

Bicuspid Aortic Valve: China Experience with the Venus A-Valve

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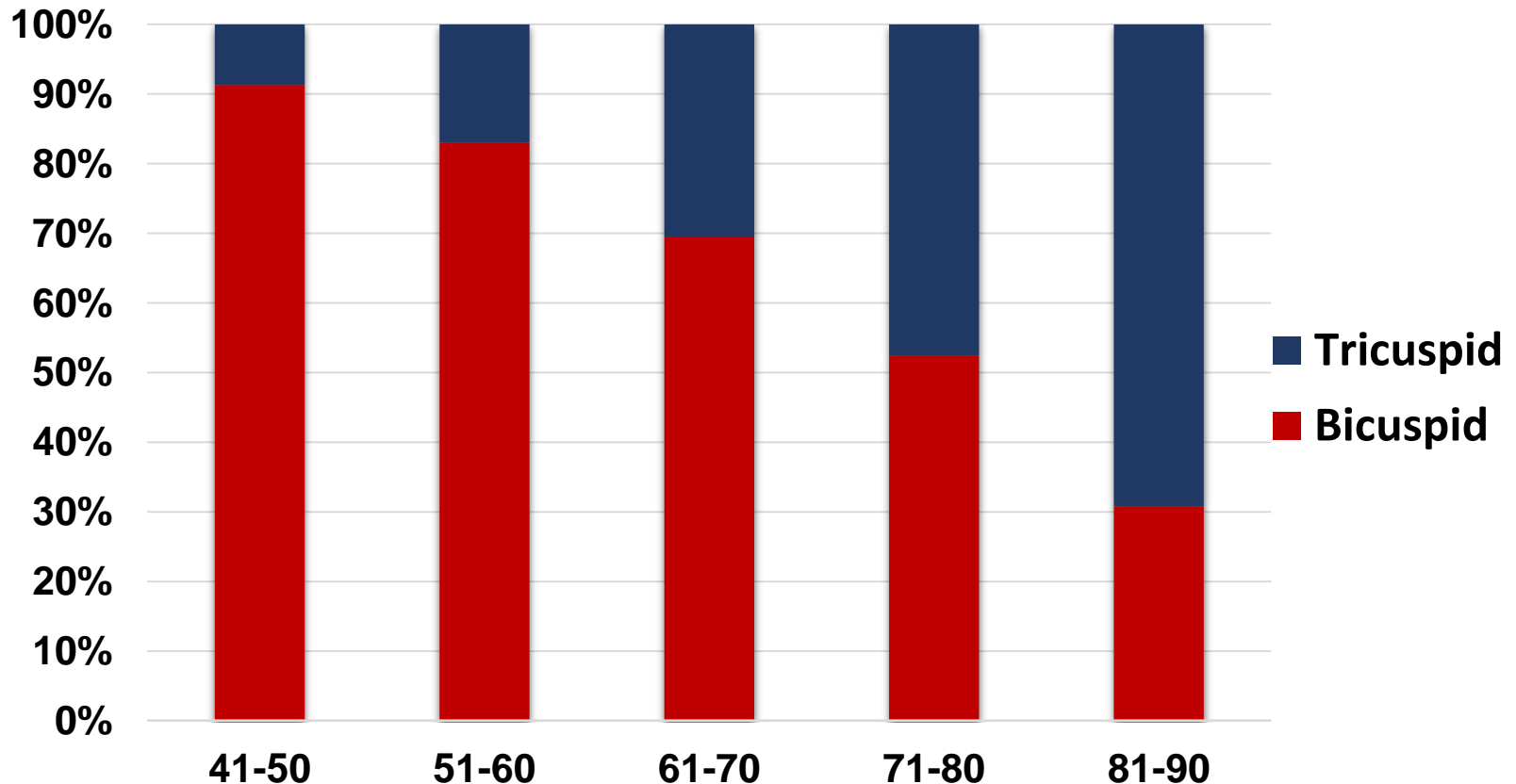
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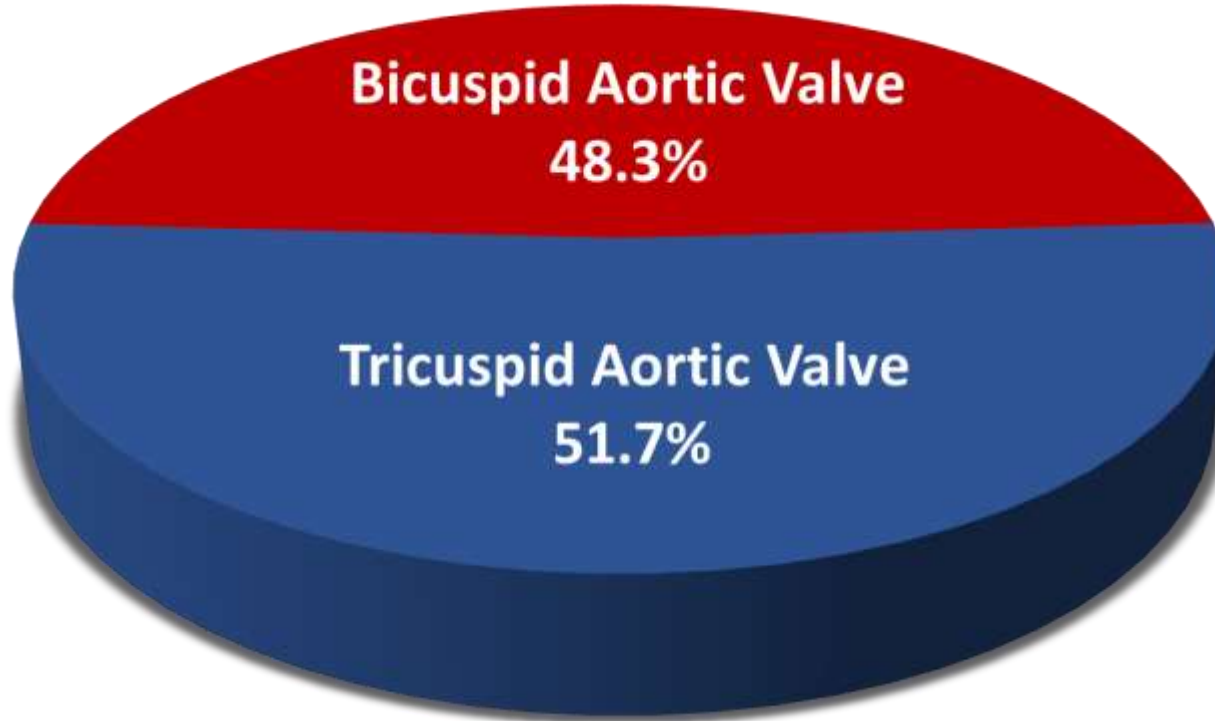
Potential Role of TAVI in BAV

