

TAVI for Bicuspid Aortic Stenosis and Aortic Regurgitation

Open Issues Related to TAVI

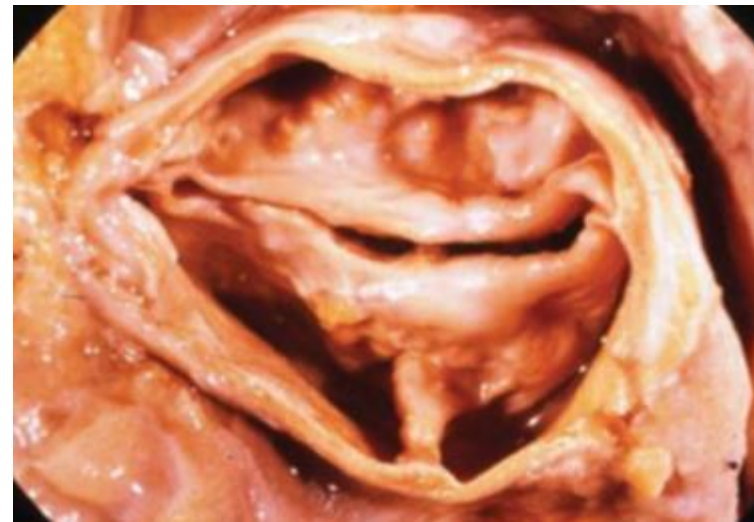
SSC/SSCS Joint Annual Meeting Zürich, 10. Juni 2015

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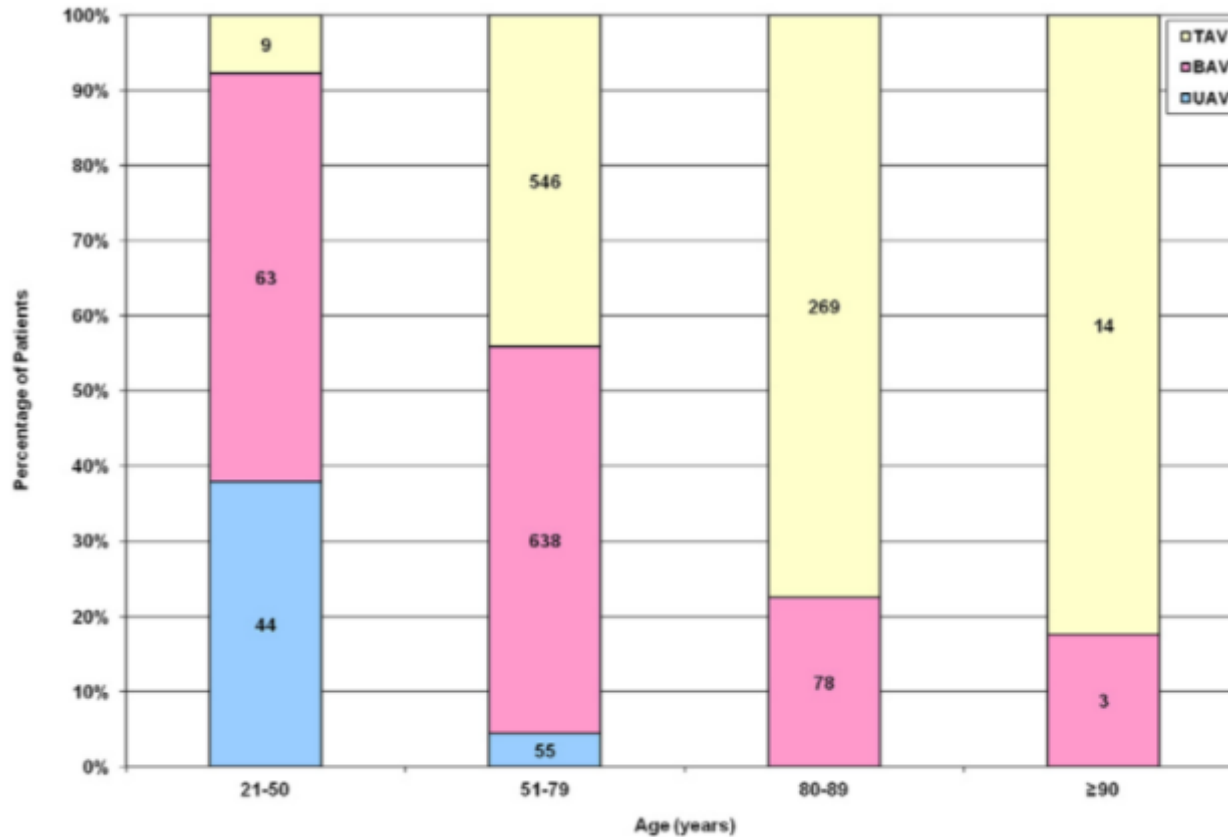


