Alternative Access Considerations for Transcatheter Valve Replacement

Hersh S. Maniar, MD
Assistant Professor of Surgery
Division of Cardiothorasic Surgery
Washington University School of Medicine
Barnes-Jewish Hospital
St. Louis, Missouri

Ralph Damiano Jr, MD
John M. Shoenberg Professor of Surgery
Division of Cardiothoracic Surgery
Chief of Cardiac Surgery
Washington University School of Medicine
St. Louis, Missouri

Disclosures

Hersh S. Maniar, MD

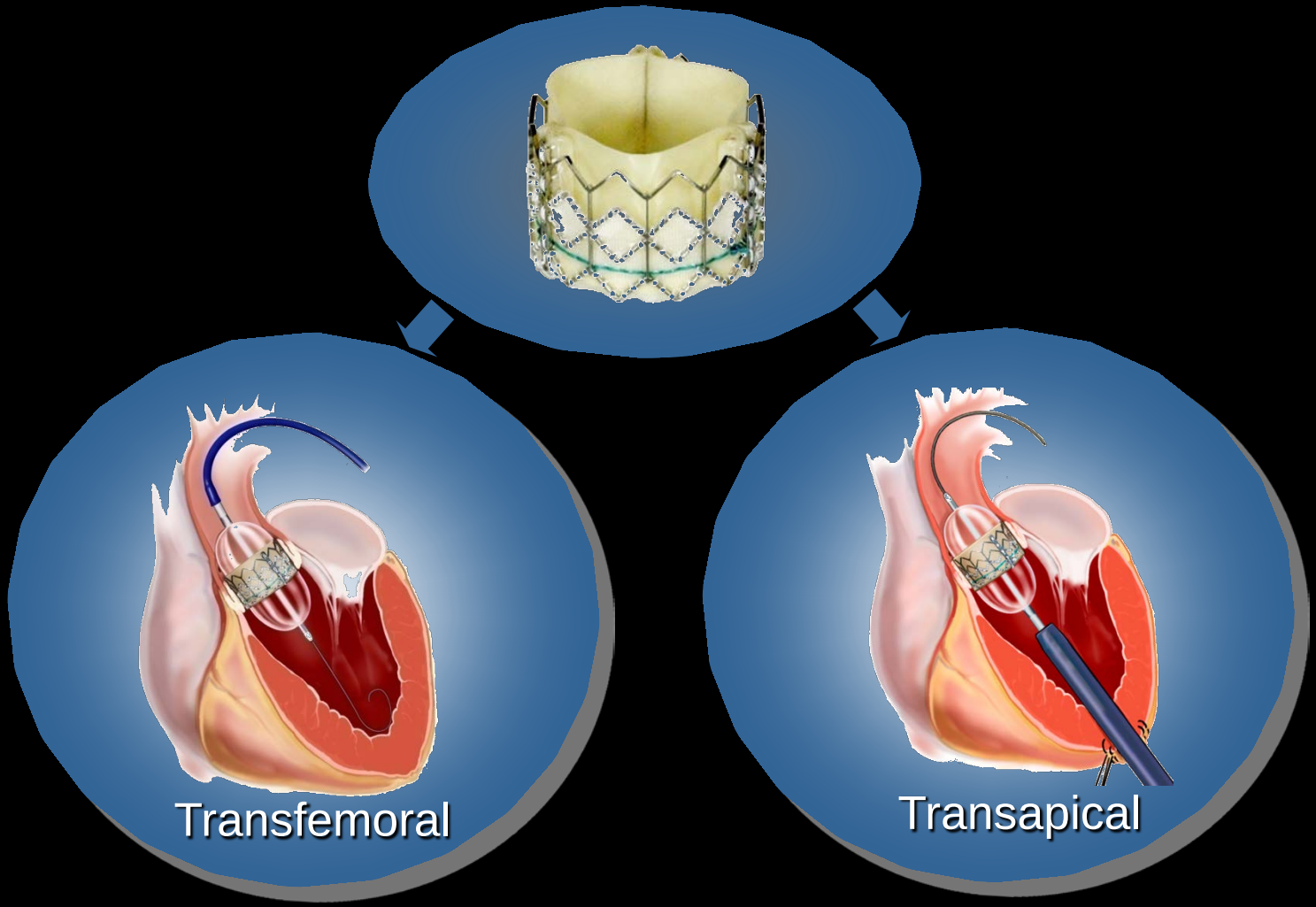
Research Support/Grants:
AHA Clinical Research Grant