- ❖ Bicuspid aortic valve (BAV) accounts for 20%~30% of octogenarians undergoing SAVR (potential TAVI candidates)



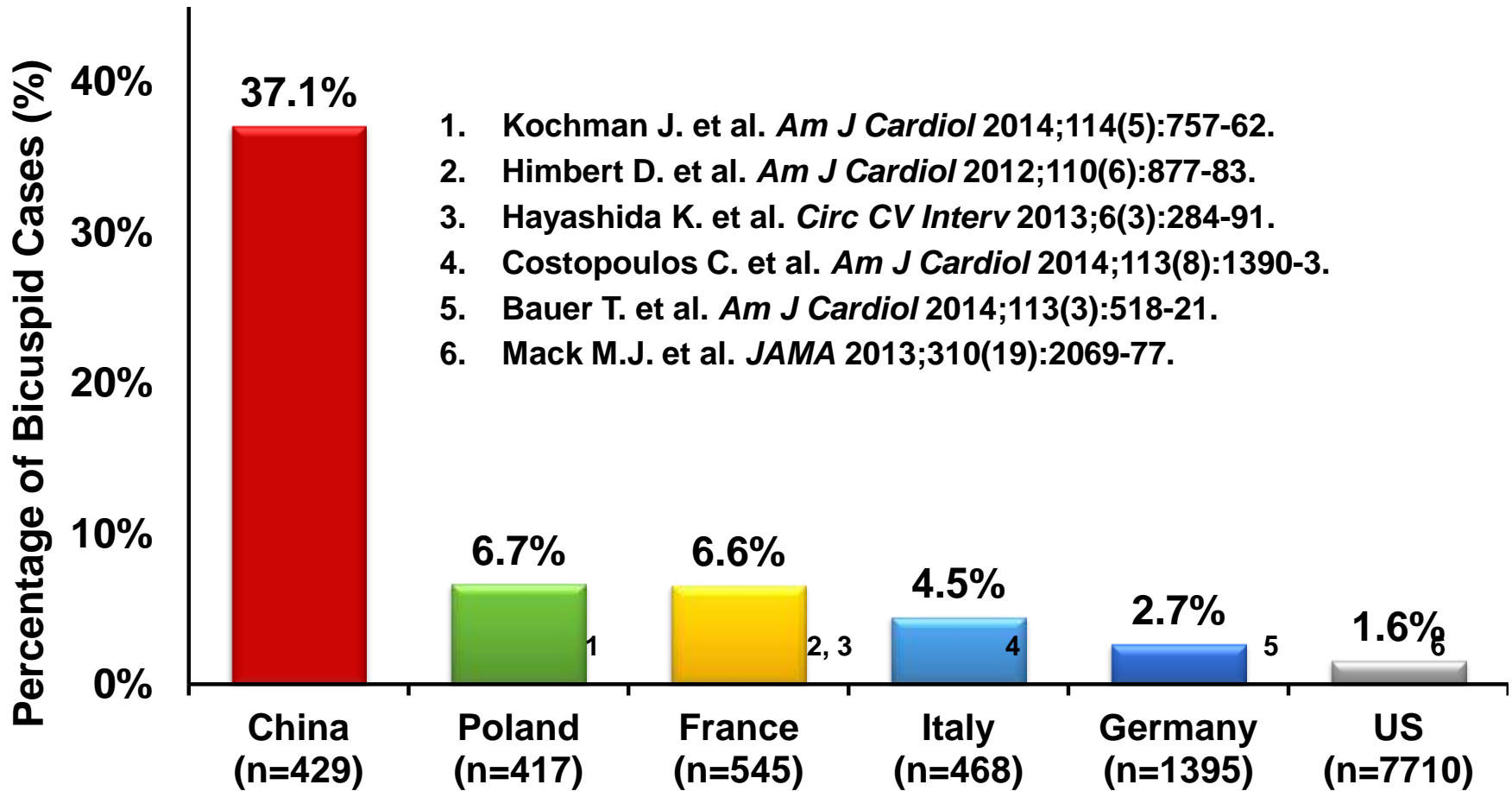
Potential Role of TAVI in BAV

- ❖ Nearly 50% of Chinese patients screened for the Venus A-Valve TAVI trial had a BAV (n = 118, median age = 74 yrs)



Potential Role of TAVI in BAV

- Nearly 40% of Chinese patients treated by TAVR had a BAV



Challenges for TAVI in BAV



European Heart Journal (2012) **33**, 2451–2496
doi:10.1093/eurheartj/ehs109

ESC/EACTS GUIDELINES



Guidelines on the management of valvular heart disease (version 2012)

Table 10 Contraindications for transcatheter aortic valve implantation

Relative contraindications
Bicuspid or non-calcified valves
Untreated coronary artery disease requiring revascularization
Haemodynamic instability
LVEF <20%

Challenges for TAVI in BAV

❖ Associated lesions of the ascending aorta

Left
Untreated



Catheter manipulation

The impacts of prosthesis
(eg. outflow end of the CoreValve)

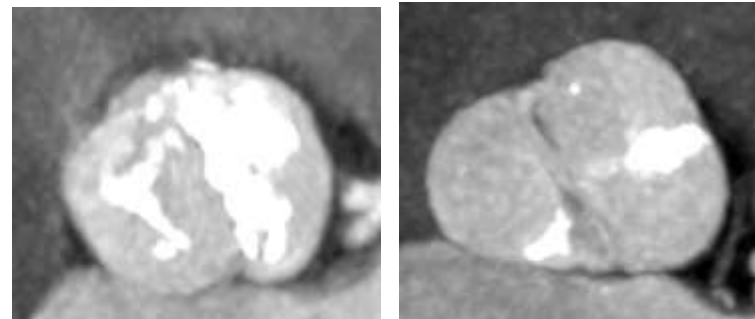
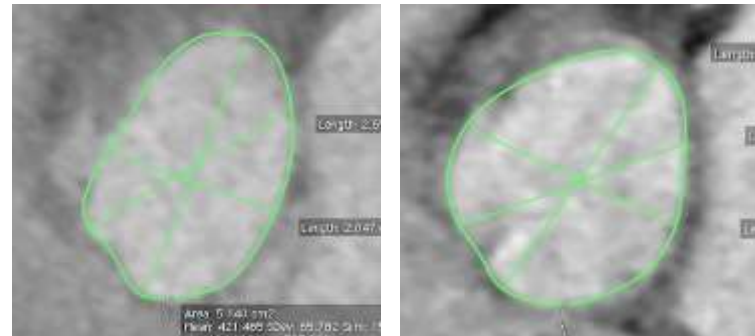
**Aortic complications
(rupture or dissection)**



