

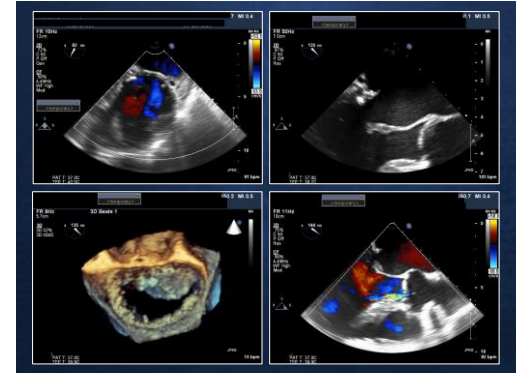
Vumedi January 2017

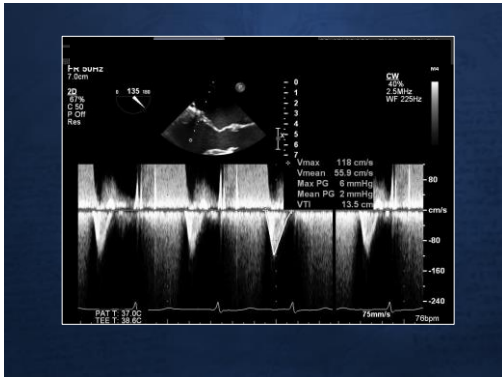
Challenging Case

Paul Sorajja, MD
Director, Center for Valve and Structural Heart Disease
Minneapolis Heart Institute
Abbott Northwestern Hospital
Disclosures: none

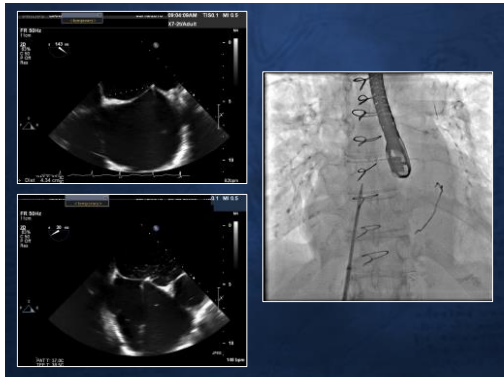
84 year old woman

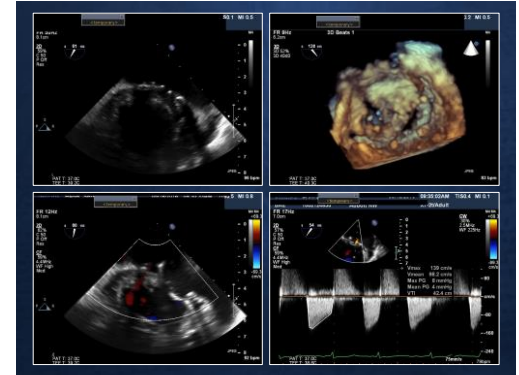
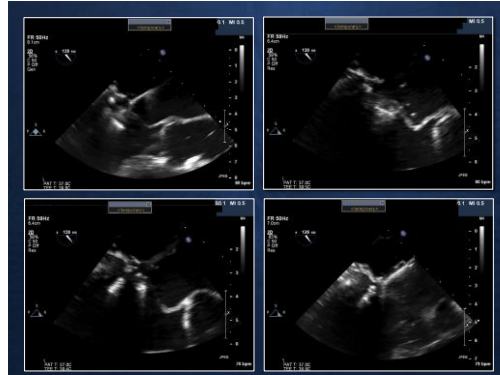
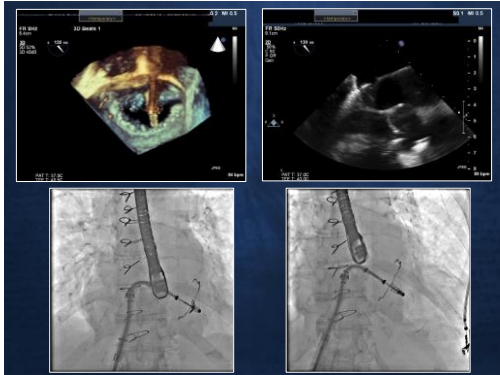
MV repair in 2005
New DOE for 6 months
NYHA III
Frail

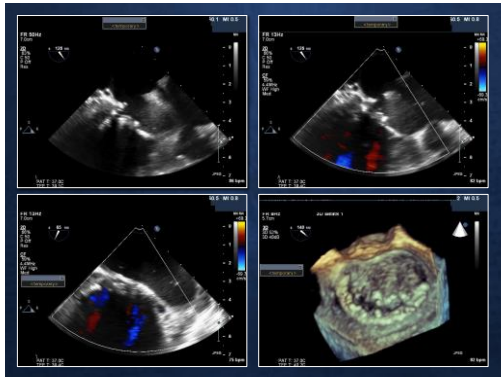
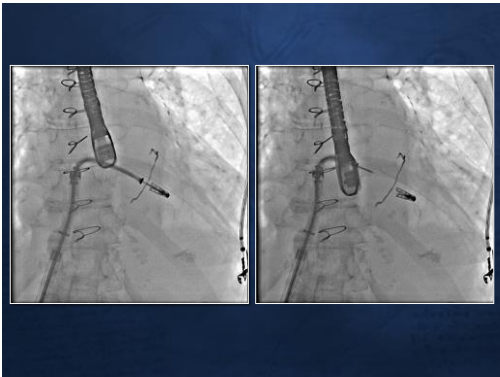




What next?



