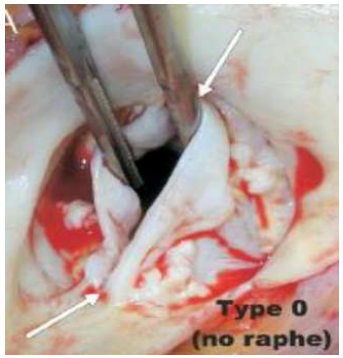
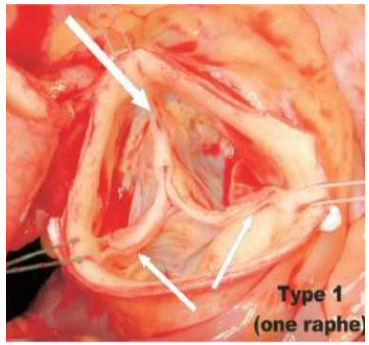
DOIT ON ENCORE CONTRE INDIQUER LE TAVI DANS LA (LES) BICUSPIDIE (S) ?





Florence LECLERCQ

Département de cardiologie

CHU MONTPELLIER

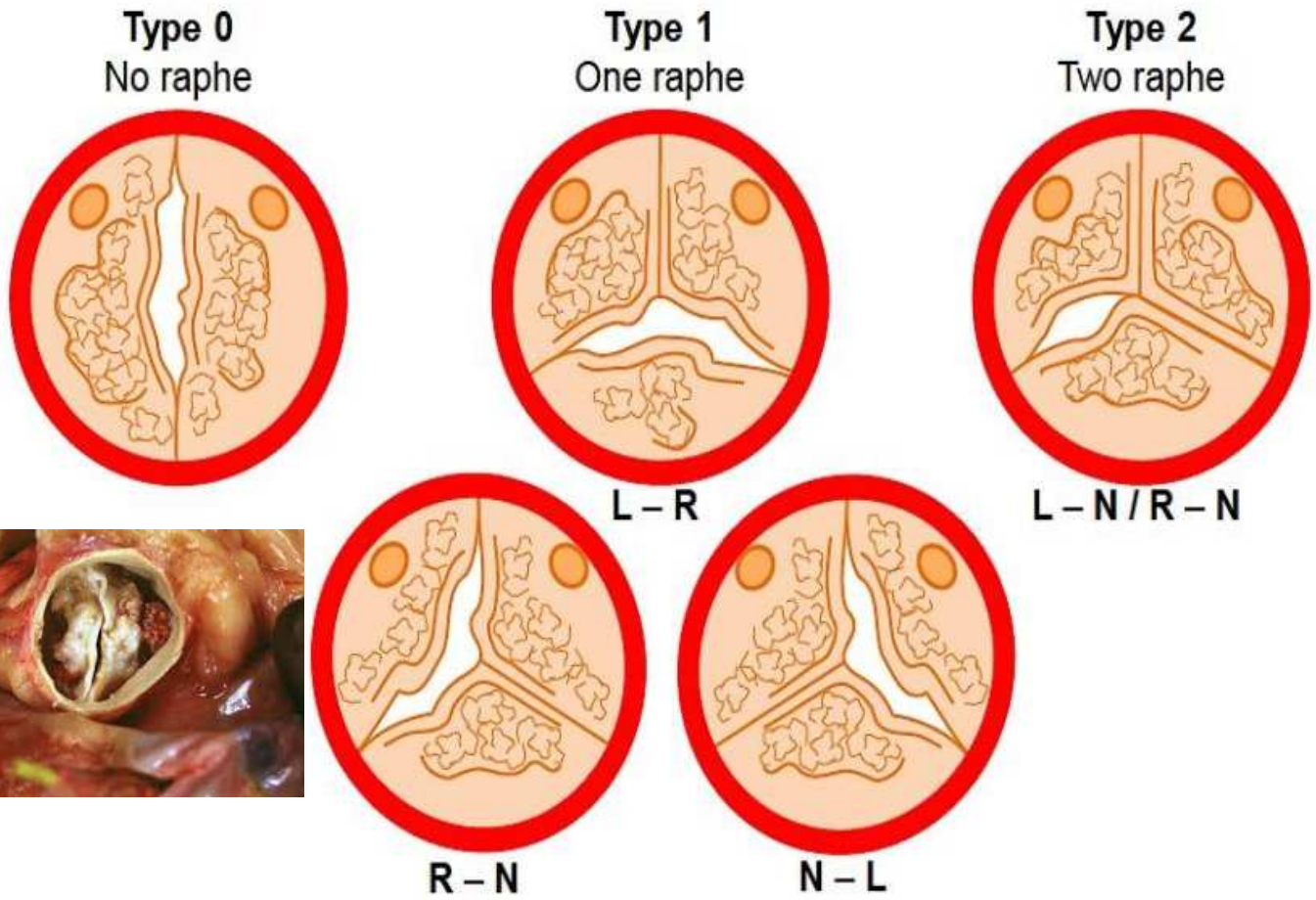
CONFLITS D'INTERETS

- Subventions et honoraires
  - Edwards Lifesciences
  - Medtronic

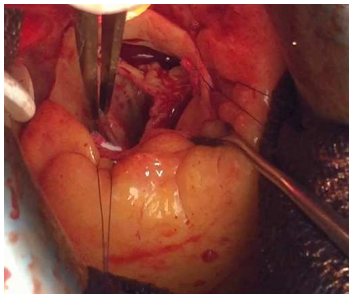
BICUSPID AORTIC VALVE
WHAT ARE THE CURRENT ISSUES ?

- **The most common congenital valvular abnormality** (0.5 % to 2% of the general population), **the majority of aortic valve replacements in patients below the age of 60**