Bicuspid Aortic Stenosis

- Most common congenital heart defect (1–2%)
- Males:females 2:1
- Two leaflets instead of three
 - Two symmetric leaflets
 - Three leaflets with raphe («seam»)
- Elliptical valve orifice
- Possible additional intrinsic structural defect of the aortic media with subsequent aortic dilation



Bicuspid Valves in Aortic Stenosis



→ TAVI is frequently performed in un-recognized bicuspid valves!

TAVI in Bicuspid Aortic Stenosis

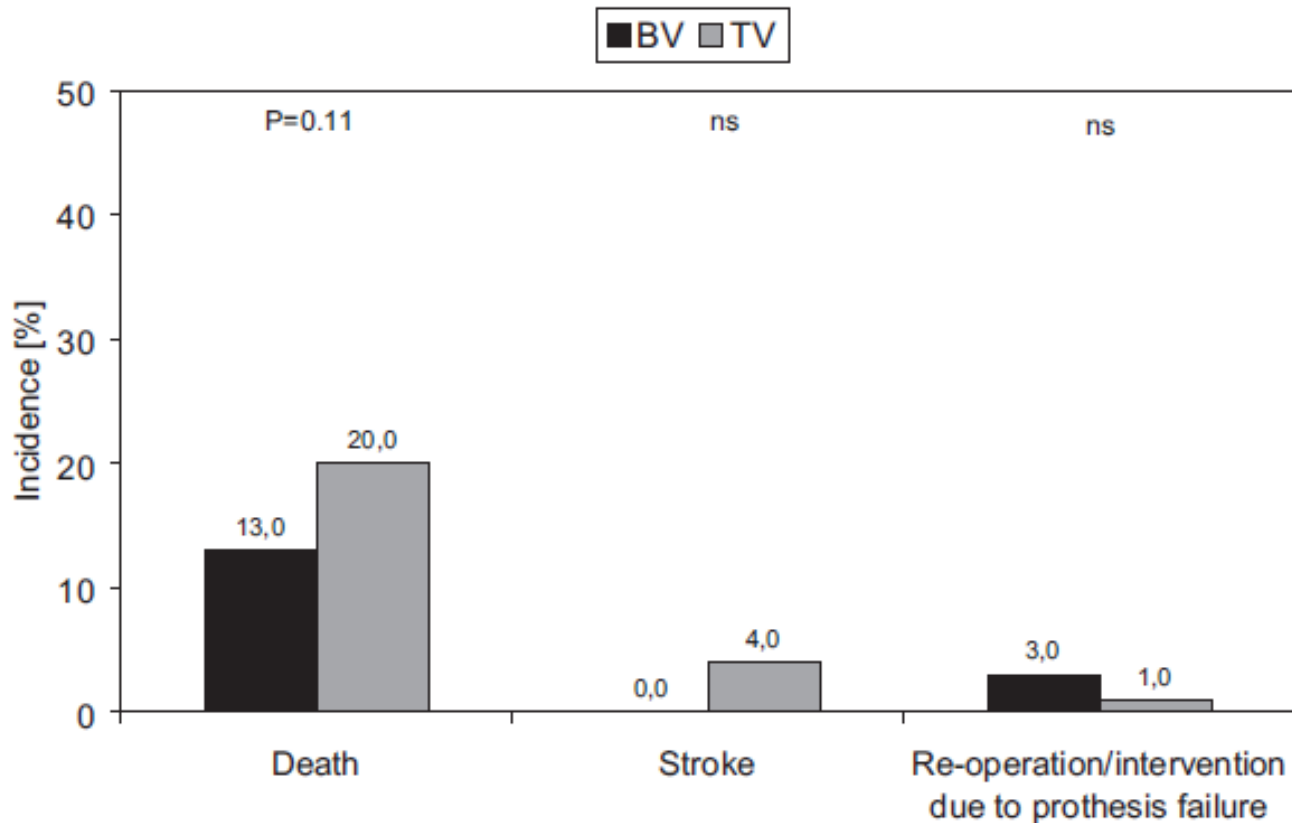
- Relative contraindication to TAVI

- 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 (e.g., higher transvalvular gradients and paravalvular leak)
 3. Presence of aortic disease increases the risk of dissection or rupture during valvuloplasty, postdilatation, 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