Challenges for TAVI in BAV

❖ Asymmetric anatomy

- Eccentric annulus
- Asymmetric valve calcification & calcified raphe
- Unequal-sized or bulky leaflets

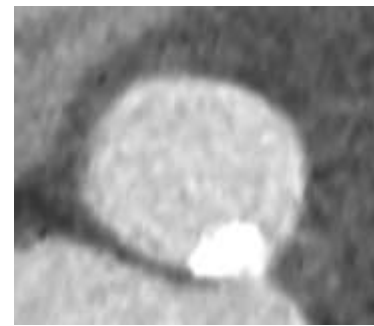
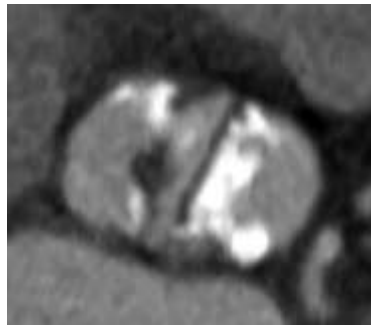


Challenges for TAVI in BAV

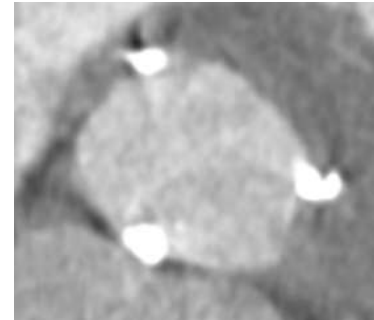
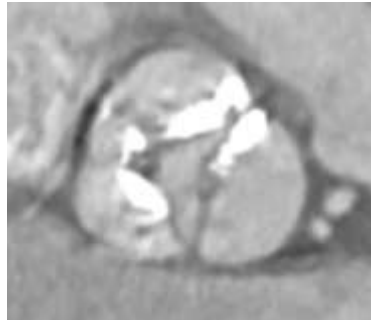
❖ Annulus-orifice “mismatch”