- **Historically considered as a contraindication to TAVI**
- **Populations of TAVI are more likely to include patients with bicuspid valves** (worldwide shift of treating younger and lower surgical-risk patients)
- **New generation valves and growing experience may provide better results in challenging anatomies such as bicuspid AS**

BAV morphology & Classification



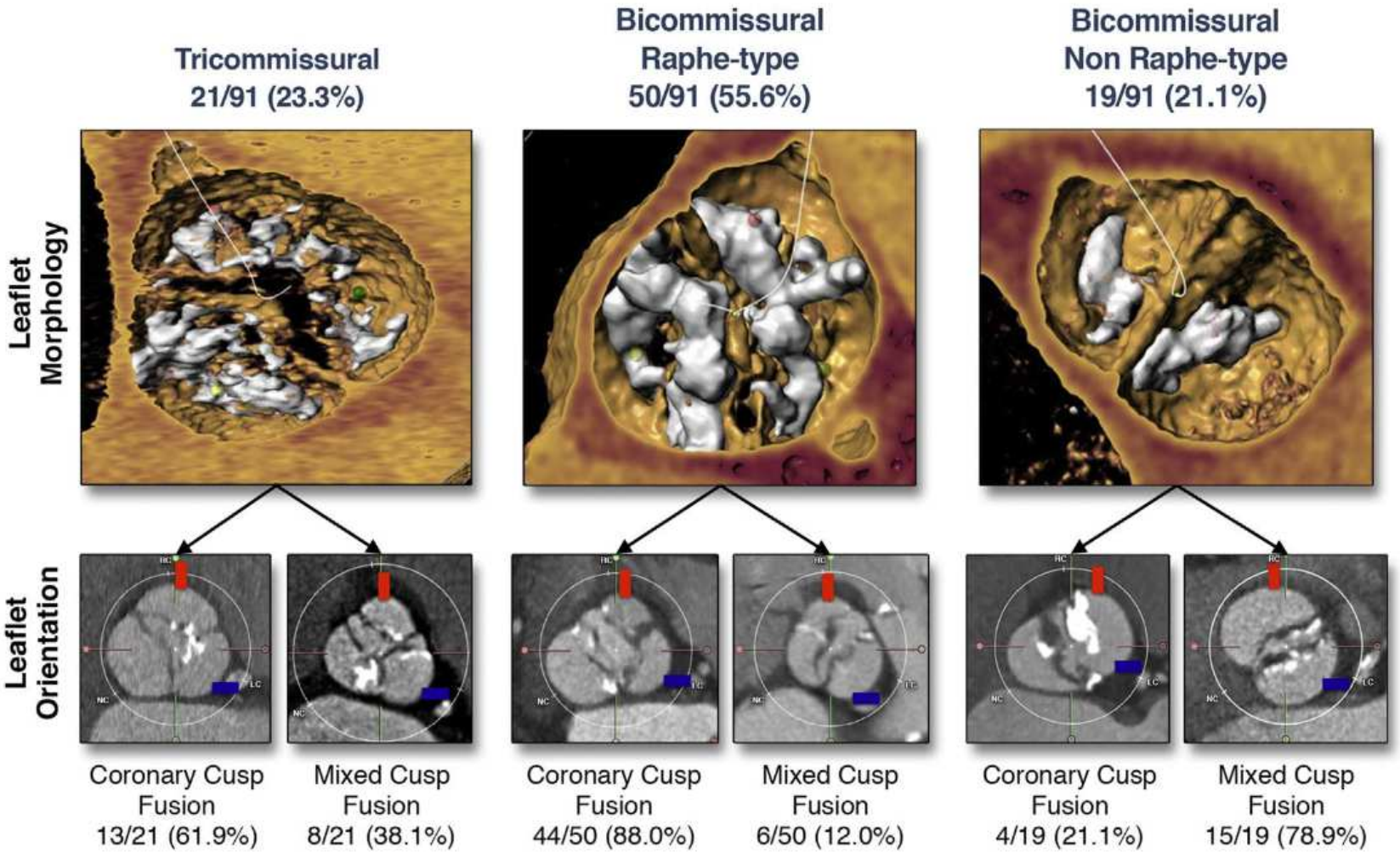
- **Type 0: 26.7%**
- **Type 1: 68.3%**
- **Type 2: 5.0%**