TAVI in Bicuspid Aortic Stenosis: 1-Year Outcome

German TAVI Registry:

BAV (n=38, 3%) vs. TAV (1'357, 97%)



TAVI in Bicuspid Aortic Stenosis: Aortic Regurgitation

Aortic regurgitation Grade \geq 2:
28.4% \rightarrow 17% (sizing with MSCT)

Characteristic	Univariate Analysis			Multivariate Analysis		
	Odds Ratio	95% CI	p Value	Odds Ratio	95% CI	p Value
Age	0.95	0.96-1.03	0.63			
Males	3.50	1.50-8.20	0.004	4.29	1.63-10.79	0.003
STS PROM	0.85	0.75-1.04	0.05	0.88	0.75-1.04	0.13
Mean aortic gradient	0.99	0.97-1.02	0.61			
Aortic valve area	3.20	0.34-29.86	0.31			
LV ejection fraction <40%	1.40	0.62-3.14	0.41			
Annulus size	0.93	0.82-1.04	0.20			
TAV size	1.10	0.92-1.31	0.31			
MSCT-based TAV sizing	0.23	0.10-0.51	<0.0001	0.19	0.08-0.45	<0.0001
Bicuspid type 1	2.14	0.82-5.56	0.11			
CoreValve	1.93	0.82-4.54	0.13			
Year of procedure	0.78	0.60-1.03	0.08			