Ralph J. Damiano Jr., MD

Research Support/Grants: AtriCure, Estech, and Edwards Lifesciences

Consulting/Employment: AtriCure and Medtronic

In the beginning there were just two…

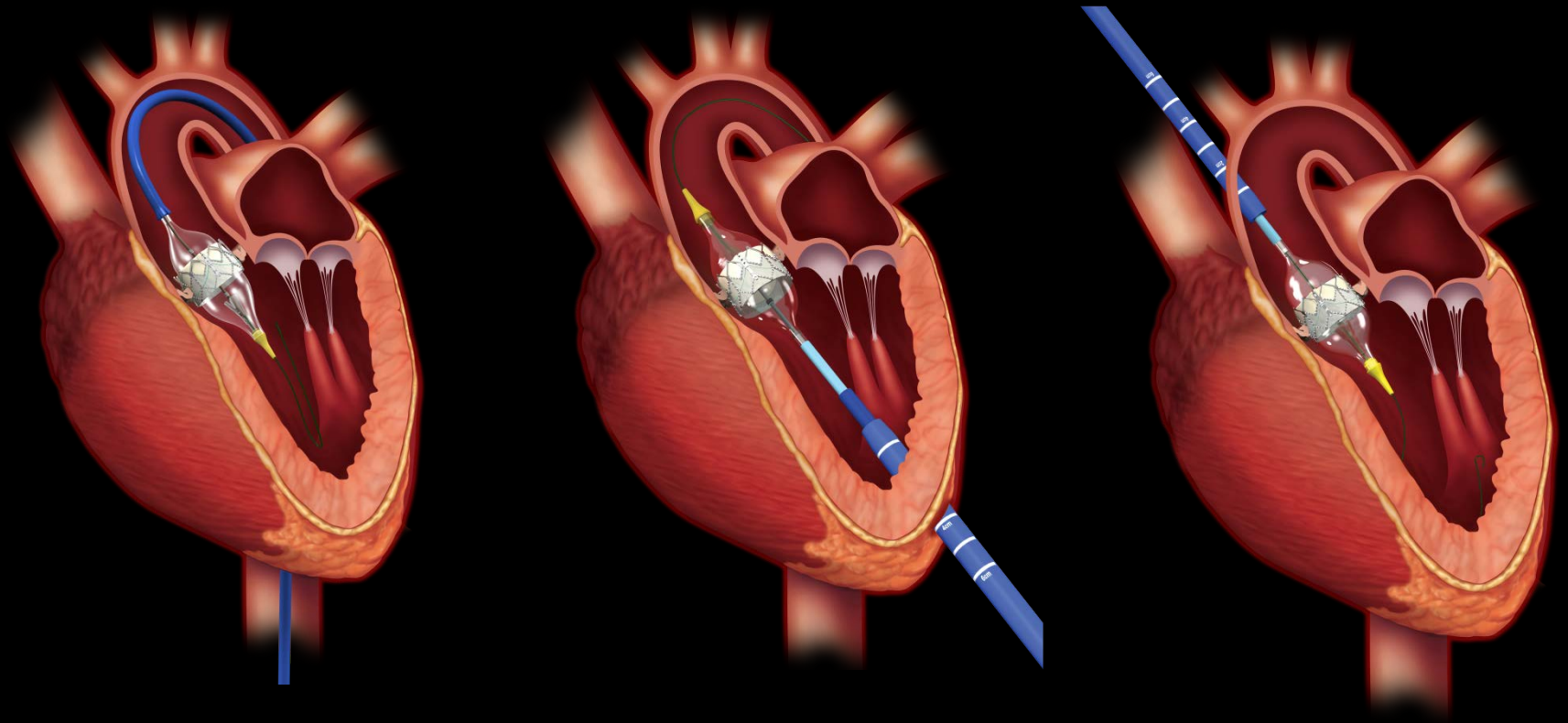