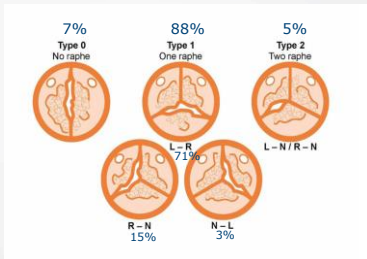




TAVR in bicuspid Aortic valve

Itsik Ben-Dor ,MD
Augusto Pichard ,MD
Medstar Washington Hospital Center.
Washington, DC

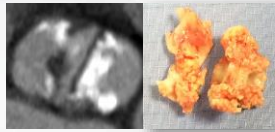
Classification of Bicuspid Valves



Sievers et al. J Thorac Cardiovasc Surg 2007;133:1226-33.

Potential Problems in Bicuspids

- Often heavily calcified
 - Incomplete valve expansion
 - Paravalvar leak
 - Annulus rupture
 - Coronary obstruction
 - Higher rate of pacemaker
- Frequently associated with ascending aortic aneurysm
 - Risk of rupture/dissection
- Oval shaped valve area
 - Risk of paravalvar leak
 - Sizing is difficult
 - Long-term durability of the TAVI valve?



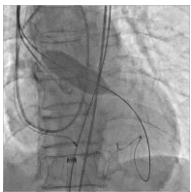
➤ For these reasons bicuspid valves had been excluded from all randomized trials

Valve size in bicuspid valves

- Avoid oversizing
 - Risk of rupture
 - Larger self-expanding valves have less radial force
- Usually it is safe to undersize
- Very large annuli may still be suitable for TAVI due to higher degree of calcification

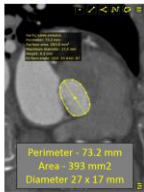
Sizing

Balloon sizing



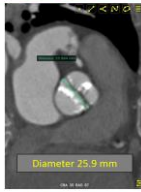
29 mm Core Valve

Annular method



29 mm CoreValve

Commissure-to-Commissure



29 mm CoreValve

Case History

- 81 year-old woman with presents with progressive SOB and leg edema

• **PMH:**

- Atrial fibrillation s/p retinal embolus on Eliquis
- DVT

Echo :

EF 20-25%

AVA 0.5cm² v2 6.3m/sec, mean gradient 106mmHg

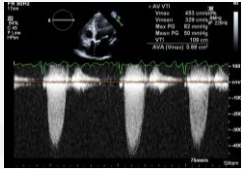
Mild to moderate AR

STS score: 2.4%

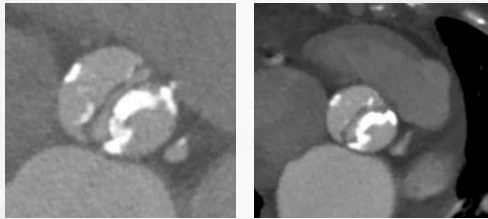
BAV (2 months before) – Maxi 22mm AVA 0.25 to 0.52 cm²
Mean gradient 100 to 43mmHg

Echo

Date of ECHO	01.27.2016 (post BAV)		
LVEF ($\geq 20\%$) *	45%	Aortic Valve Area ($\leq 1.0\text{cm}^2$) *	0.7
Mean Aortic Gradient ($\geq 40\text{mmHg}$) *	44	Aortic Valve Area Index ($\leq 0.6\text{cm}^2/\text{m}^2$) *	0.41
Peak Velocity ($\geq 4.0 \text{ m/sec}$) *	4.2	RV Size and Function	Normal size, borderline reduced systolic function
Estimated Systolic Pulmonary Pressure (mmHg)	36		
Other Valvular Findings	Mild MR, trace AR; mild TR		
Native Coronary and Graft Findings	LM 30%; LAD 10%; LCX = 10%; RCA=10%		



Bicuspid valve



Which Valve would you choose ?

1. Balloon expandable
2. Self expandable

**Bicuspid
 Favorable Ea
 Transcatheter**

Gidon Y. Perlman, MD,
 Marco Barbanti, MD,¹
 Caterina Gandolfo, MD
 Christopher Thompson

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)

MD,¹
 am, MD,^b

Values are n (%). *All clinical events were defined according to VARC-2 criteria. †The rate of patients requiring a new pacemaker, excluding 4 patients who had a pacemaker before transcatheter aortic valve replacement, was 25.5%.