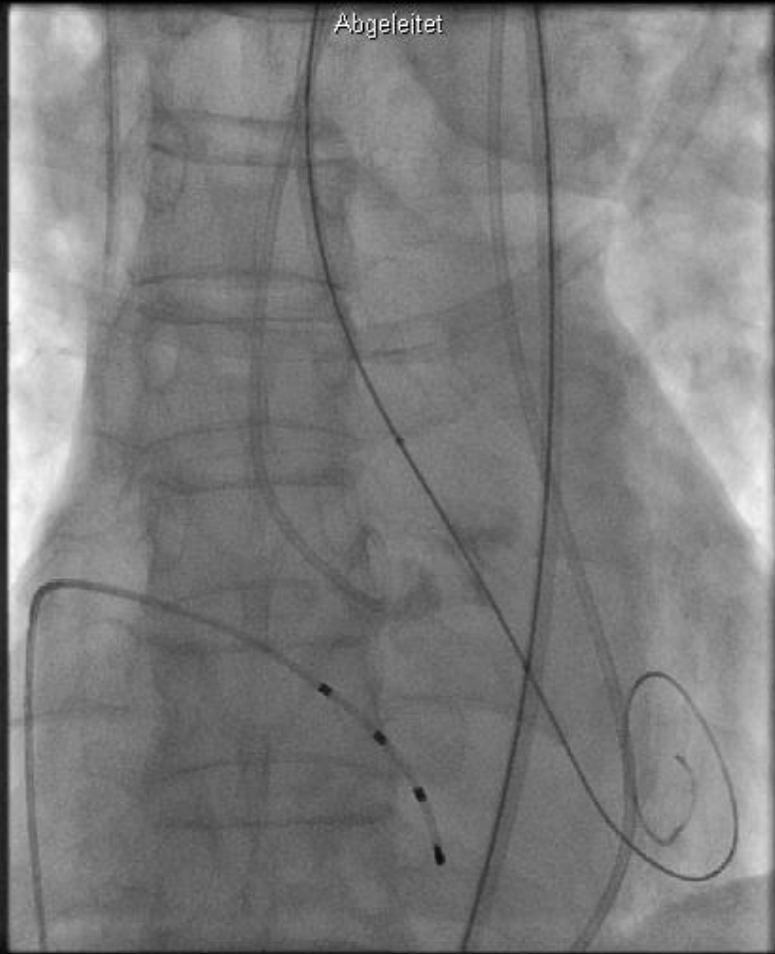


Case Bicuspid Valve

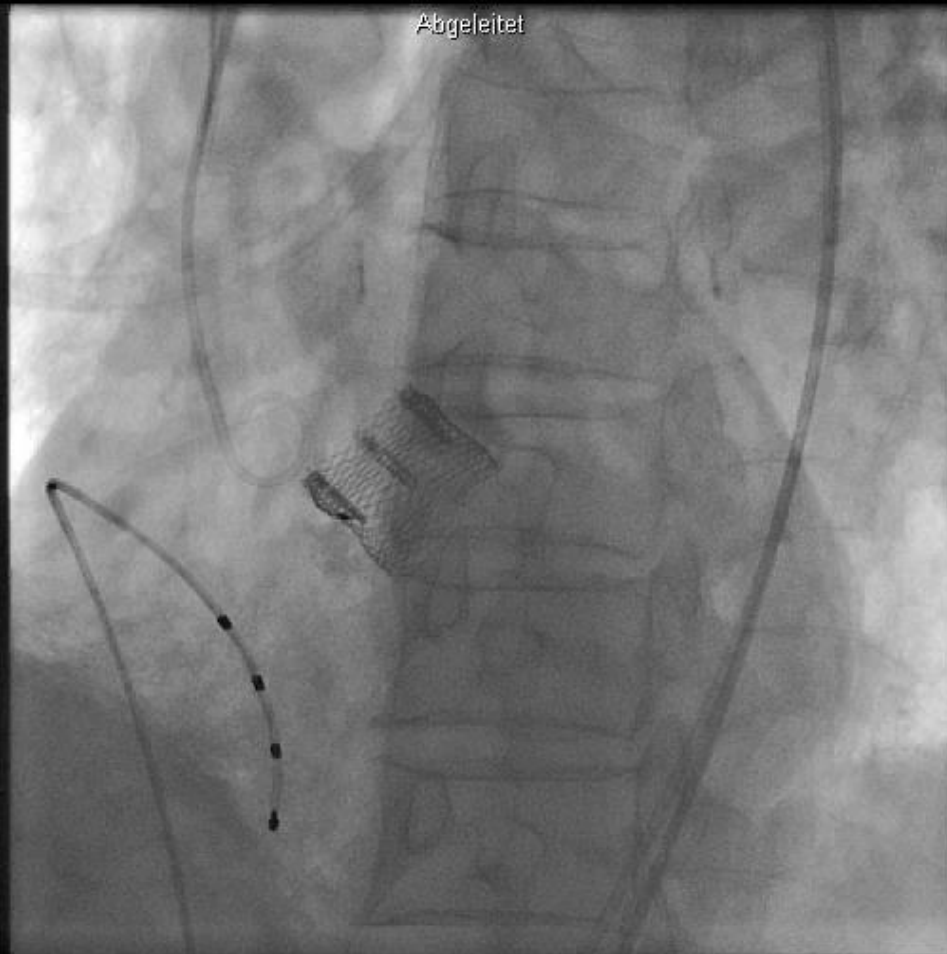
- 84 year old male patient
- Chronic renal failure
- COPD GOLD II
- Severe symptomatic aortic stenosis (dP mean 75 mmHg)



- Annular diameter = 28 mm
- Valve = functionally bicuspid
- Orifice diameter = 22-25 mm