Multiple Access Options

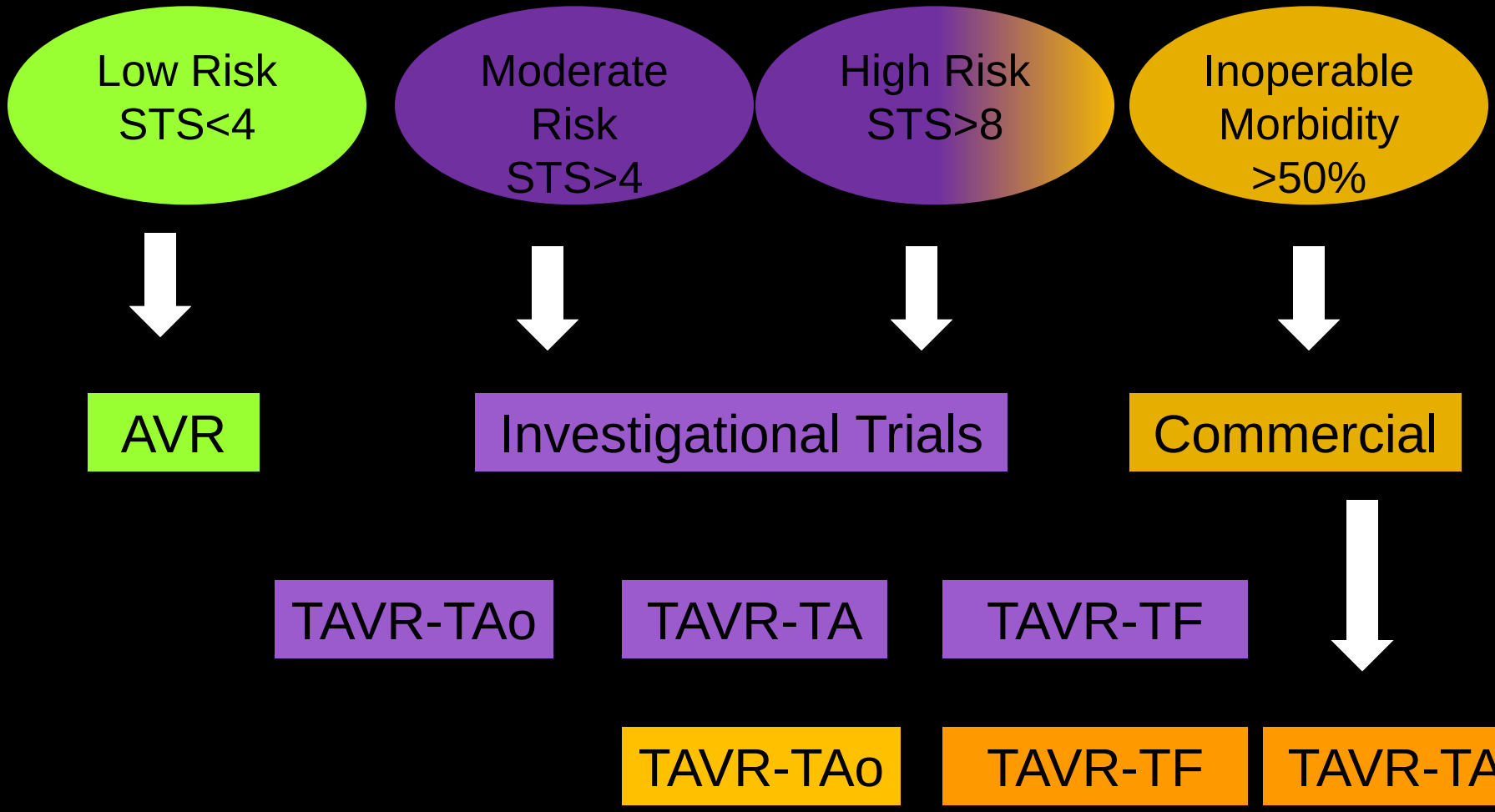
Transfemoral Approach

Transapical Approach

Transaortic Approach

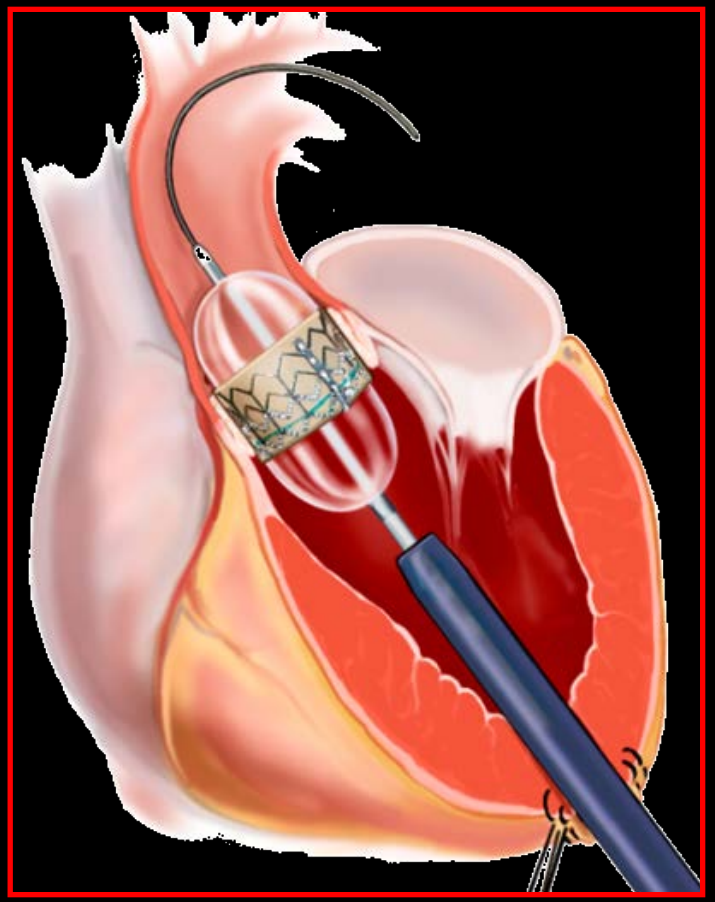


Is there an ideal route of access?