Sievers et al. J Thorac Cardiovasc Surg 2007

Mylotte D., JACC. 2014;64(22):2330-2339

BAV Classification in TAVI Era



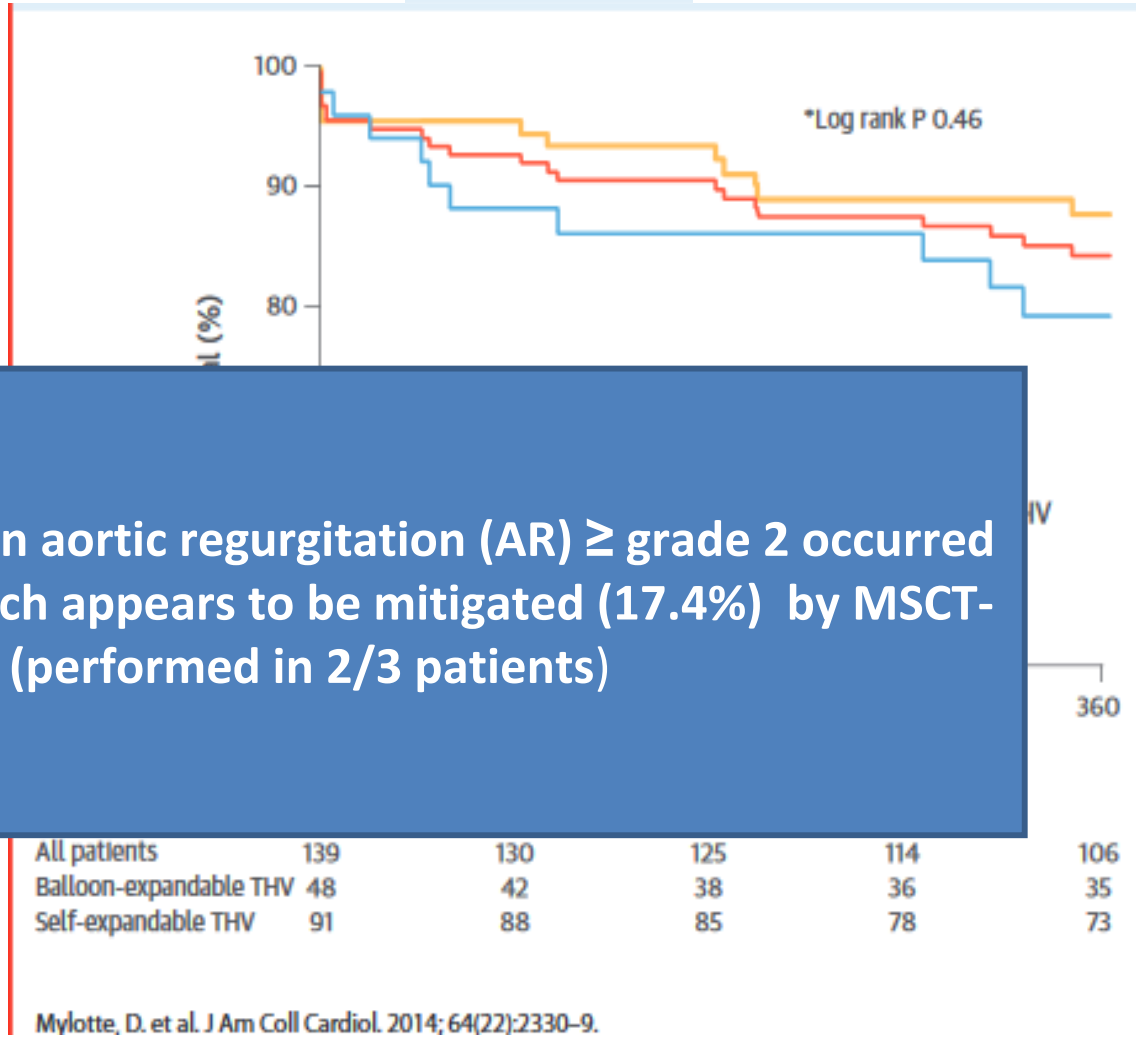
Jilaihawi et al. JACC imag. 2016

Transcatheter Aortic Valve Replacement in Bicuspid Aortic Valve Disease

TABLE 4 Clinical Outcomes

Characteristic	All patients (n = 139)	Sapien (n = 48)	CoreValve (n = 91)	p Value
Hospital stay, days	8 (5, 11)	7 (4, 12)	8 (6, 11)	0.38
Mortality				
Procedural	5 (3.6)	1 (2.1)	4 (4.9)	0.66
At 30 days	7 (5.0)	3 (6.3)	4 (4.9)	0.69
At 6 months*	13 (9.6)	7 (14.6)	6 (6.6)	0.12
At 1 year†	21 (17.5)	10 (20.8)	11 (12.5)	0.12
Myocardial infarction	3 (2.2)	0	3 (3.3)	0.55
Periprocedural	3 (2.2)	0	3 (3.3)	-
Spontaneous	0			
Stroke	3 (2.2)			
Disabling	2 (1.4)			
Non disabling	1 (0.8)			
Bleeding	37 (26.6)			
Minor	18 (12.9)			
Major	9 (6.5)			
Life-threatening	10 (7.2)			
Acute kidney injury (stage 3)	3 (2.2)			
Vascular complications	30 (21.6)			
Minor	21 (15.1)			
Major	9 (6.5)	4 (8.3)	5 (5.5)	-
New pacemaker	32 (23.2)	8 (16.7)	24 (26.7)	0.21
Device success	125 (89.9)	43 (89.6)	82 (90.1)	0.99
Combined safety endpoint	110 (79.1)	39 (82.2)	71 (78.0)	0.83
Combined efficacy endpoint	118 (84.9)	42 (87.5)	76 (84.5)	0.81