Free Edge of BAV Leaflets $\approx \frac{2}{3} * \text{Annulus Circumference}$

Type 0 BAV



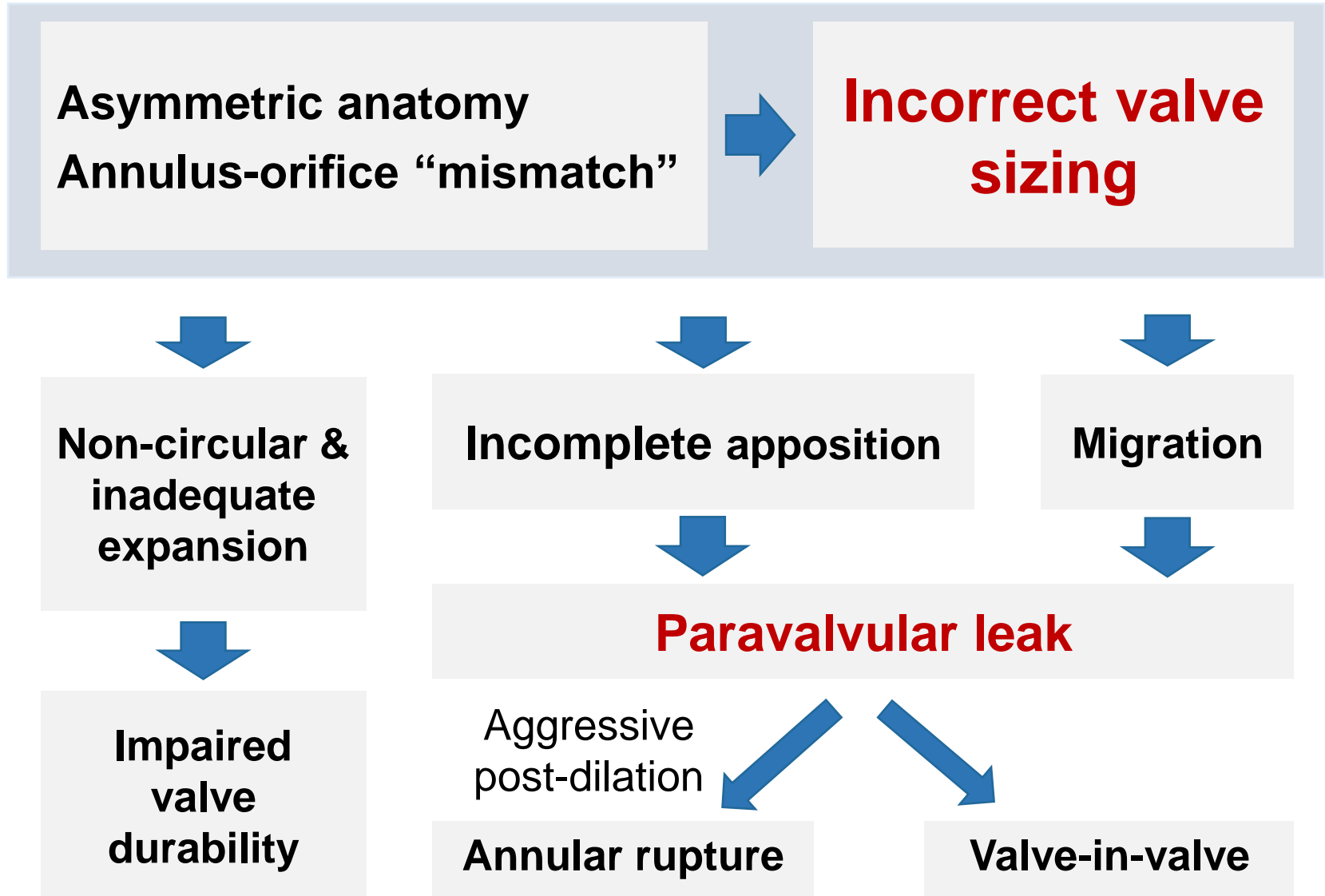
Type 1 BAV



Valve Orifice

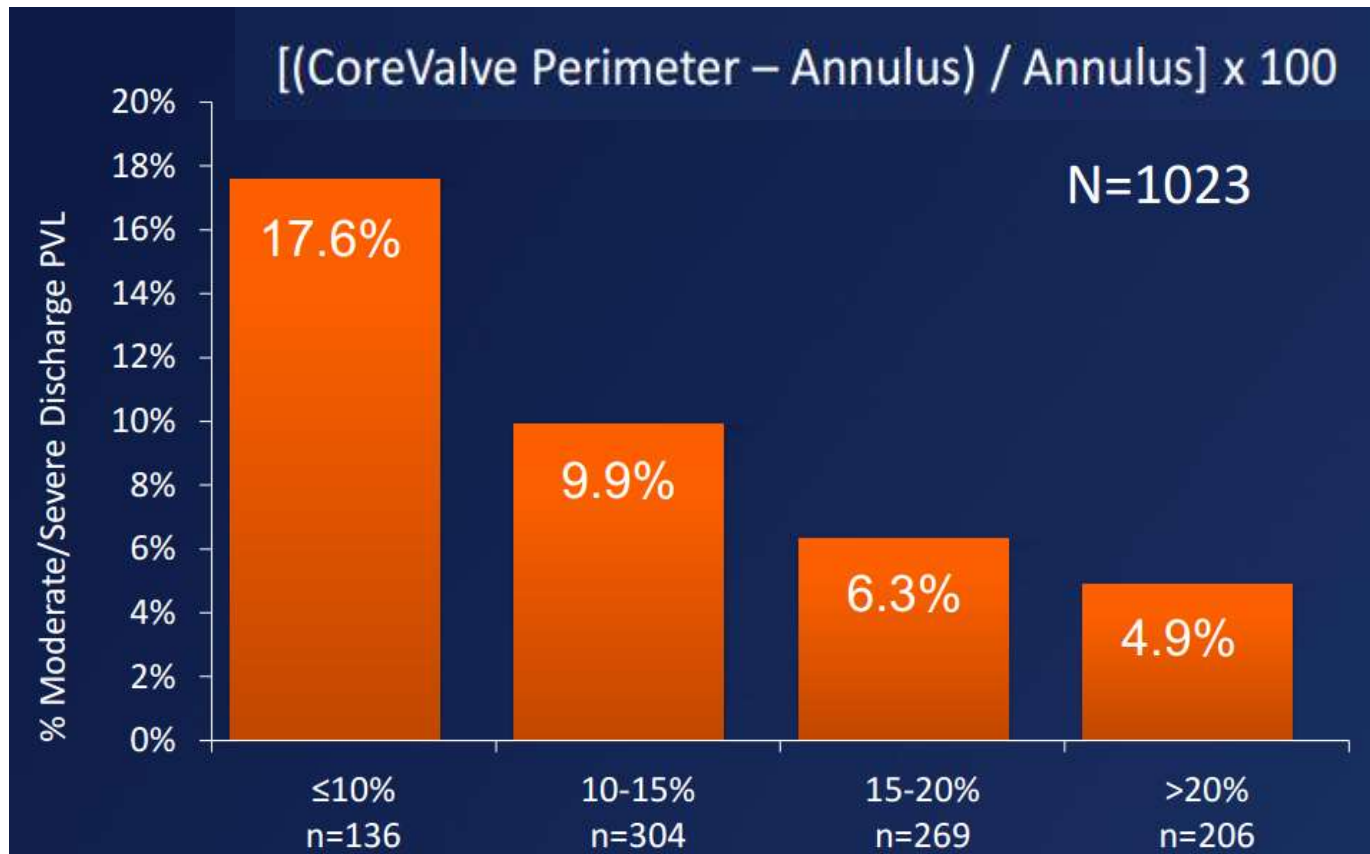
Annulus

Challenges for TAVI in BAV



Valve Sizing: Experience from US CoreValve Pivotal Trials

- ❖ Sizing ratio and the incidence of AR grade \geq moderate



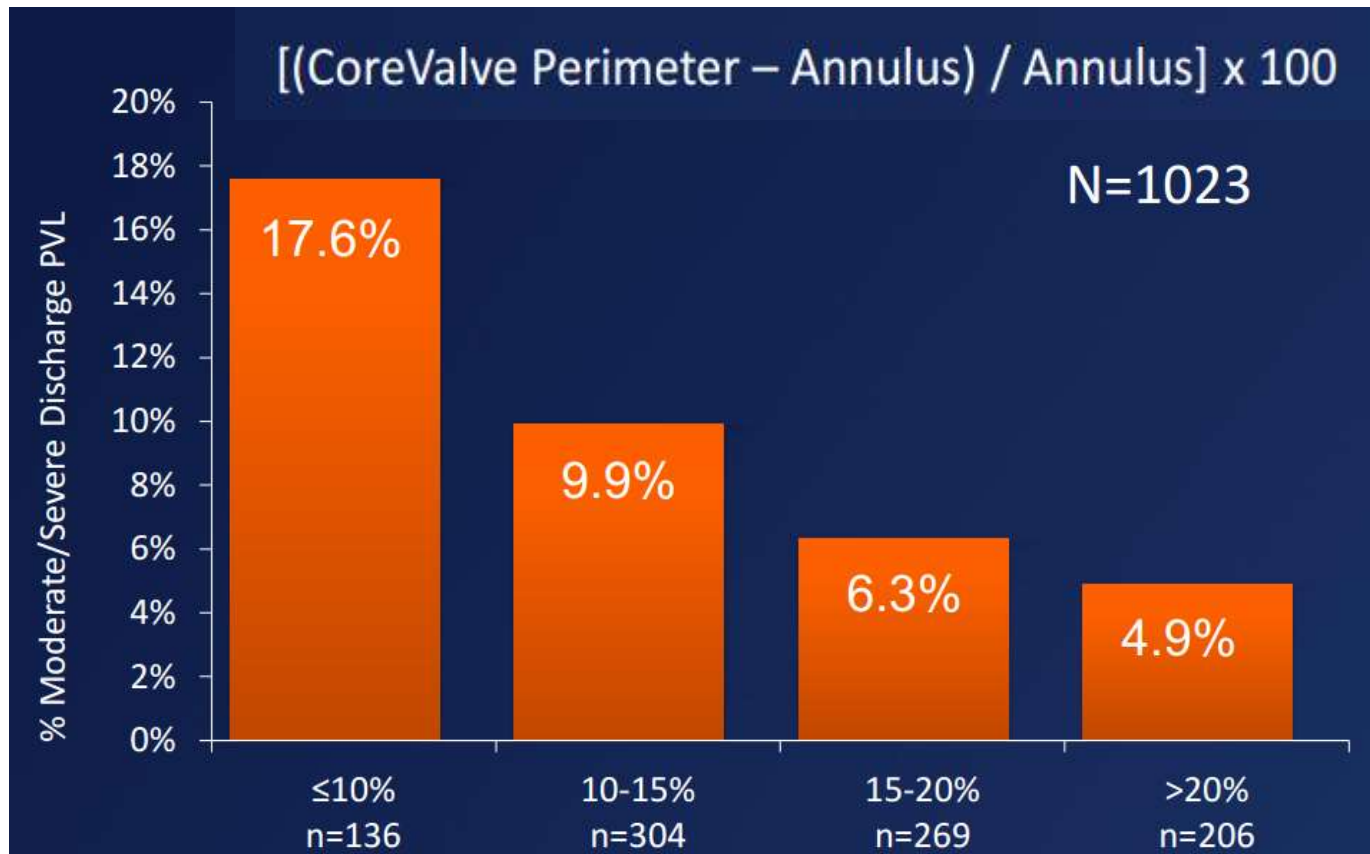
Challenges for TAVI in BAV

❖ Incidence of AR grade ≥ 2 following TAVI in BAV

Valve sizing	BE-THV	SE-THV	P Value
Echo- & CT-based	19.6%	32.2%	0.11