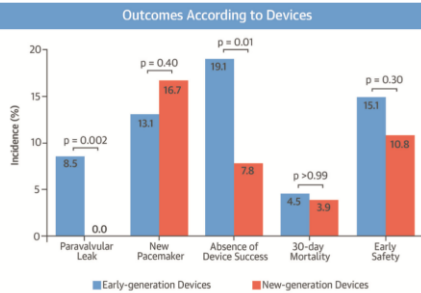
AR > Mild, %

TABLE 5 Reported Series of Bicuspid AS Treated With TAVR

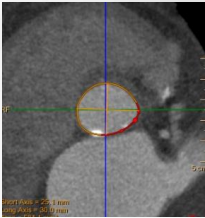
Study/First Author (Year)	n	Multicenter	Balloon/Self-Expandable, %	30-Day Mortality, %	Dev	AR > Mild, %	emaker, %
Current (2016)	51	Yes	100/0	3.9		28.4	3.5
Mylotte et al. (2014)	139	Yes	35/65	5		30.8	3.2
Yousef et al. (2015)	108	Yes	56/44	8.3			9.4
Bauer et al. (2014)	38	Yes	32/68	11			17
Kochman et al. (2014)	28	Yes	18/82	4		25	29
Hayashida et al. (2013)	21	No	52/48	4.8			4.3
Himbert et al. (2012)	15	No	0/100	7		32	10
Wijesinghe et al. (2010)	11	Yes	100/0	18			19

*VARC-2 definition.
 AR = aortic regurgitation; AS = aortic stenosis; NR = not recorded; TAVR = transcatheter aortic valve replacement.

CENTRAL ILLUSTRATION Transcatheter Aortic Valve Replacement With Early- and New-Generation Devices in Bicuspid Aortic Valve Stenosis

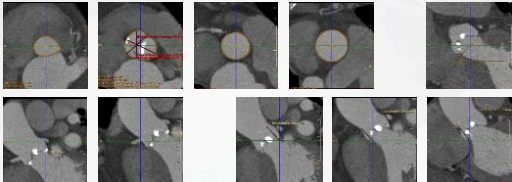


CT Analysis



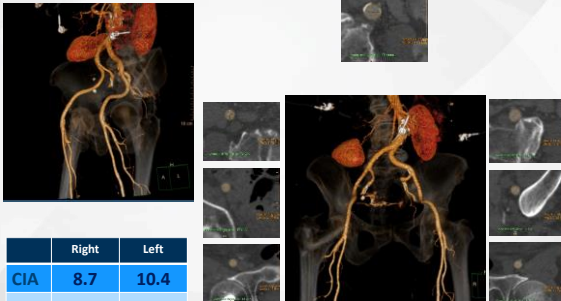
Annulus by CT	Measure
Short Annulus Diameter	25.1 mm
Long Annulus Diameter	30.0 mm
Annular Perimeter	85.3 mm
Annular Area	581.1 mm ²
Derived diameter (perimeter/area)	27.2/27.2 mm/mm

CT Analysis



Aortic Root by CT	Measure
Sinus of Valsalva Diameter	37.7(L)x30.5(R)x33.2(N)mm
STJ Diameter	32.5x35.4mm
Sinus Height	24.1(L)x21.5(R)x24.0(N)mm
Left Coronary Height	13.2mm
Right Coronary Height	15.7mm
Aorta	39.1x40.3mm
Angle	44°

Access

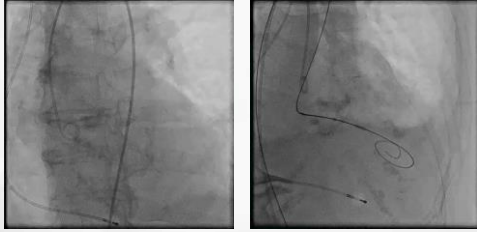


	Right	Left
CIA	8.7	10.4
EIA	6.6	7.5
CFA	6.8	7.1

Procedure

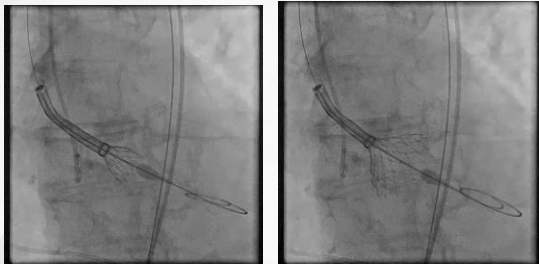
- Right femoral two perclose
- Temporary pacer

