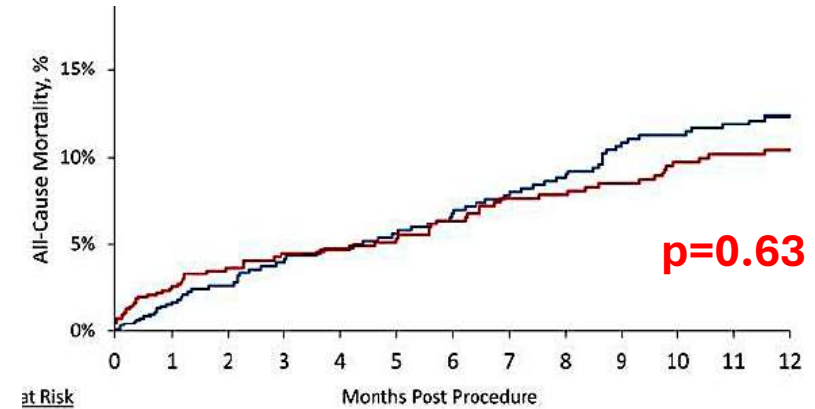
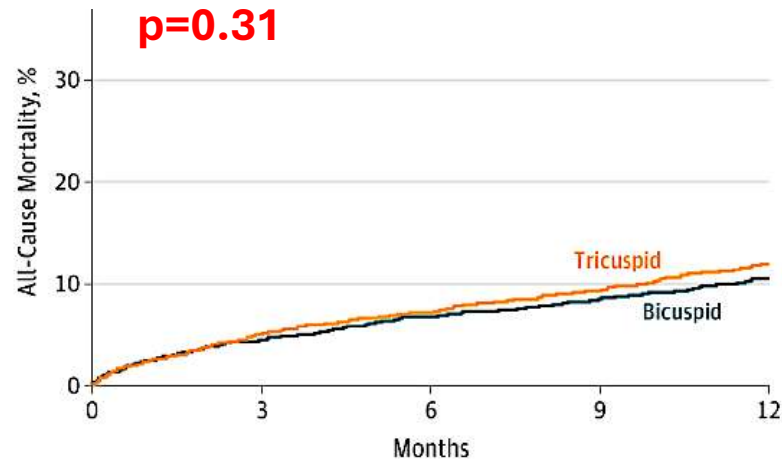
5 382 pts

1 900 pts

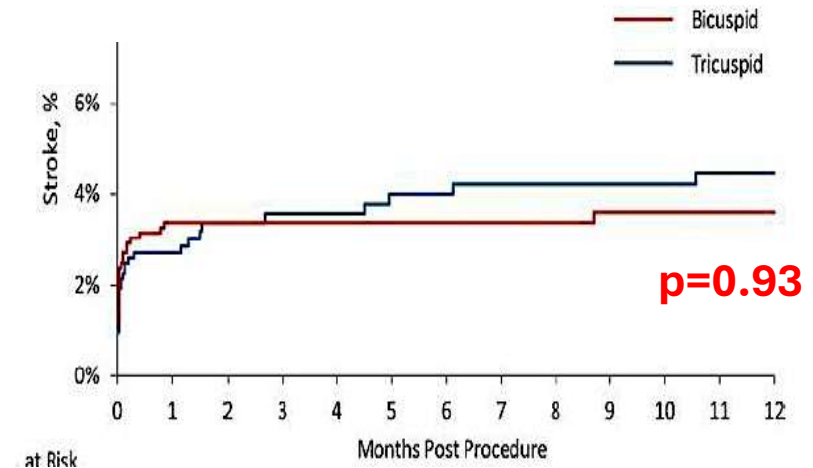
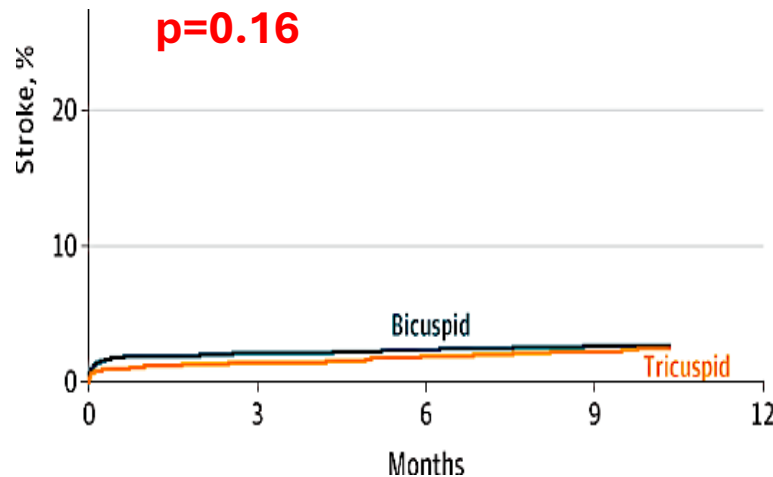
Evolut R/PRO