One-Year Survival

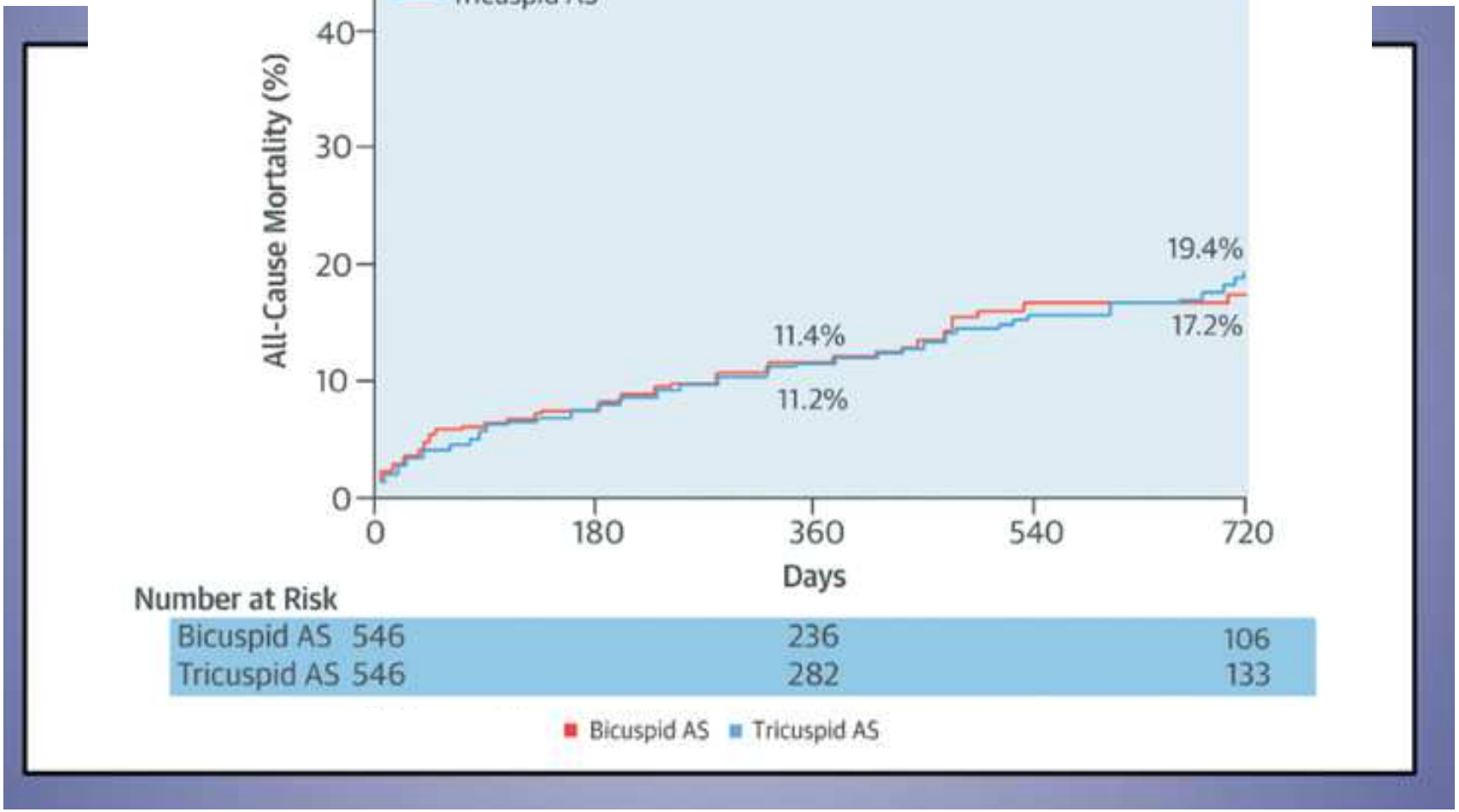


Mylotte, D. et al. J Am Coll Cardiol. 2014; 64(22):2330–9.

Post-implantation aortic regurgitation (AR) ≥ grade 2 occurred in 28.4% but which appears to be mitigated (17.4%) by MSCT-based TAV sizing (performed in 2/3 patients)

Outcomes in Transcatheter Aortic Valve

All-Cause Mortality



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

ANATOMY IS CHALLENGING

- **Complex anatomy**: more aortic root calcification , asymetral calcification of leaflet or raphe, smaller LVOT, dilated aorta

→ Malposition, PVL, annulus rupture, acute aortic regurgitation, conductive disorders (strokes?)