CT-based	16.7%	17.6%	0.99

Valve Sizing: Experience from US CoreValve Pivotal Trials

- ❖ **Could we apply these experiences to our BAV patients? Maybe NO!**



Valve Sizing for BAV: Experience from West China Hospital

- ❖ ***Annulus-based sizing***

Apr. 2012 ~ May 2014

- ❖ ***Balloon sizing***

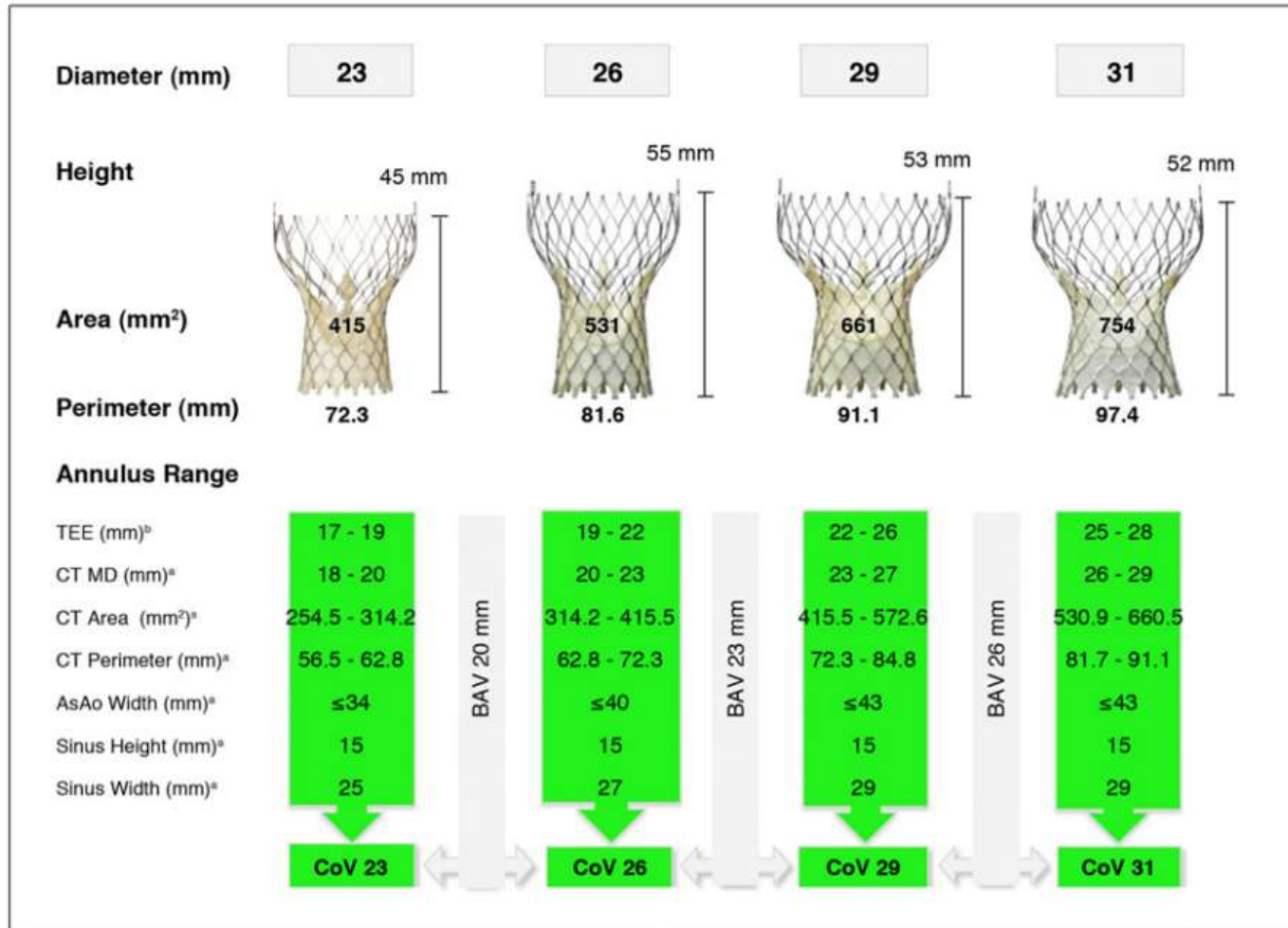
May 2014 ~ Jan. 2016

- ❖ ***Supra-annular sizing***

Jan. 2016 ~ now

Valve Sizing for BAV: Experience from West China Hospital

❖ Annulus-based sizing (MCV and early Venus A-Valve era)