Sizing: Predilatation with
24 mm LomaVista Balloon



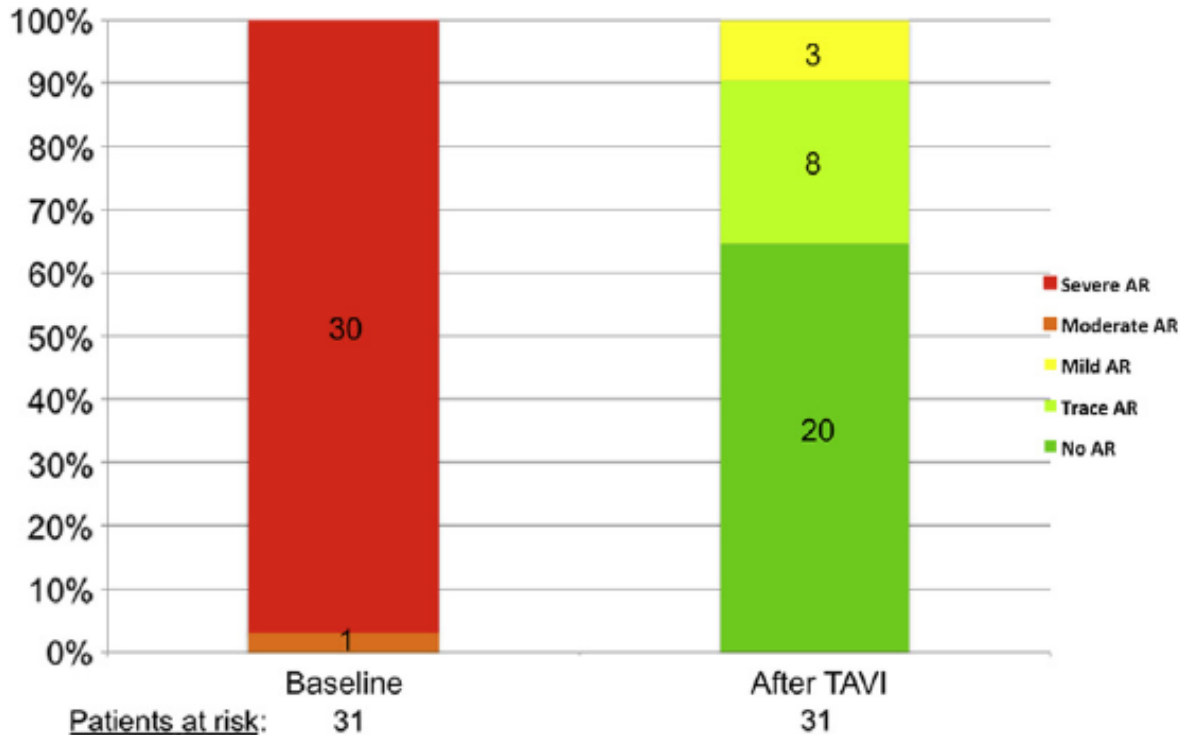
Implantation of a 25 mm
Lotus Valve

TAVI in Aortic Regurgitation

- Aortic regurgitation without calcification: no indication for TAVI or rather classical contraindication to TAVI

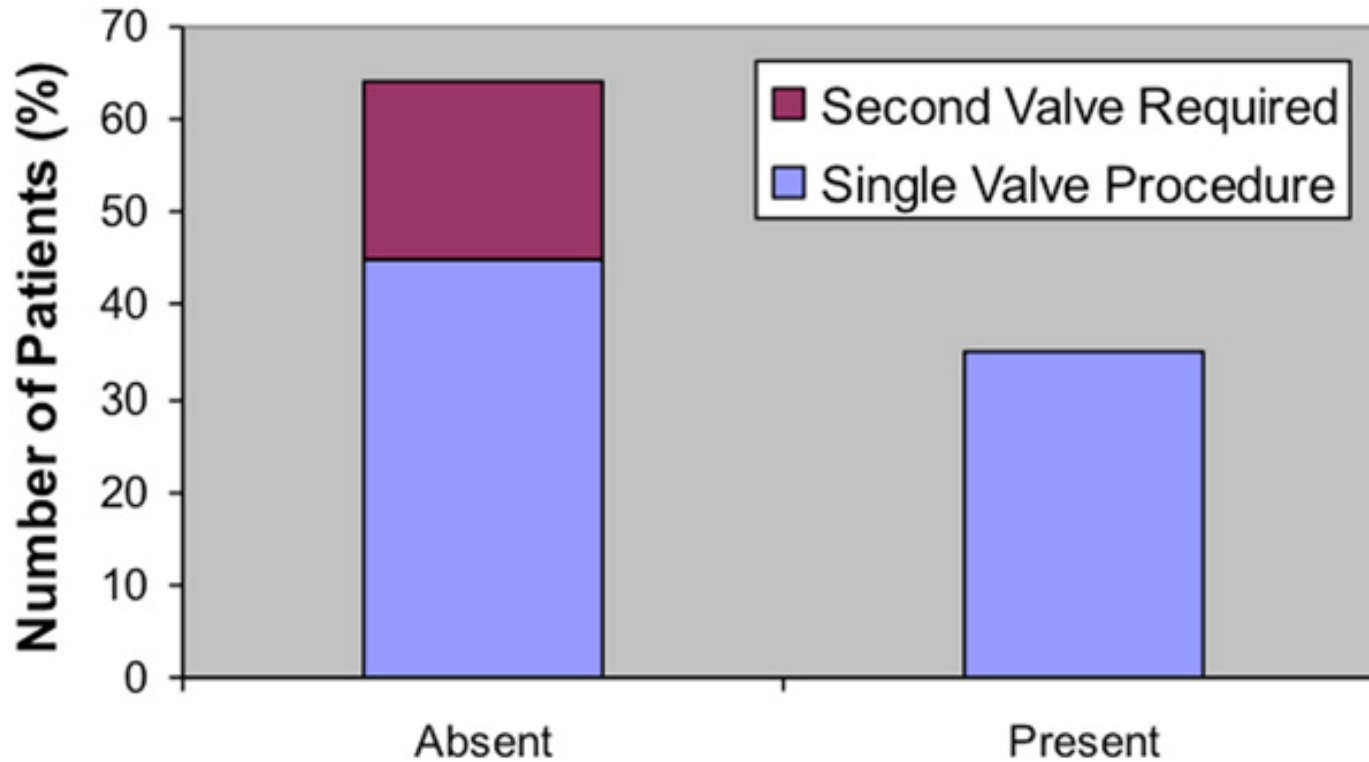
- Specific concerns:
 1. Absence of annular or leaflet calcification → Dislocation or embolization of the valve
 2. Dilation of the sinus aortae → TAVI sizes too small, potential residual regurgitation
 3. Due to absence of calcification, necessary oversizing of the valve → Potential annular rupture