- **Ellipically shaped annulus**

→ valve underexpansion or hemodynamics (gradient or PVL), durability

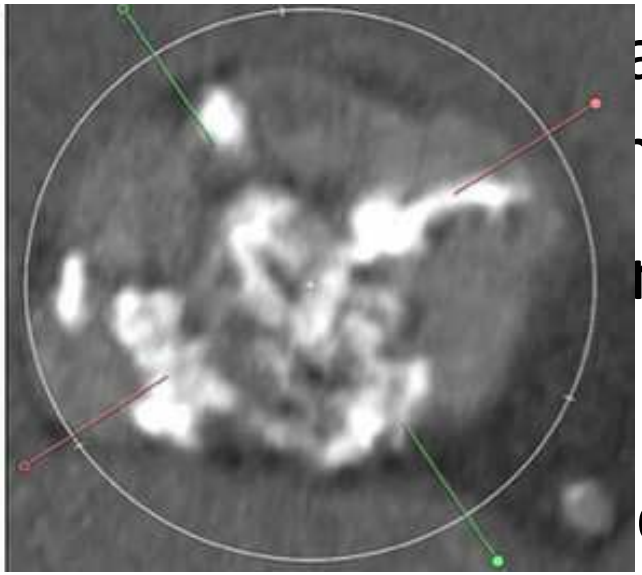
- **Sinuses are more often effaced**

→ Coronary obstruction/injury of the sinuses

DIAGNOSTIC IS CHALLENGING

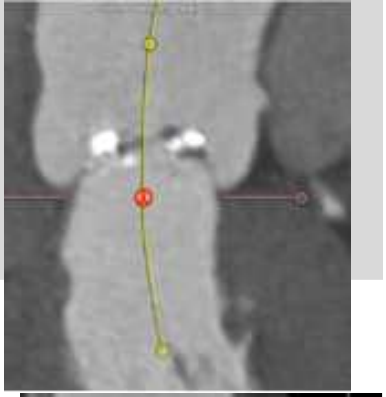
- Underestimation of bicuspid valve with ETT either ETO

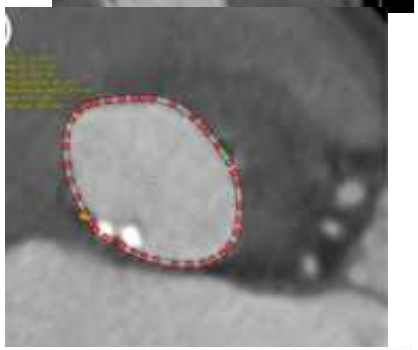
- MSCT—which has become the gold standard —is used to c alve a s 0, 1 or 2 or J ne ao and cha m loa



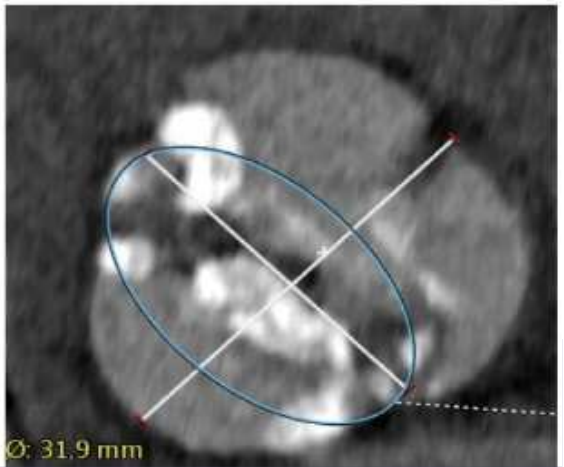
- Hov cuspi ifficult particularly in patients with extremely calcified anatomies.

SIZING IS CHALLENGING





- **Lack of consensus** concerning the optimal sizing methodology: **to avoid aggressive oversizing**
- **Supra-annular sizing** (inter Commissural Distance 4–8 mm above the annular plane), **in combination with the dimension of the aortic annulus** (the perimeter-derived diameter at annulus level)
- **CT area showed the highest correlation and the best agreement with intraoperative sizing?**
- **Sizing in grey zones: ballon sizing ?**
- **The optimal ratio annulus/device remain to determine** (registries ongoing)