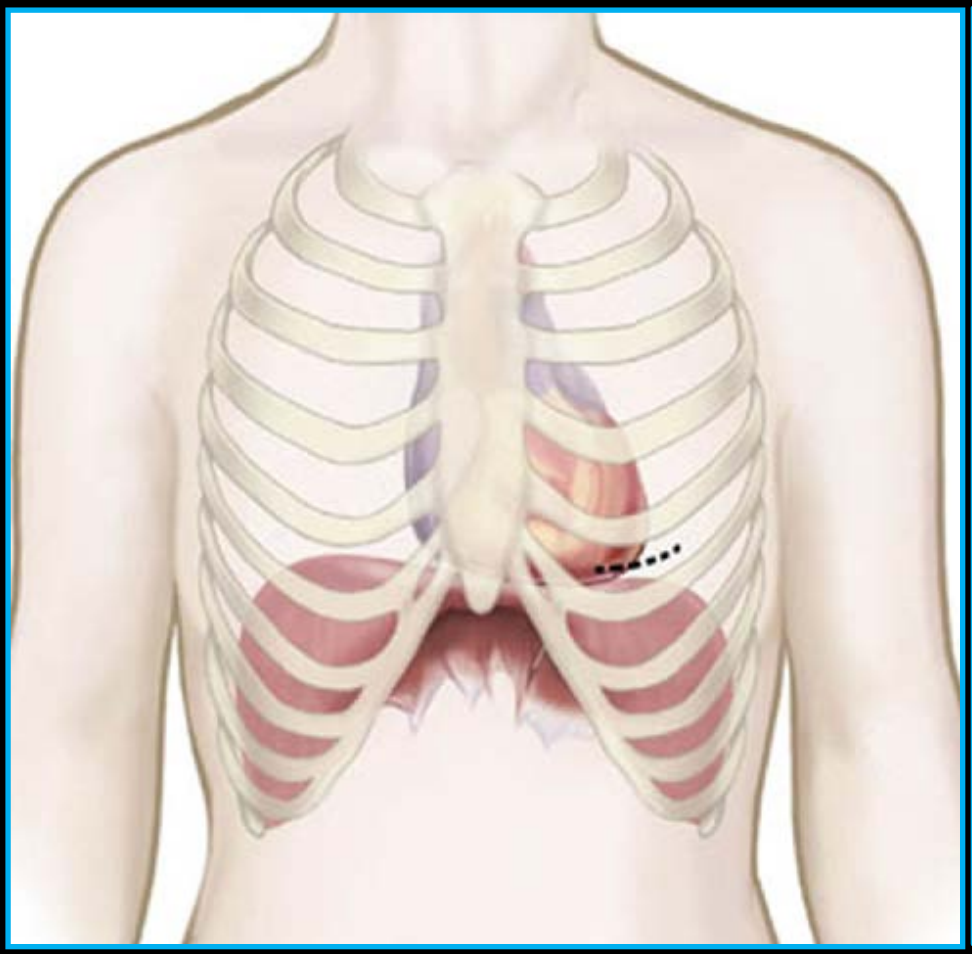
Transapical TAVR

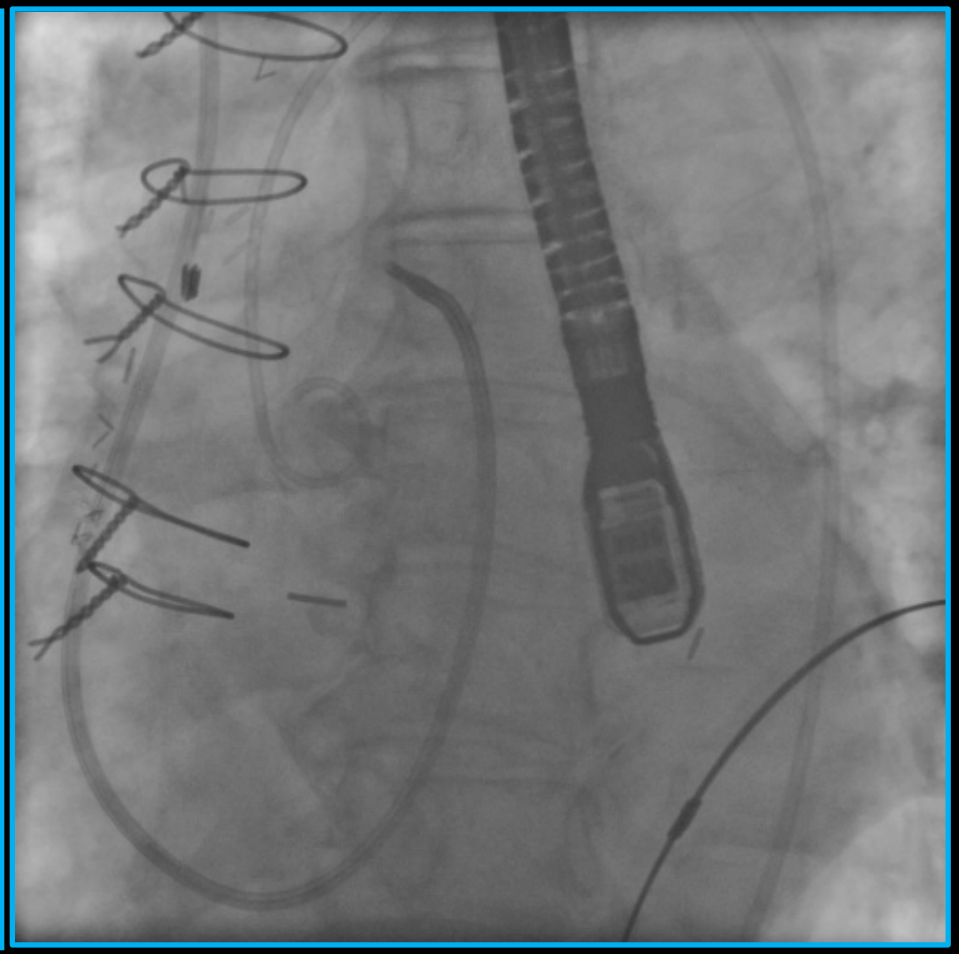
- Ease of positioning
  - Straight line approach
  - Not effected by STJ narrowing
  - Less manipulation of the aortic arch
- Not limited by arterial access issues
- 15-30% of patients require this approach