BAV



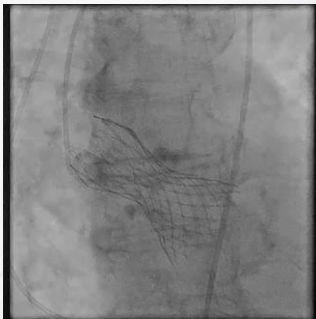
Maxi 20/4

Procedure

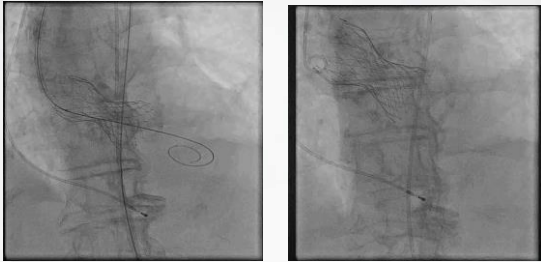


31 mm core valve

Procedure

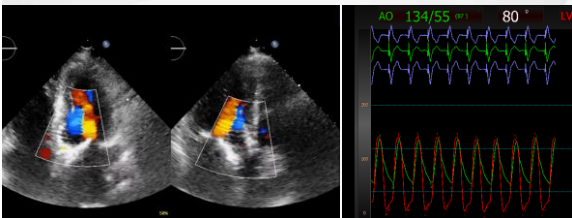


Procedure



True balloon 22mm

Echo post valve



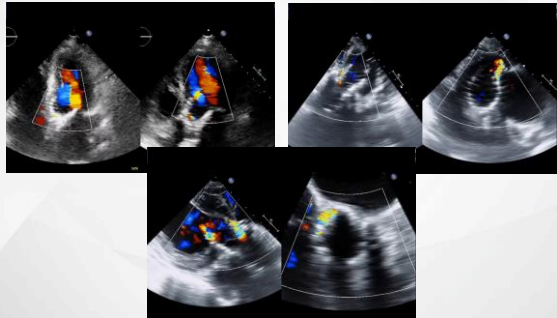
Mild to moderate AR

Hospital course

- **LBBB – EP study –CAVB with infra-his conduction block**
- **Pacemaker day 3**
- **Echo at 2 days: moderate AR**
- **Home day 5**

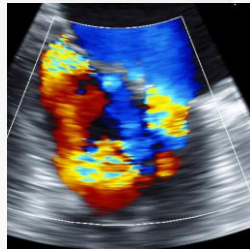
Post discharge

- Shortness of breath with minimal activity
- TTE and TEE



Echo Variable (TTE) Measure	
Peak Velocity	2.2 m/sec
Mean Gradient	11 mmHg
Calculated AVA	n/a cm ²
Severity of AR	Severe
Severity of MR	Mild
Ejection Fraction	55-60 %
2 paravalvular leaks: the larger leak in the non-coronary cusp and the smaller is more anterior. Reversal of flow in the descending and abdominal aorta consistent with severe paravalvular leak.	

TEE one month post

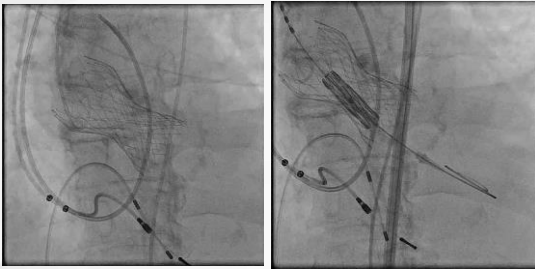


Next step ?