C. De Biase et al. / International Journal of Cardiology 266 (2018) 56–60

Wang European Radiology (2019) 29:259–269

CHOICE OF THE VALVE IS CHALLENGING

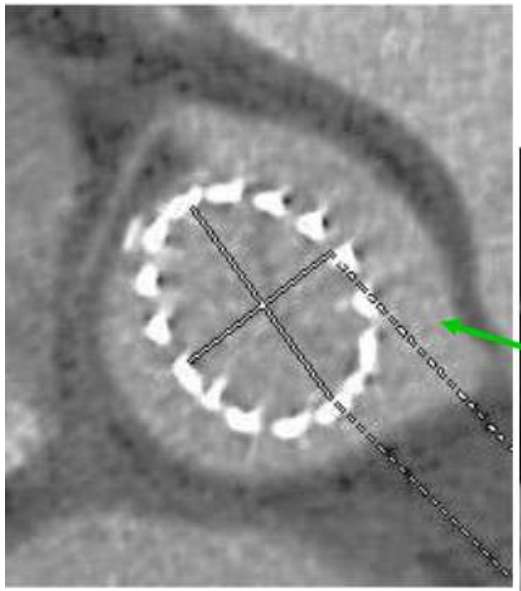
- **No direct comparative studies**

- **The balloon-expandable valve**
  - Greater radial force : to circulate the native annulus and obliterating potential sites of paravalvular AR.
  - External skirt of the Sapien 3: decrease risk of paravalvular AR
  - calcified nodules or raphe: may impair complete prosthesis expansion
  - Potential risk of rupture ?

- **The self-expanding prostheses**
  - Supra-annular position: potentially improve hemodynamic outcomes with non circular annulus
  - External wrap of the EVOLUT Pro: decrease risk of paravalvular AR
  - Reduced radial strength relative to balloon-expandable valve and frequent need to post dilatation

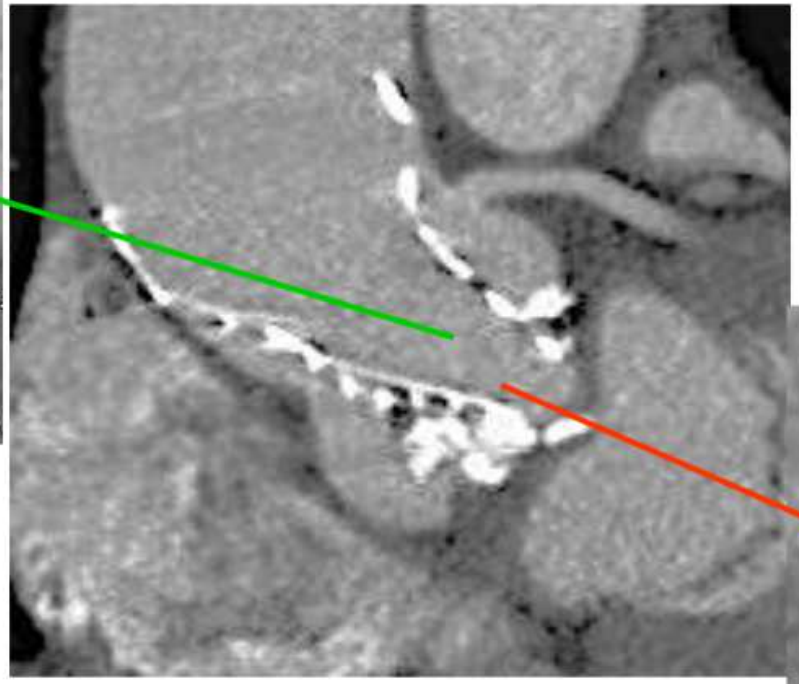
- **Last generation valves: lotus and accurate ?**