TAVI in Aortic Regurgitation: JenaValve



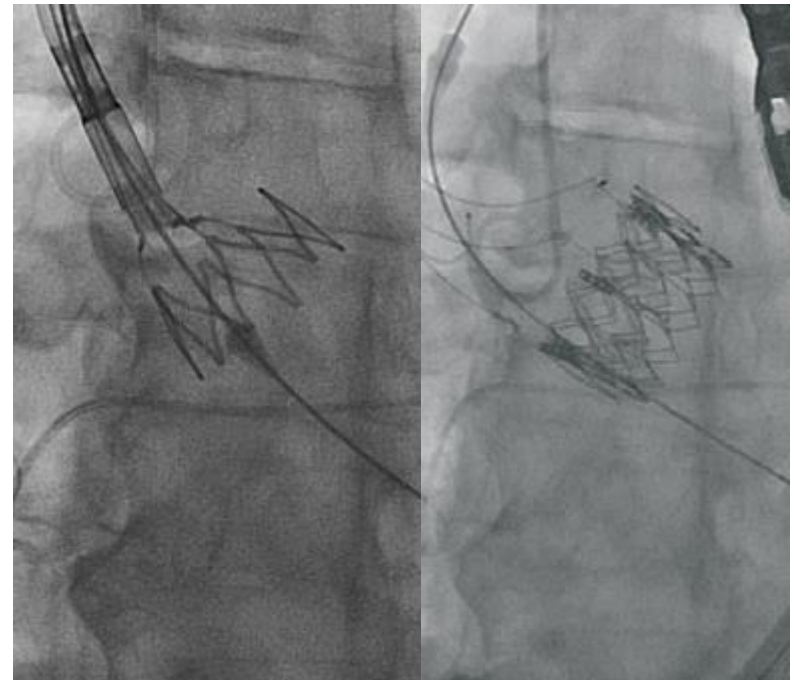
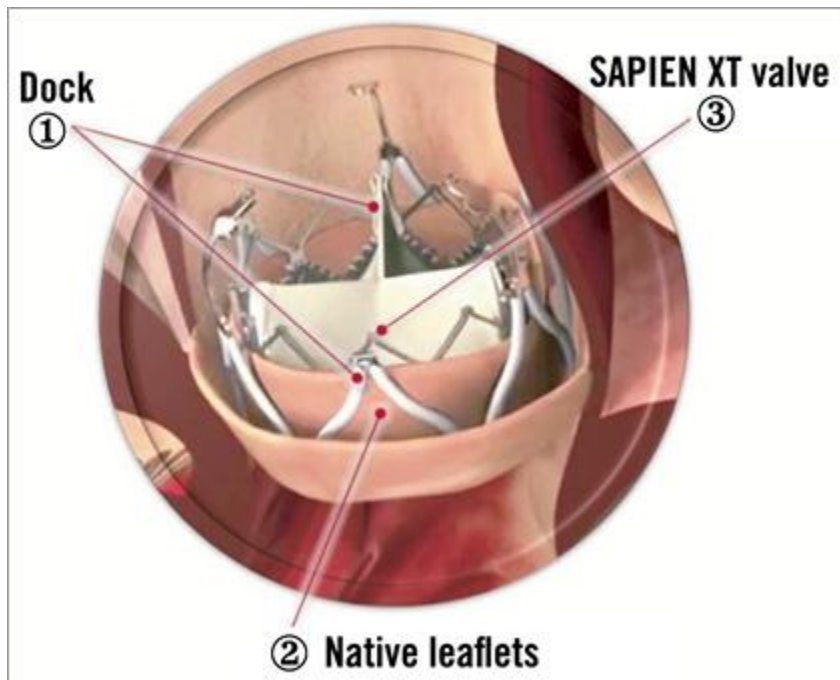
- CE-approved for aortic regurgitation
- Active clip fixation on the native leaflets and anatomically correct feeler-guided positioning