Valve Sizing for BAV: Experience from West China Hospital

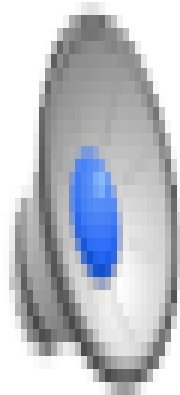
❖ Balloon sizing

- **Balloon valvuloplasty: routinely performed**
 - Balloon sizing
 - Coronary patency

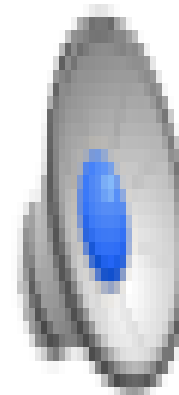
- **Particularly helpful in borderline cases**
 - Borderline annulus diameter
 - At risk of coronary obstruction
 - X-factor: calcification

Valve Sizing for BAV: Experience from West China Hospital

Balloon size = shorter annulus diameter



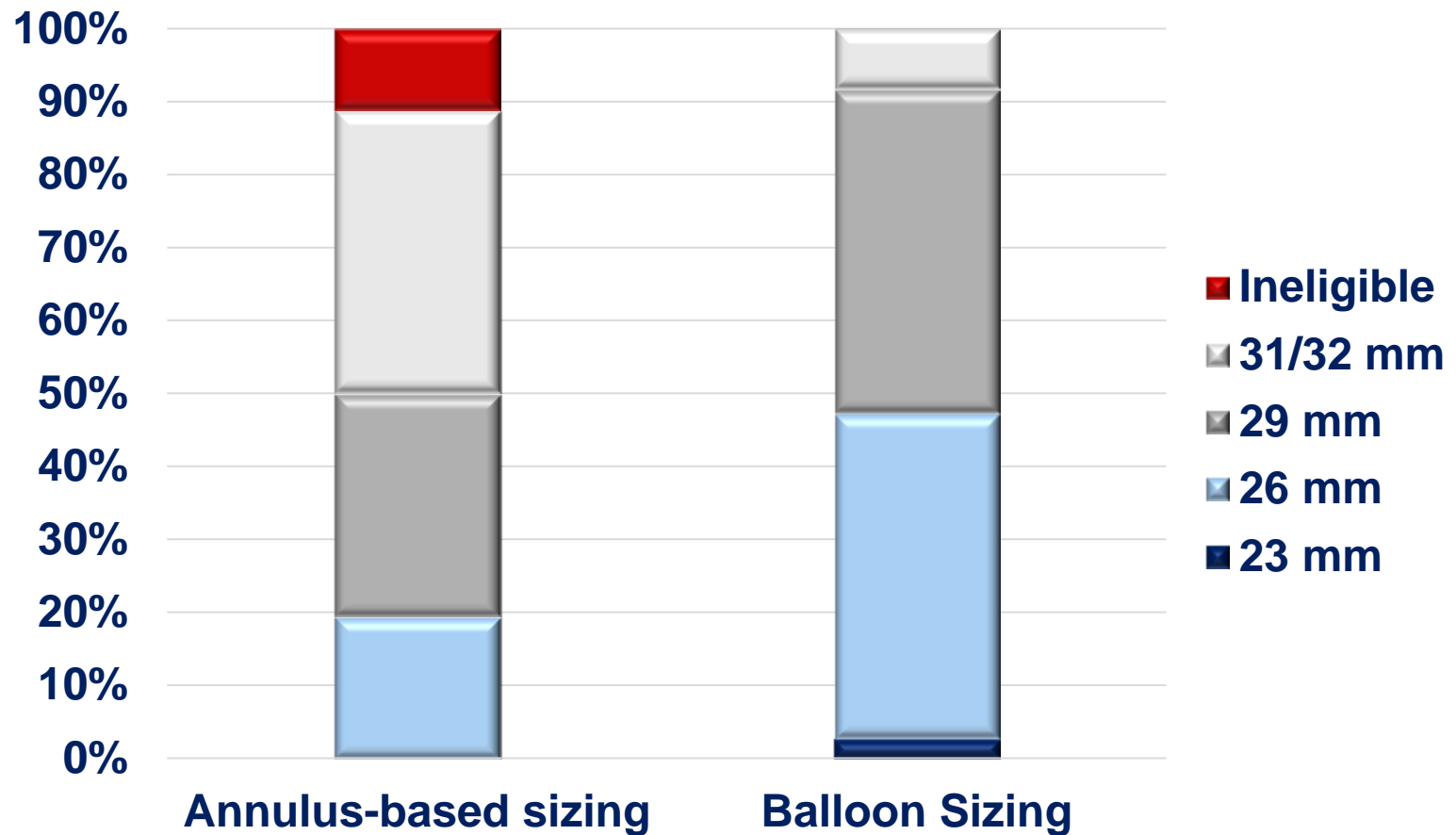
- ❖ Annulus size = balloon size + 3 mm
- ❖ Select the valve accordingly