Frame expansion at different levels



Supra annular level

CT Scan, post implantation



Annular level

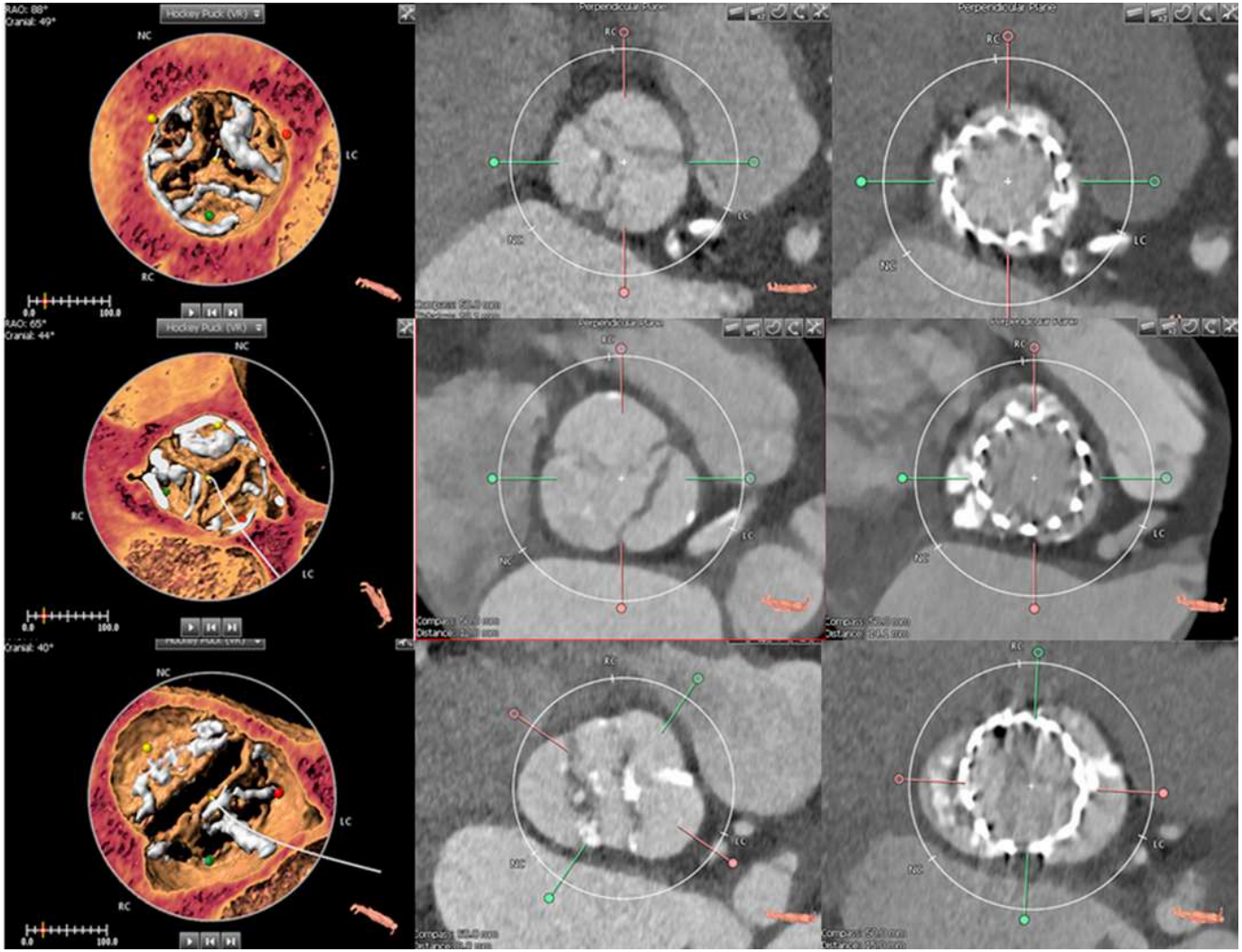
U. Gerckens MD

2017 euro PCR

HIGH TECH MARSEILLE
PALAIS DU PHARO

Computed tomography characteristics of the aortic valve and the geometry of SAPIEN 3 transcatheter heart valve in patients with bicuspid aortic valve disease

Hiroyuki Kawamori,



European Heart Journal 2018
Cardiovascular Imaging

TIPS AND TRICK ?

- **Evaluation of the anatomy on MSCT imaging ++** (raphe, commissures, calcification, aortic anatomy, LVOT)
- **Predilatation** (undersize ballon)
- **No oversizing but correct sizing, contrast injection in grey zones**
- **High implantation** (supra annular functioning, valve anchoring, conductive disorder)
- **Pacing with self expandable THV**
- **Post dilatation** (valve expansion, gradient, PVL)
- **ETO if required**

TAKE HOME MESSAGES

- TAVI in bicuspid valves **is possible** with new generation THV and associated with high rates of device success and low rates of early safety events
- A perfect understanding of the anatomy of the valve and the aortic root is required.
- MSCT is the basis of the diagnosis and anatomic evaluation. Specific sizing rules need to be defined.
- The choice of device type depends on the preferences of the individual heart team. Second-generation devices seem to share equivalent outcomes, place of new devices have to be evaluated
- TAVI is not contra indicated in bicuspid valve **but surgical indications probably remain**: high degree of valve calcification (raphe) , unfavorable aortic anatomy
- Large prospective registries and long follow-ups are required to explore the outcomes (pace makers and durability)