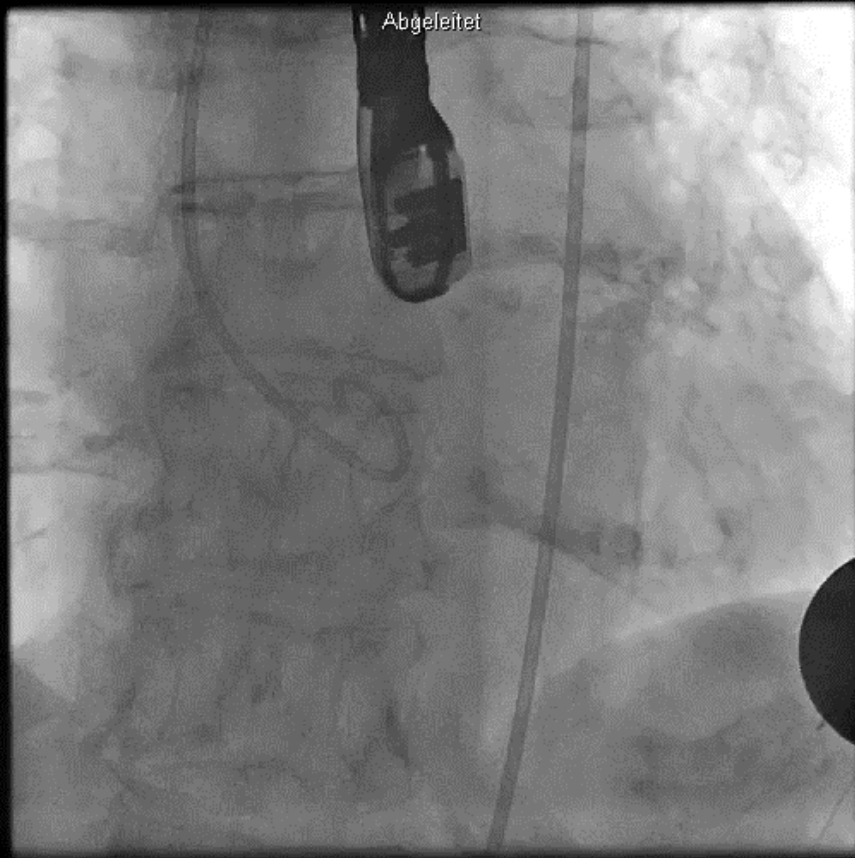
TAVI in Aortic Regurgitation: CoreValve



n=48

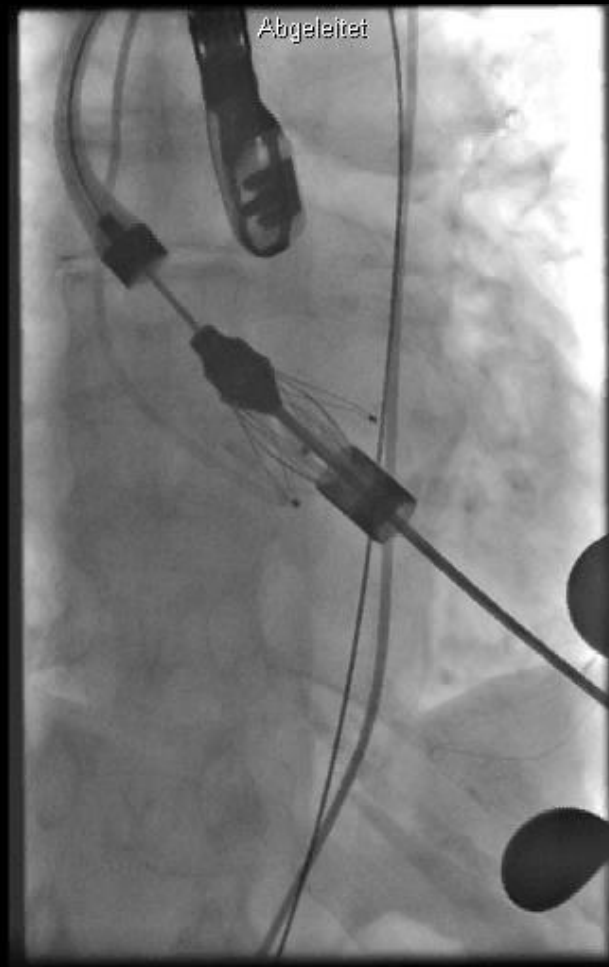
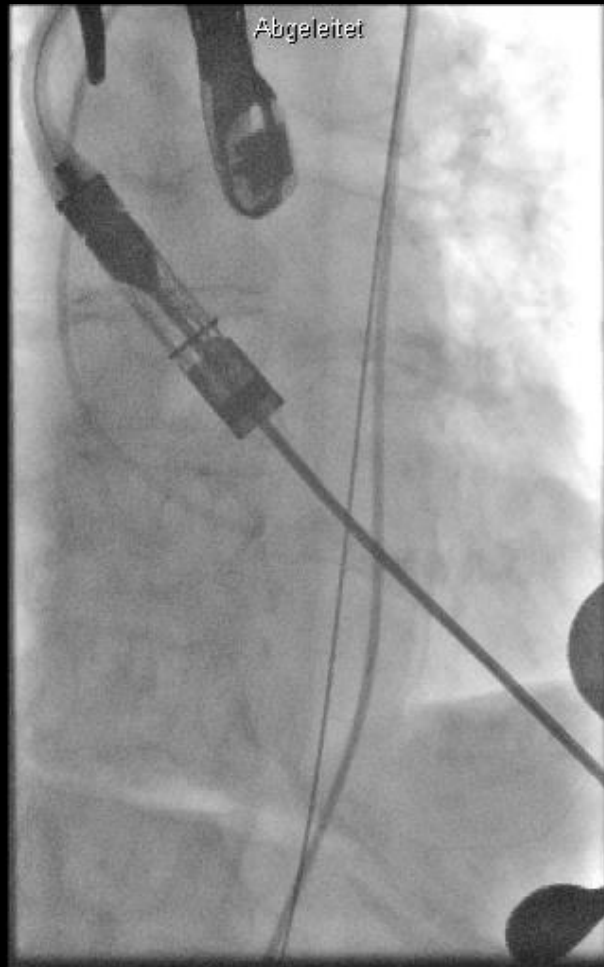
TAVI in Aortic Regurgitation: Helio Dock/Edwards