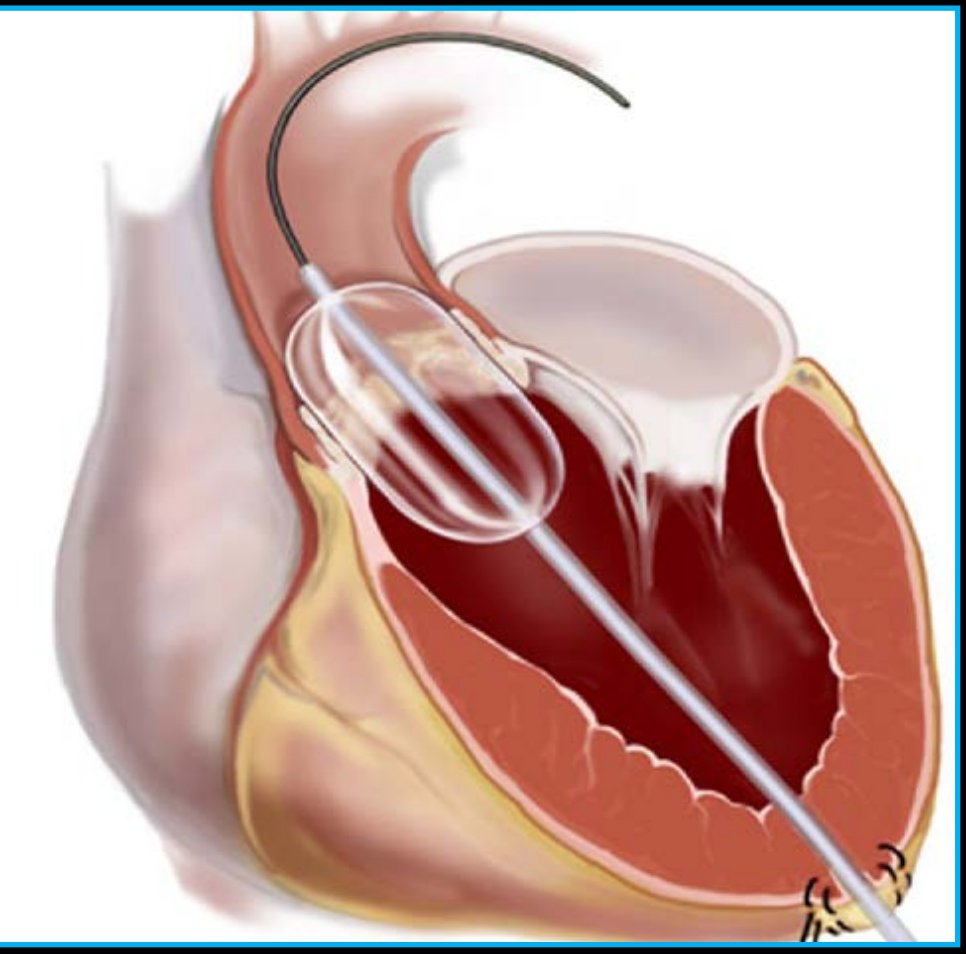
Transapical TAVR Animation

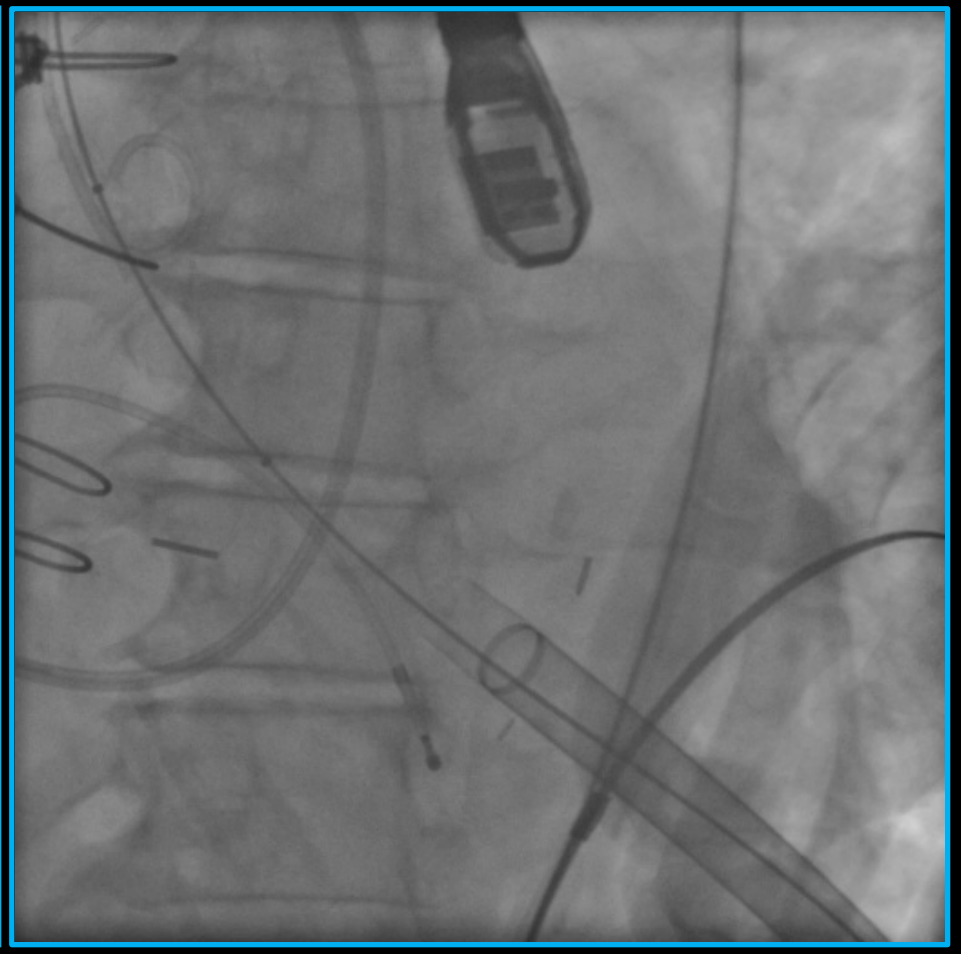
Transapical TAVR



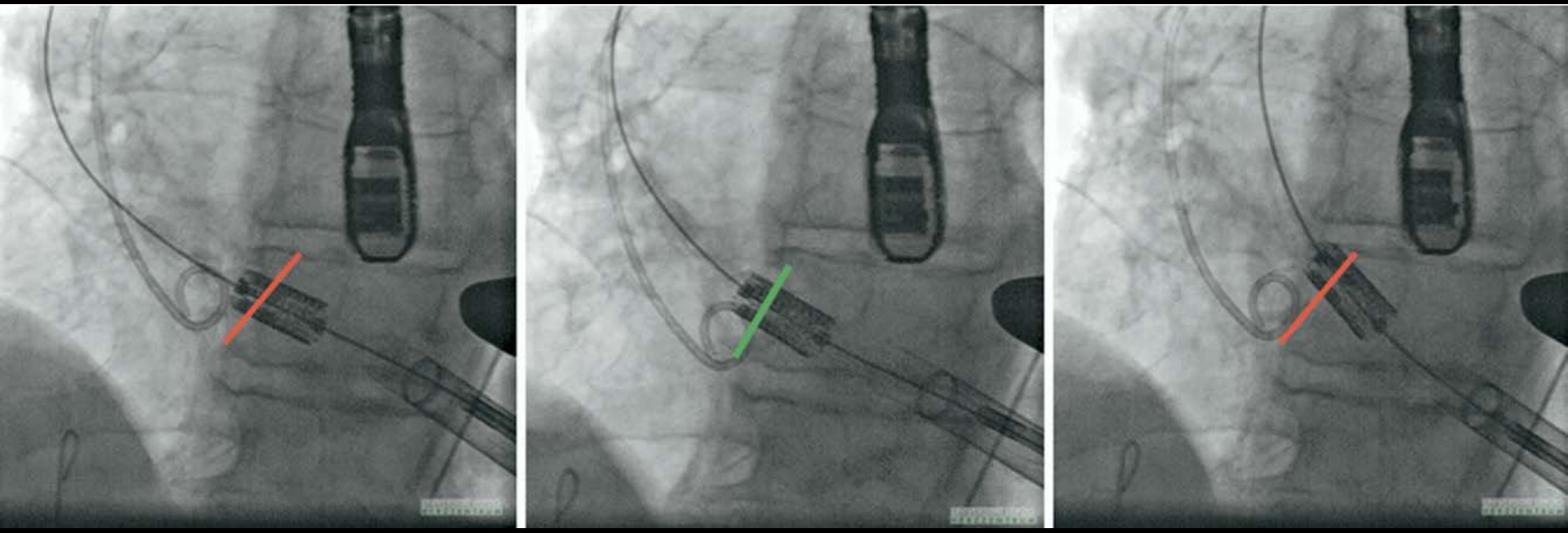


Transapical TAVR

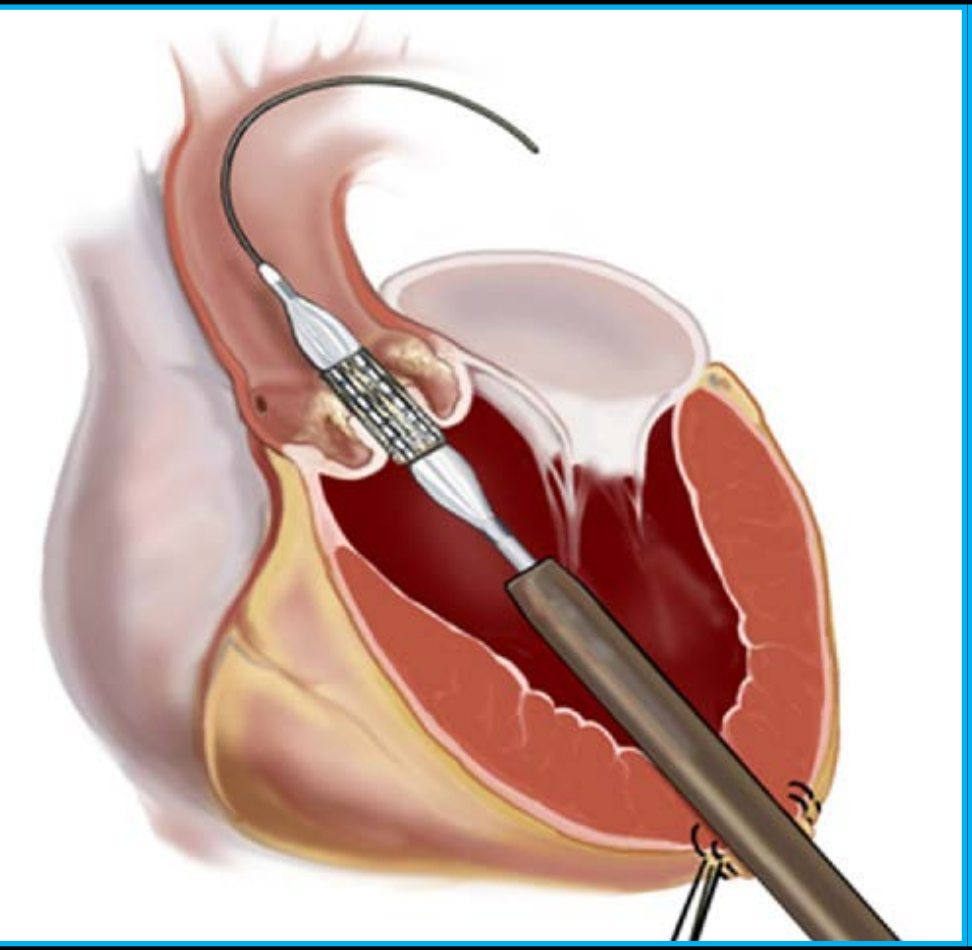


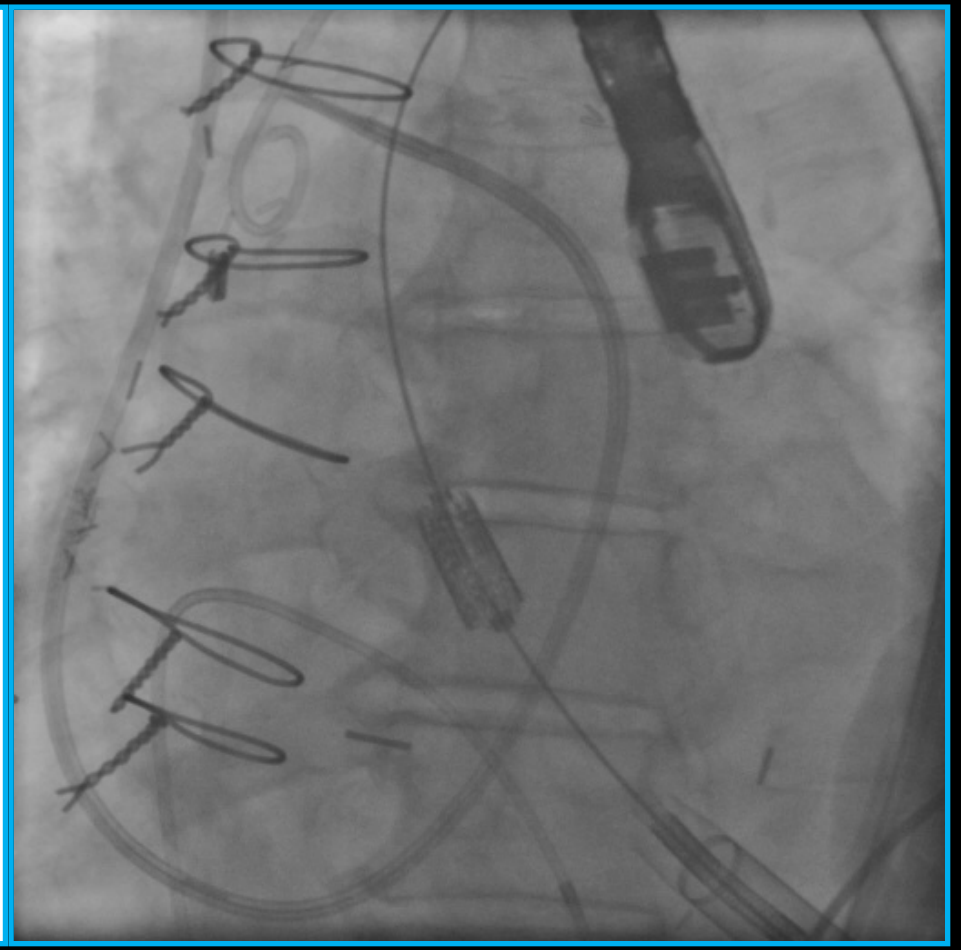


Transapical TAVR



Transapical TAVR





PARTNER TRIAL
Transfemoral vs Transapical

	Transfemoral (n=492)	Transapical (n=207)	p-value
Age	84.4 ± 6.7	83.2 ± 6.5	0.03
STS score	11.7 ± 3.3	11.8 ± 3.5	0.7
NYHA III/IV (%)	94	95	0.94
Prior CABG (%)	39	53	0.001
Prior MI (%)	26	33	0.08
Cerebrovascular Disease (%)	25	36	0.01
Peripheral Vascular Disease (%)	35	60	0.001
Atrial Fibrillation (%)	39	51	0.05
Creatinine > 2 (%)	10	8	0.5

TAVR-Transfemoral and Transapical

- TAVR-TF and TAVR-TA are *complimentary* procedures dealing with *two distinct* populations with specific comorbidities.