Mortality

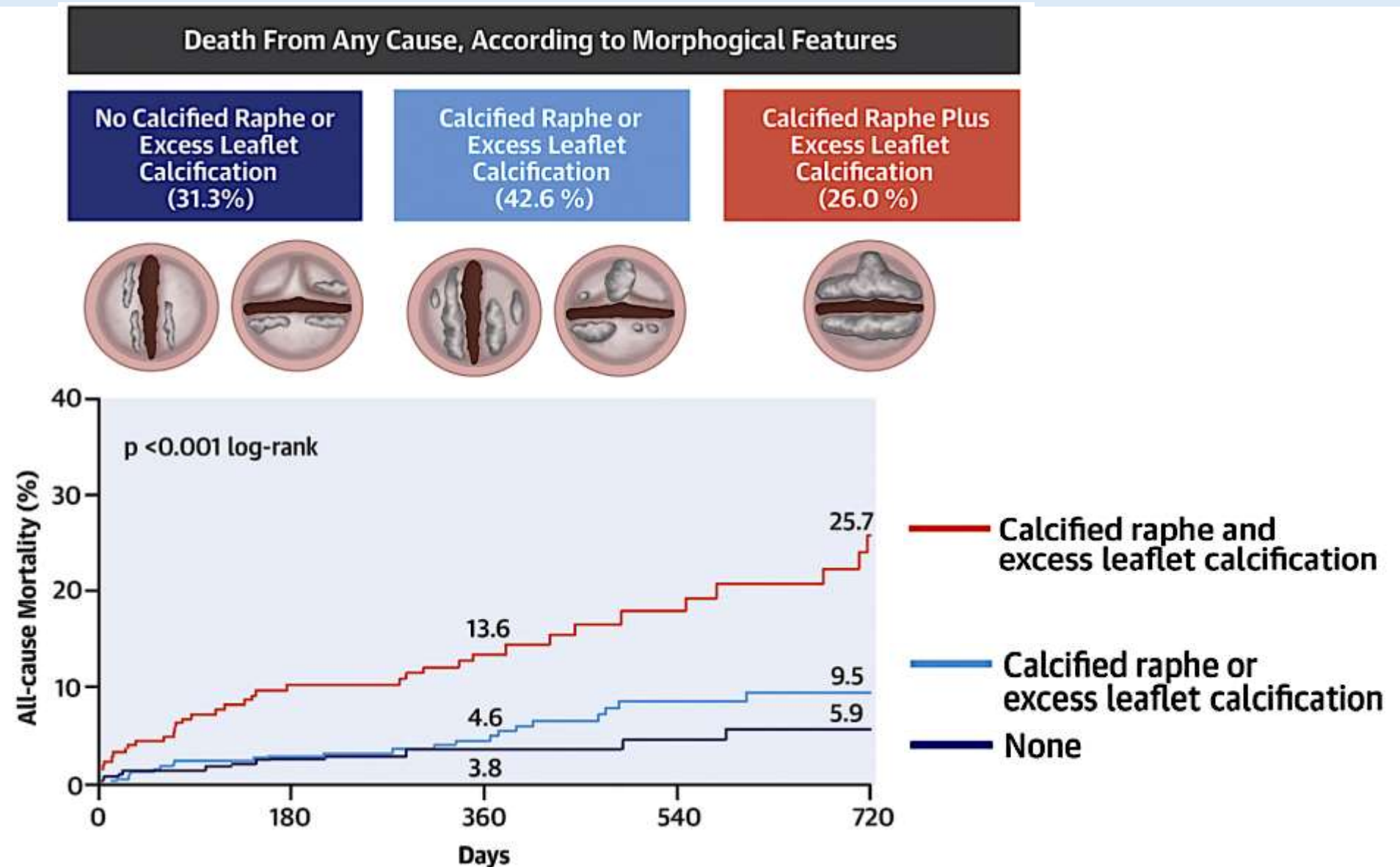


Stroke

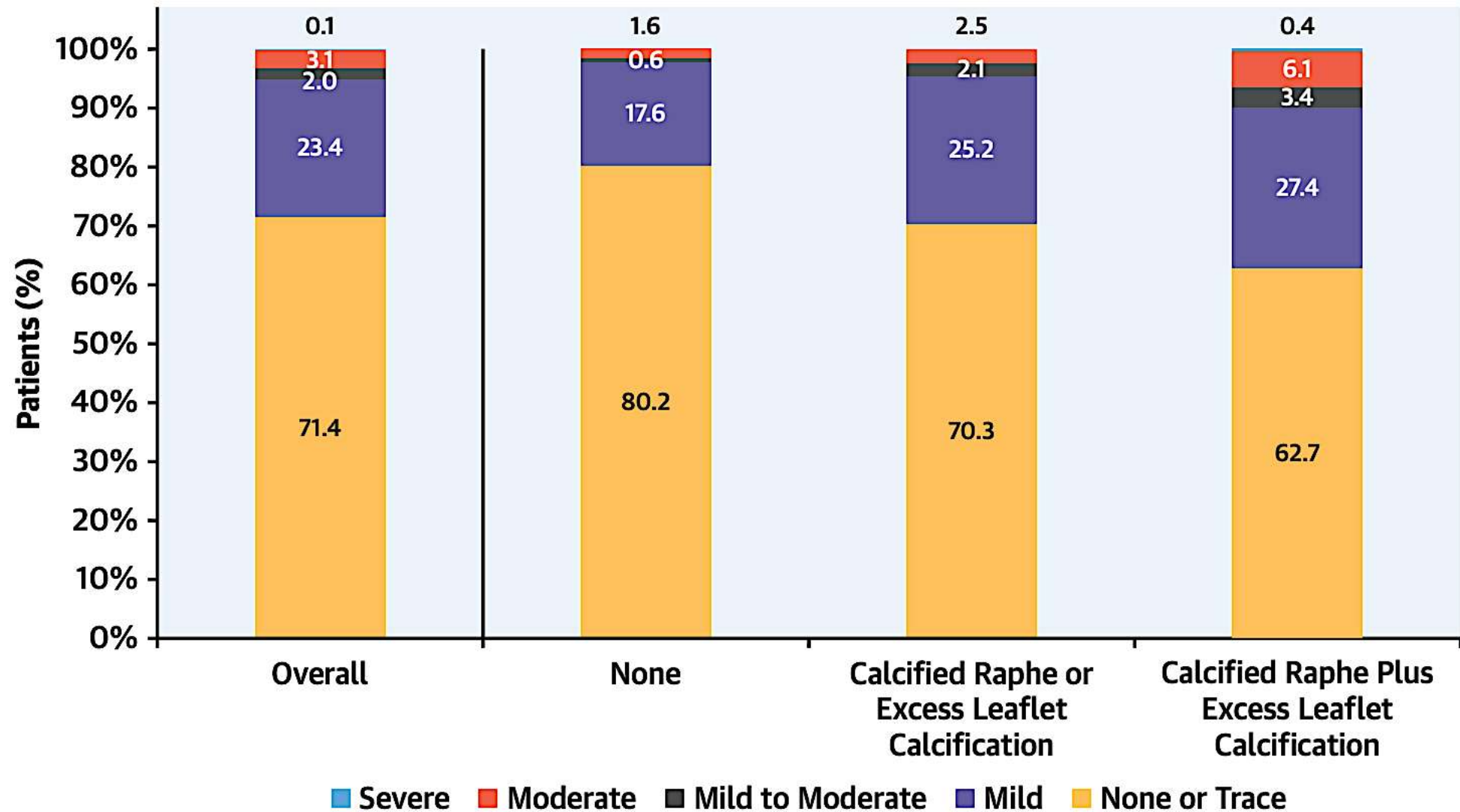


Registry of BAV according to morphological features

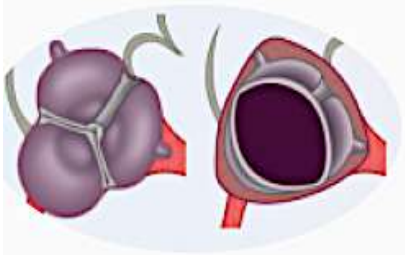
1 070 bicuspidies



Registry of BAV according to morphological features



Guidelines



Recommendations

TAVI may be considered for the treatment of severe BAV stenosis in patients at increased surgical risk, if the anatomy is suitable.

Class

IIb

Level

New

B

Messages

It is **the most common** of all **congenital heart diseases**, affecting 1 to 2% of the population

There are **anatomical particularities** (wide, elliptical annulus...) and **technical issues** (poor expansion, PM....)

Often excluded in **randomised studies**

Post-TAVI outcomes are identical to tricuspid valves except when **the raphe AND the valves** are highly **calcified**.

Key elements: analysis and measurement of TC, choice of valve, discussion within the heart team between SAVR and TAVI