- Para valvular closure device
- Valve in valve core or Edwards
- Surgery

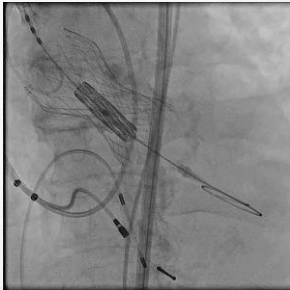


Procedure

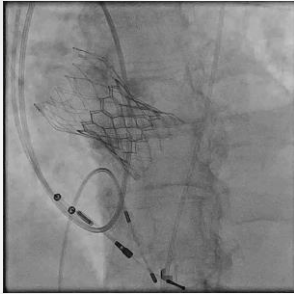


29mm S3 Edwards

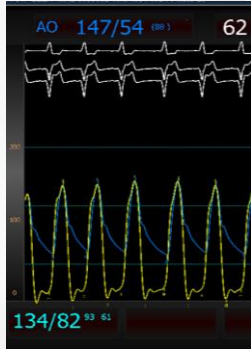
Procedure



Procedure

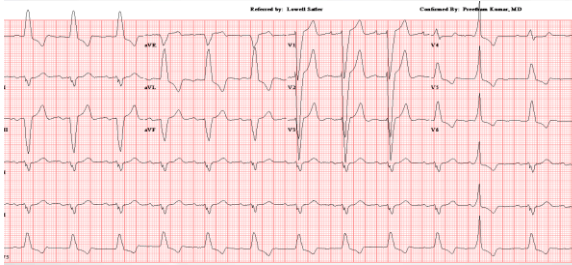


No AR



Hospital course

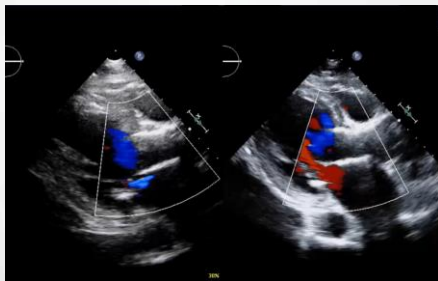
Day one post procedure mild chest pain

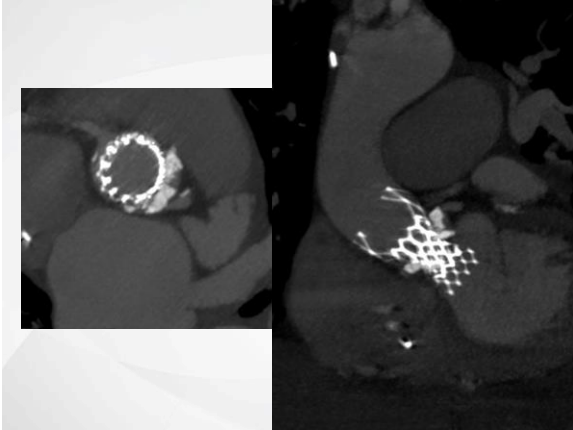


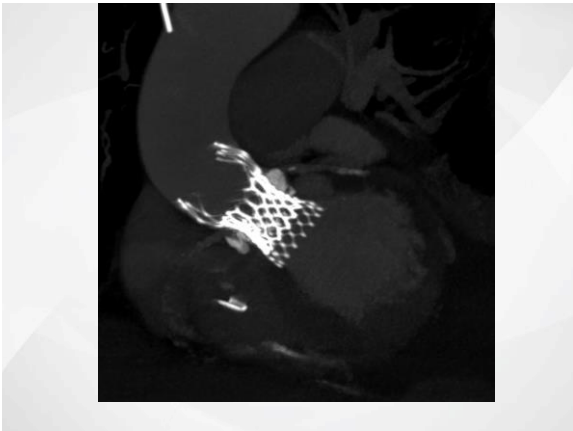
Cardiac enzyme - troponin 14 → 35 → 43 stable

Hospital course

Day one post procedure mild chest pain







Hospital course

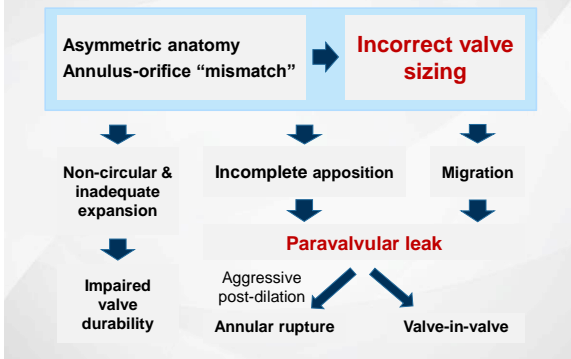
Discussion with CV surgery for CABG or PCI

More than 24 hours post infarct

Medical treatment

Discharge day 5 after the procedure

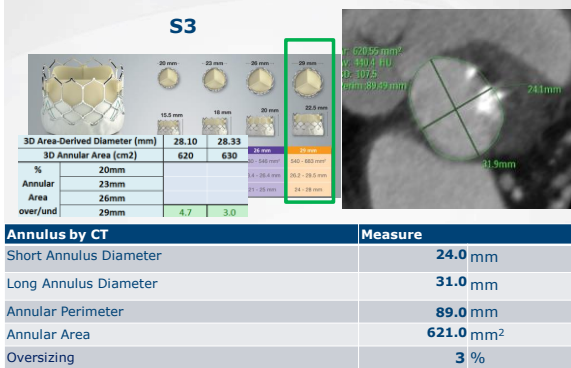
Challenges for TAVI in BAV



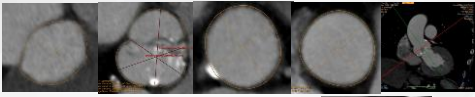
Conclusions

- TAVI in bicuspid valves is feasible but may be technically more difficult.
- Results are comparable to those tricuspid valves.
- Paravalvular leaks may be more frequent.
- Pacemaker may be more frequent.
- Oversizing of the valve should be avoided.
- Balloon sizing may be better than CT sizing.
- Supra-annular sizing better than balloon sizing.
- Patients with large annulus may still be suitable for TAVI if the valve is bicuspid
- Better results can be expected with newer valves.

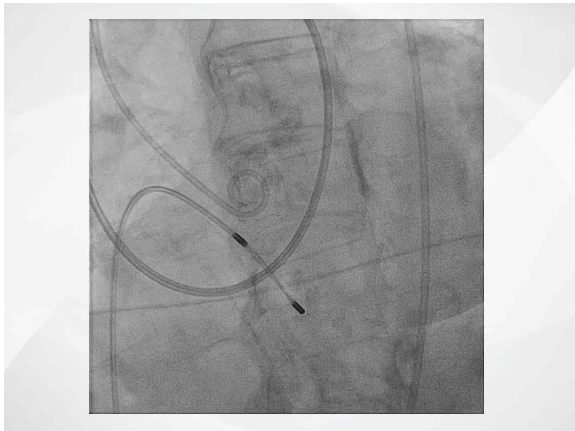
CT Analysis (1/6/2017)