- The PARTNER trial was neither powered or randomized to answer this question.

Transfemoral vs Transapical Mortality

	30 day	1 year
Himbert, *et al.* (6)		
Femoral, n=51	8	19
Apical, n=24	8 (16*)	26
Rodes-Cabau, *et al.* (7)		
Femoral, n=168	9.5	25
Apical, n=177	11.3	22
Thomas, *et al.* (8,9)		
Femoral, n=463	6.3	18.9
Apical, n=575	10.3	27.9
Ewe, *et al.* (10)		
Femoral, n=45	11.1	19.8
Apical, n=59	8.5	14.3
Lefevre, *et al.* (11)		
Femoral, n=61	8.2	21.3
Apical, n=69	18.8	50.7
Moat, *et al.* (12)		
Femoral, n=599	5.5	18.5
Nonfemoral, n=271	10.7	27.7
Gilard, *et al.* (13)		
Femoral, n=2293	8.5	21.7
Apical, n=567	13.9	32.3

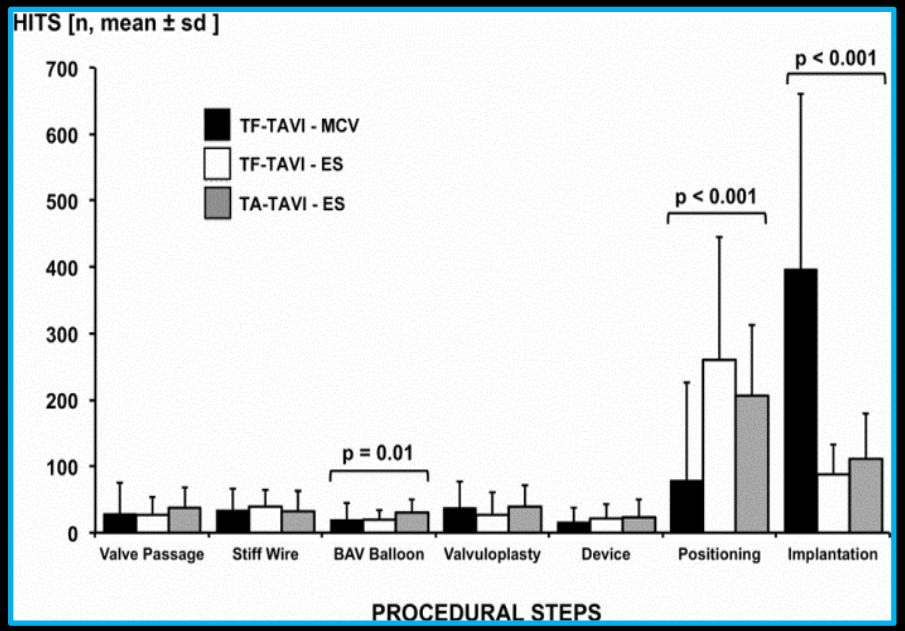
Gaasch et al.

Transfemoral vs Transapical Stroke

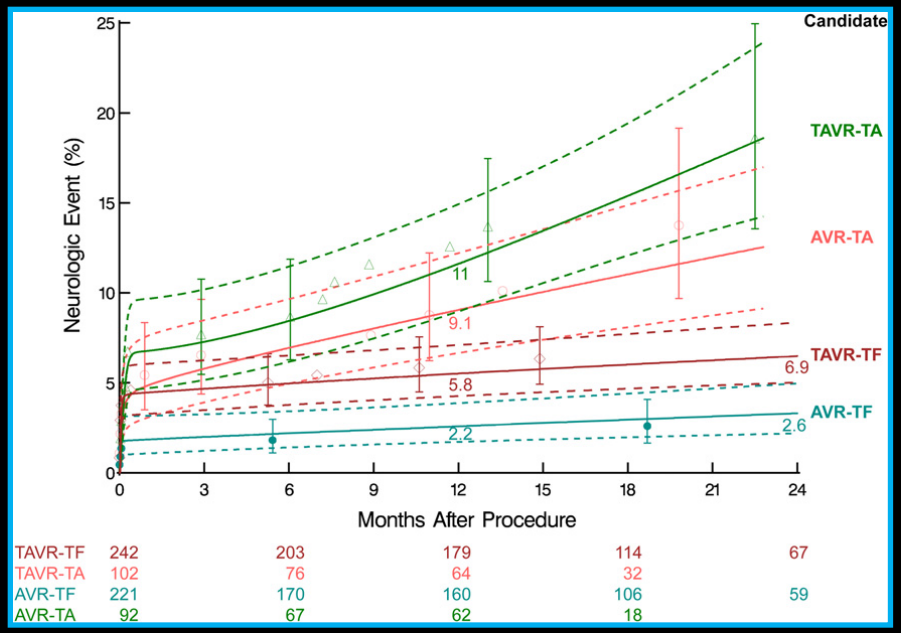
	30 day	1 year
Himbert, *et al*. (6)		
Femoral	6	
Apical	0	
Rodes-Cabau, *et al*. (7)		
Femoral	3	
Apical	1.7	
Thomas, *et al*. (8,9)		
Femoral	2.4	
Apical	2.6	
Ewe, *et al*. (10)		
Femoral	4.4	
Apical	3.4	
Lefevre, *et al*. (11)		
Femoral	5.3	10.3
Apical	1.5	7
Moat, *et al*. (12)		
Femoral	4	
Nonfemoral	4.1	
Gilard, *et al*. (13)		
Femoral	3.7	
Apical	4.4	

Gaasch et al.