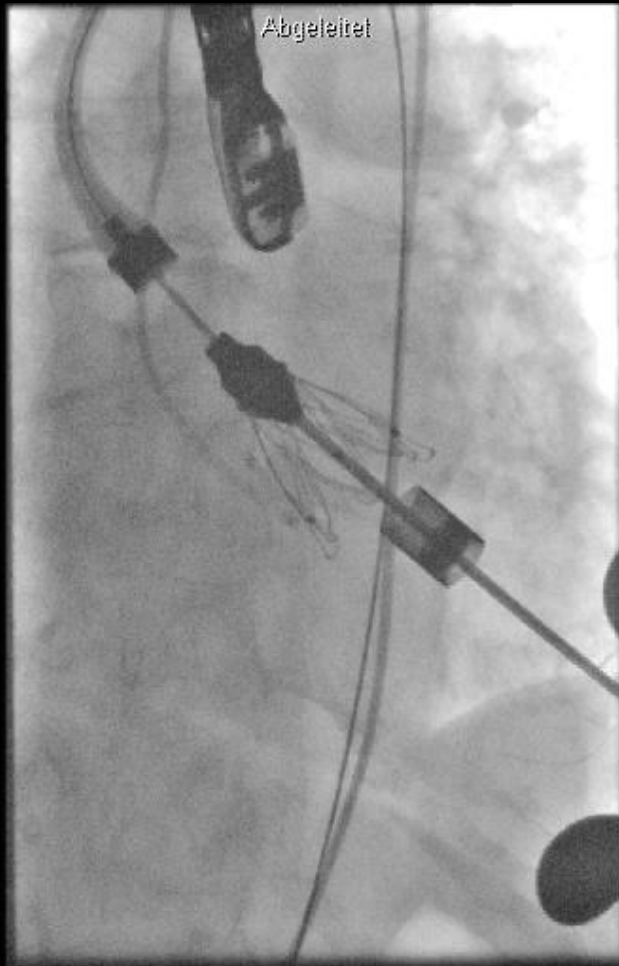


Case Aortic Regurgitation

- 81 year old female patient
- Chronic renal failure
- Coronary artery disease
- History of myocardial infarction
- Atrial fibrillation
- Severely impaired LV function
- Repeat cardiac decompensation



JenaValve 27 mm: Positioning



JenaValve 27 mm: Deployment and final result

TAVI in Bicuspid Aortic Valves and Aortic Regurgitation

- **Bicuspid valves** are more frequent than expected
- TAVI for unrecognized bicuspid aortic valves may lead to suboptimal results
- Good results can be achieved with MSCT sizing, adequate technique and optimal valve selection

- **Aortic regurgitation** frequently is caused by annular dilation without calcification
- Conventional TAVIs may be difficult to implant, with valve embolization and persisting aortic regurgitation as possible complications
- Special techniques with conventional valves or specific newer valves may be used

Vielen Dank
für Ihre Aufmerksamkeit