- ❖ Annulus size > balloon size + 3 mm
- ❖ Select a 1-size (3-mm) larger valve

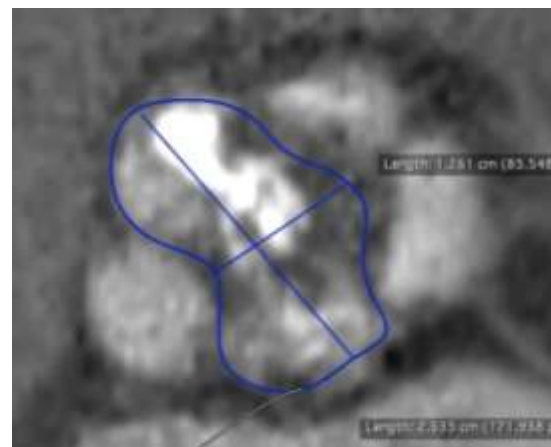
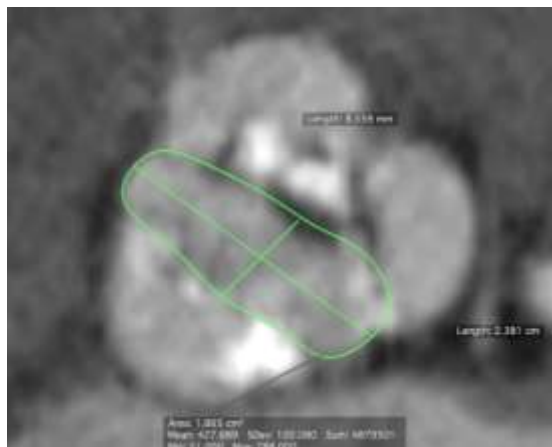
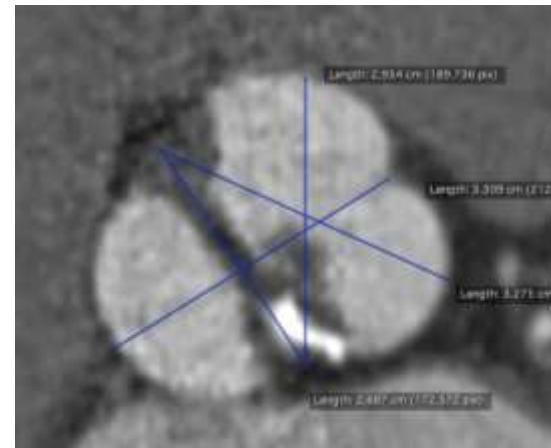
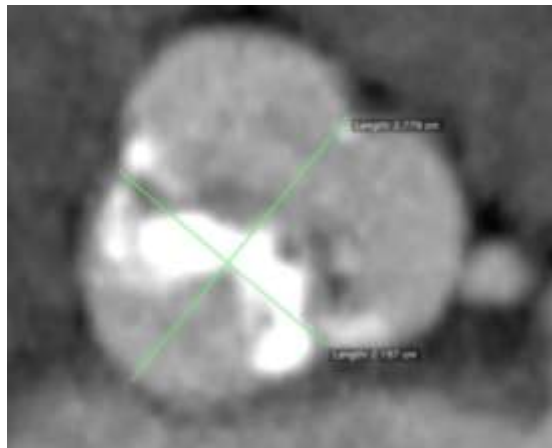
Valve Sizing for BAV: Experience from West China Hospital

- ❖ Balloon sizing was used in 36 BAV patients undergoing TAVI with MCV or Venus A-Valve



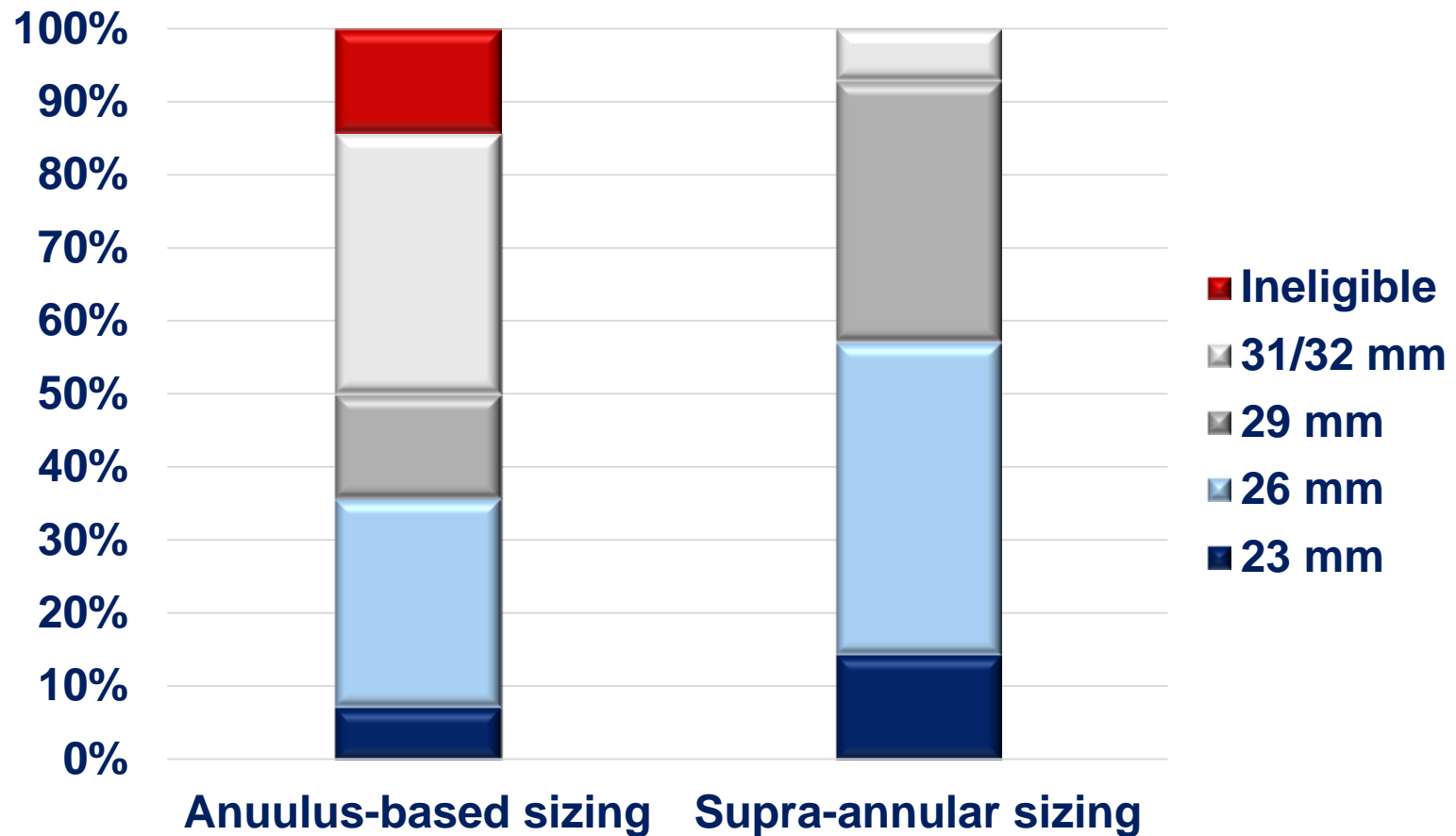
Valve Sizing for BAV: Experience from West China Hospital