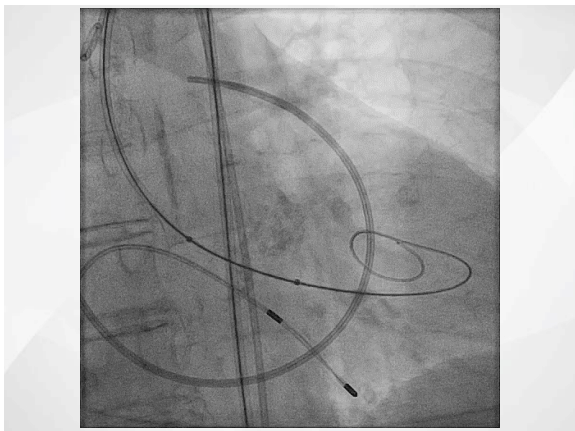


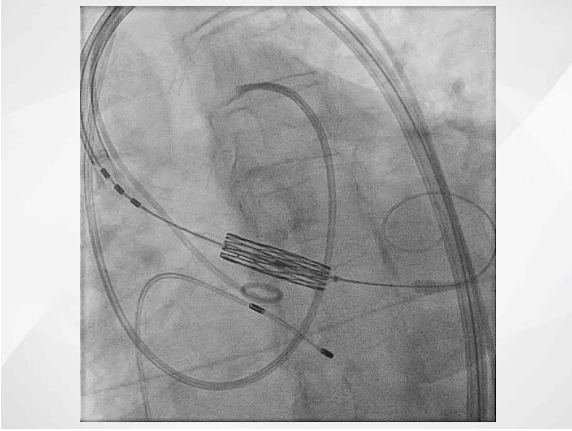
CT Analysis (1/6/2017)

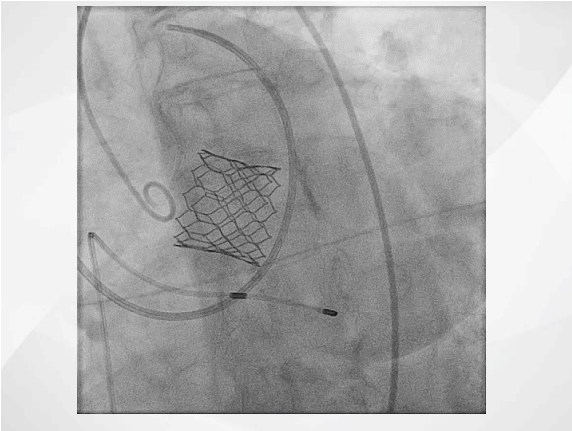


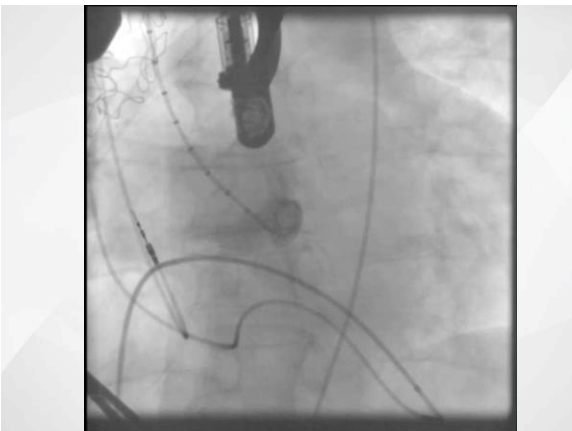
Aortic Root by CT	Measure
Sinus of Valsalva Diameter	(L)35x(R)32x(N)37mm
Sinotubular Junction Diameter	31x32mm
Sinus Height	(L)21x(R)20x(N)25mm
Left Coronary Height	19mm
Right Coronary Height	15mm
Aorta	35x37mm
Angle	53°











Preemptive Alcohol Septal Ablation in Prevention of LVOT Obstruction for TMVR

Christopher U. Meduri, MD MPH
Co-Director Marcus Heart Valve Center
Piedmont Heart Institute
Atlanta, GA



Disclosures

Affiliation

- Proctor/Speaker/Advisory Board
- Proctor/Speaker/Consultant/Grant
- Proctor/Grant
- Proctor/Consultant

Company

- Boston Scientific
- Medtronic
- Edwards
- Mitralign

Will be discussing the use of THV for off-label uses



M.K.

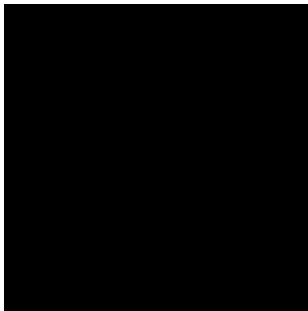
- 76 y/o woman with severe PVD, LM disease, severe AS and severe MS with MAC with NYHA III symptoms



M.K.

- 76 y/o woman with severe PVD, LMT disease, severe AS and severe MS with MAC with NYHA III symptoms
- Extreme risk because of porcelain aorta

Baseline Angio

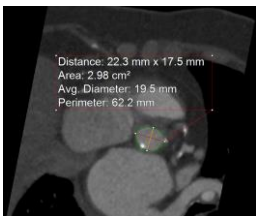


Coronary Stenting

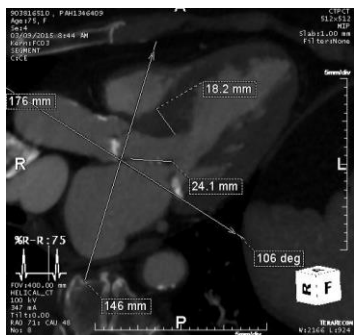


TAVR Planning

- Normal LV/RV function
- Aortic velocity = 4.1 meters/sec
- Aortic annulus area = 309 mm²
- Area derived annulus = 19.8 mm
- Ileo-femorals = 4.0 – 4.5 cm

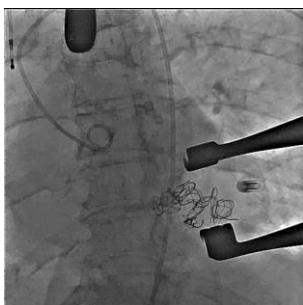


Do We Treat Mitral Stenosis?

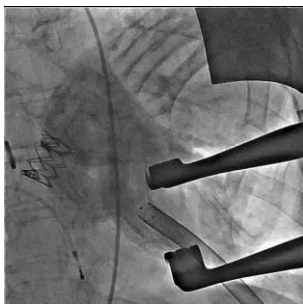


Aorto-Mitral Angle 106 degrees
Septal Bulge 1.8cm

23 mm Sapien XT



23 mm Sapien XT



Page 10

23 mm Sapien XT



Page 11

Recurrent Dyspnea 6 months later

- 23 Sapien XT gradients = 27/15 mmHg (post procedure = 28/17 mmHg)
- No aortic regurgitation

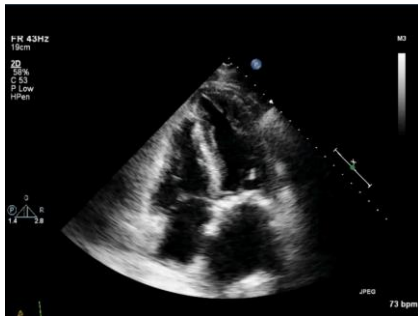
Page 12

Re-assessment of Mitral Valve



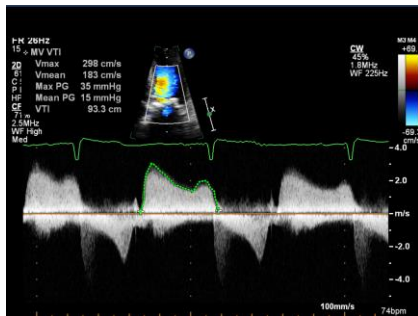
Page 13

Re-assessment of Mitral Valve



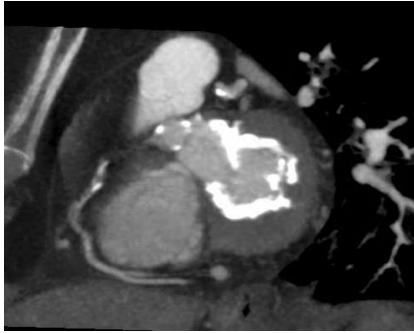
Page 14

Re-assessment of Mitral Valve



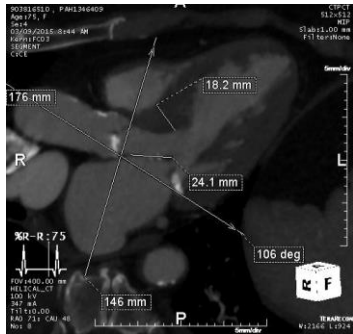
Page 15

Severe MAC



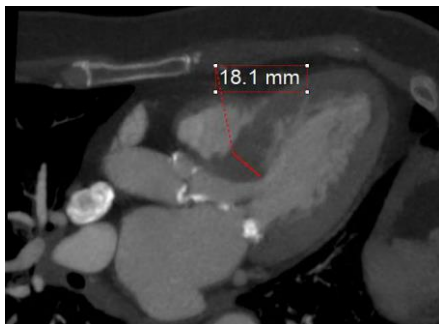
Page 16

Risk Factors for LVOT Obstruction



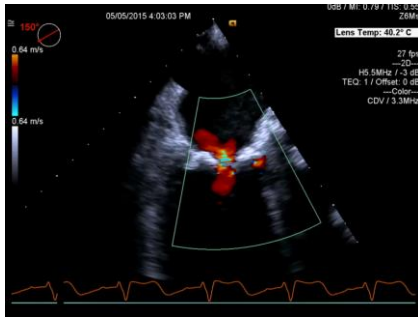
Page 17

Severely Hypertrophied Basal Septum



Page 18

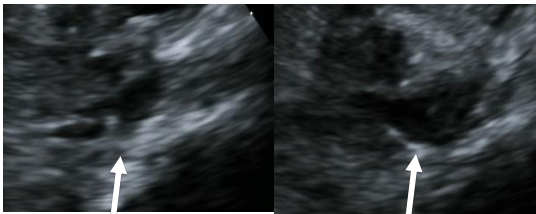
Aorto-Mitral Images



Proceed?