- ❖ **Supra-annular sizing: measuring the “leaflet-defined landing zone”**



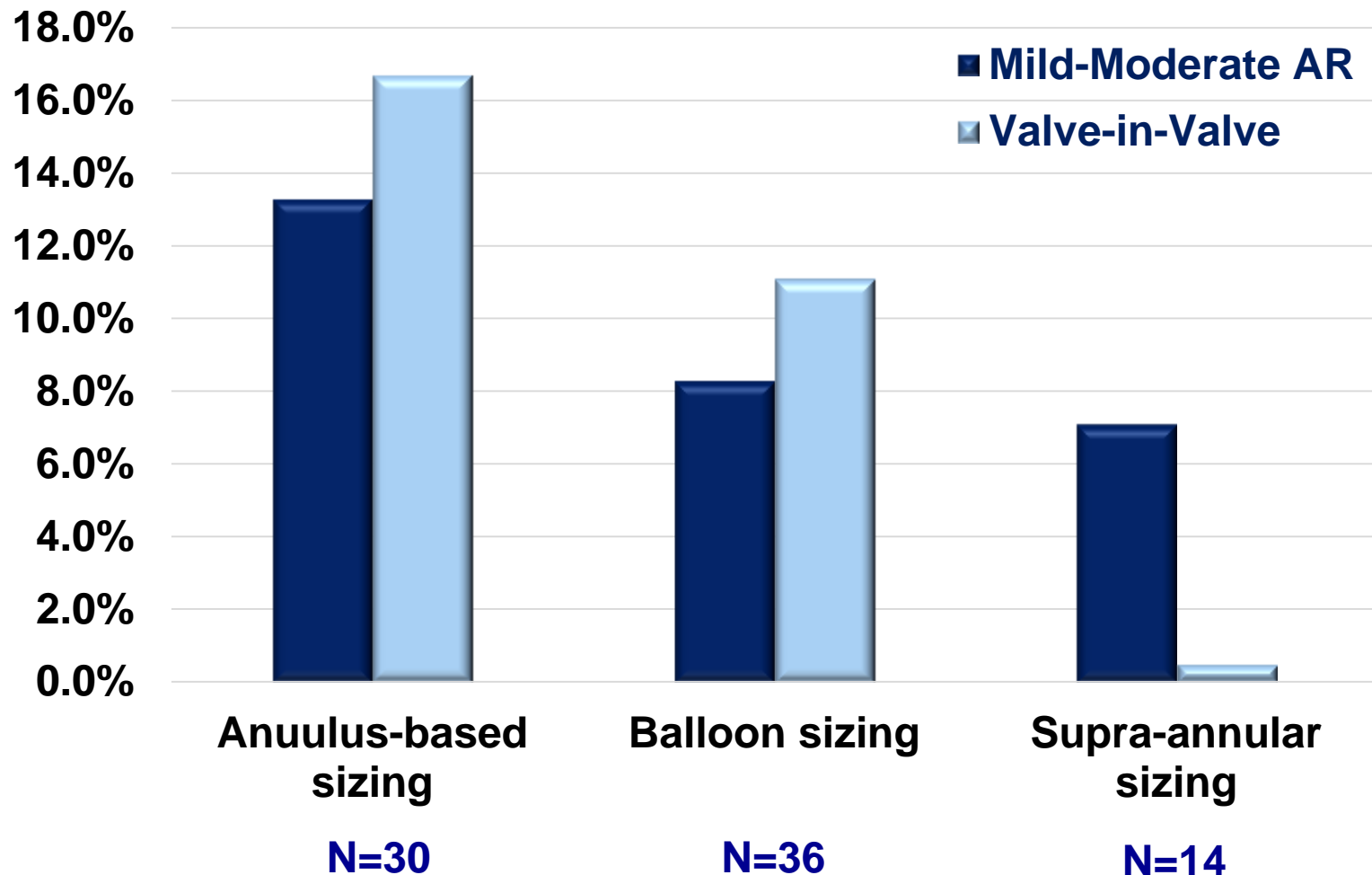
Valve Sizing for BAV: Experience from West China Hospital

- ❖ **Supra-annular sizing was used in 14 BAV patients undergoing TAVI with Venus A-Valve**



Valve Sizing for BAV: Experience from West China Hospital

❖ Incidence of mild-to-moderate AR and valve-in-valve



TAVI in BAV using Venus A-Valve: Experience from West China Hospital

N = 55

Time period	Feb. 2014 ~ Apr. 2016
Mean Age, yrs	73.6
Male, %	31 (56.4%)
BAV Type	
- Non-raphe type	32 (58.2%)
- Raphe type	23 (41.8%)
NYHA III or IV	47 (85.5%)
STS PROM, %	7.5 ± 4.1

TAVI in BAV using Venus A-Valve: Experience from West China Hospital

Procedural Results	N = 55
Procedural success	55 (100.0%) [†]
Procedural death	0
Malignant arrhythmia	0
Conversion to open surgery	0
Coronary obstruction	0
Valve migration or embolization	0

† 2 BAV patients were scheduled for TAVI with Venus A-Valve, but only valvuloplasty was performed because of the high risk of coronary occlusion, these patients were not included for analysis

TAVI in BAV using Venus A-Valve: Experience from West China Hospital

TTE Parameters	Pre-TAVR	Post-TAVR
LVEF, %	53.3 ± 15.3	55.8 ± 12.9
Peak jet velocity, m/s	5.1 ± 0.8	2.5 ± 0.6
Mean gradient, mmHg	64.5 ± 19.6	15.3 ± 8.2

TAVI in BAV using Venus A-Valve: Experience from West China Hospital

30-Day Outcomes	N = 55
Death	3 (5.5)
- Procedure-related	0
- Not procedure-related	3 (5.5)
Neurological events	1 (1.8)
- Major stroke	0
- Minor stroke or TIA	1 (1.8)
Major vascular complication	2 (3.6)
New pacemaker	8 (14.5)

TAVI in BAV using Venus A-Valve: Experience from West China Hospital

Outcomes at Follow-up	N = 55
Duration, days, median (IQR)	336 (168-790)
Survival at follow-up	49 (89.0)
Death	
- Cardiovascular	2 (3.6)*
- Other causes	4 (7.3)
Readmission for cardiac reasons	1 (1.8)†

* Sudden cardiac death

† Valve thrombosis, symptoms relieved after being treated with warfarin

Summary

- ◆ **Bicuspid AS is frequent among Chinese TAVR candidates and poses challenges for TAVR in the country**
- ◆ **Correct valve sizing is critically important in BAV cases**
- ◆ **Supra-annular sizing technique appears to be helpful**
- ◆ **TAVR using the Venus A-Valve produces satisfactory hemodynamic and clinical results in BAV patients**

Thanks for Your Attention!