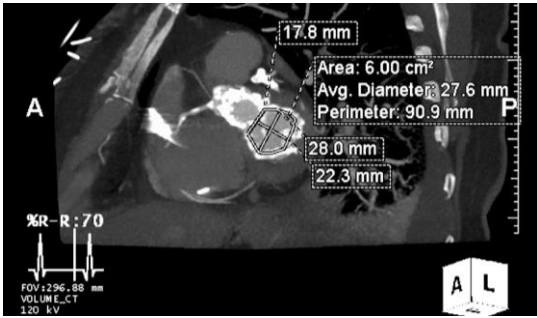
- Very high risk of LVOT obstruction
- No potential surgical bailout for patient if worse
- Must be confident in result and have ability to remove if needed
- Plan for septal ablation and request compassionate use Lotus in MAC from FDA

Alcohol Septal Ablation



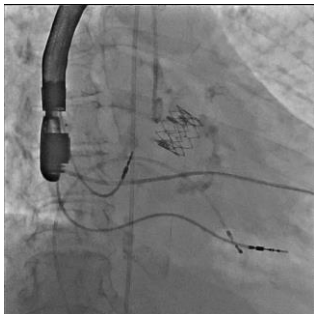
LVOT Pre-Ablation

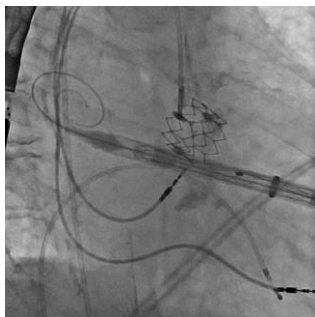
LVOT Post-Ablation



Pre Procedure

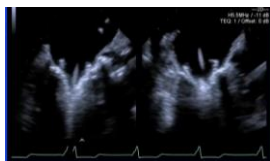
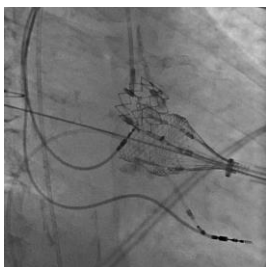




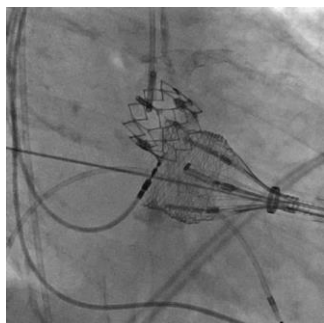


Page 25

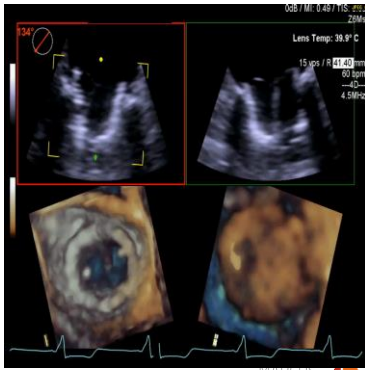
TEE Guidance of Implant Depth



Page 26

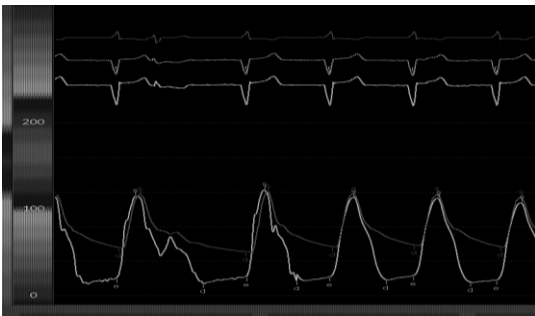


Page 27



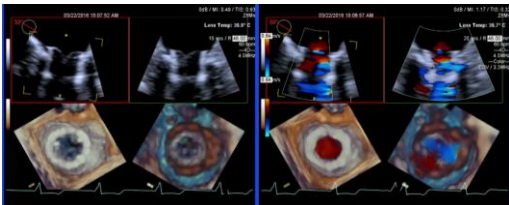
Page 28

No LVOT Gradient



Page 29

Post Procedure



Page 30

No MR/PVL



Page 31



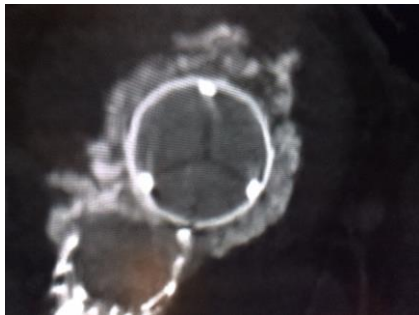
Page 32

Post-Procedure

- Extubated on table
- Within 6 hours walking laps around CVICU saying, "I feel like a new person"
- Discharge POD 2
- Walked 2.5 miles without stopping within 1 week of procedure!

Page 33

30 Day Follow-Up CT



Page 34

Thank You

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Page 35