Transfemoral vs Transapical Stroke

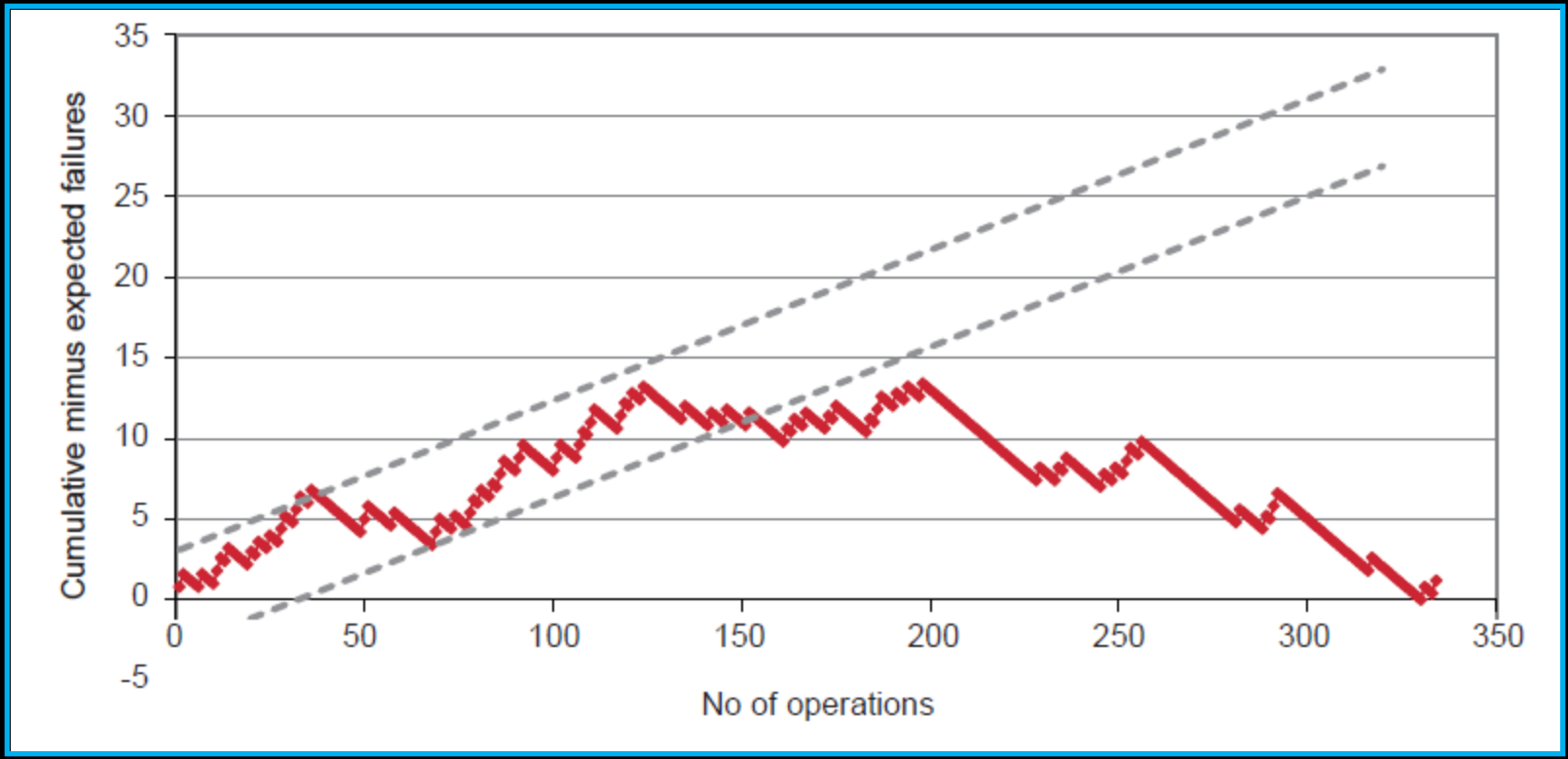


Khalert et al.

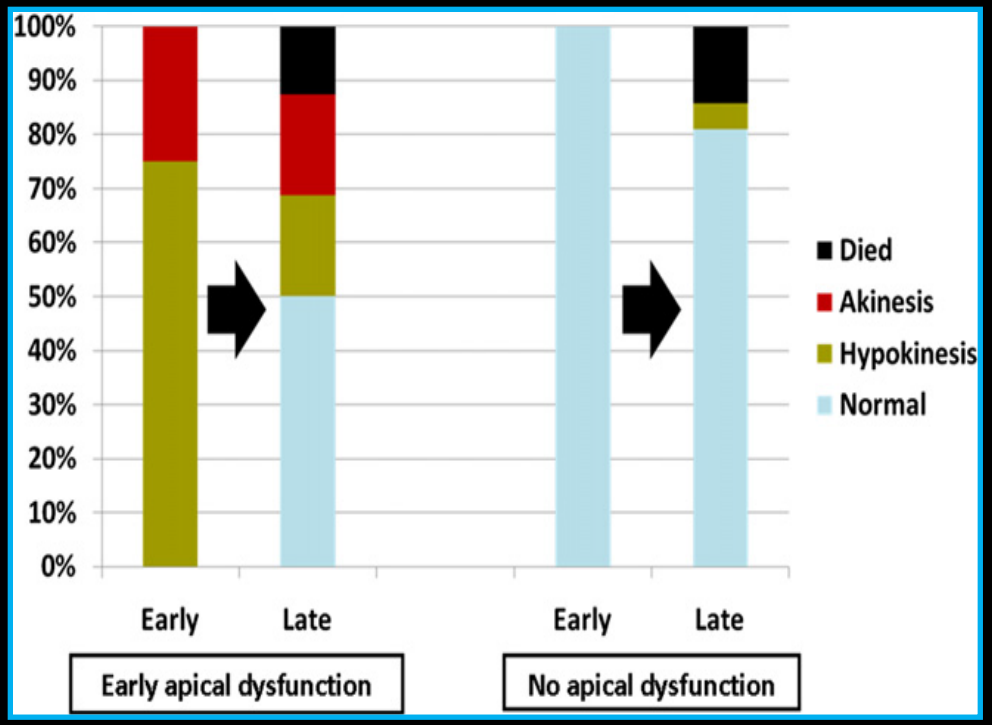


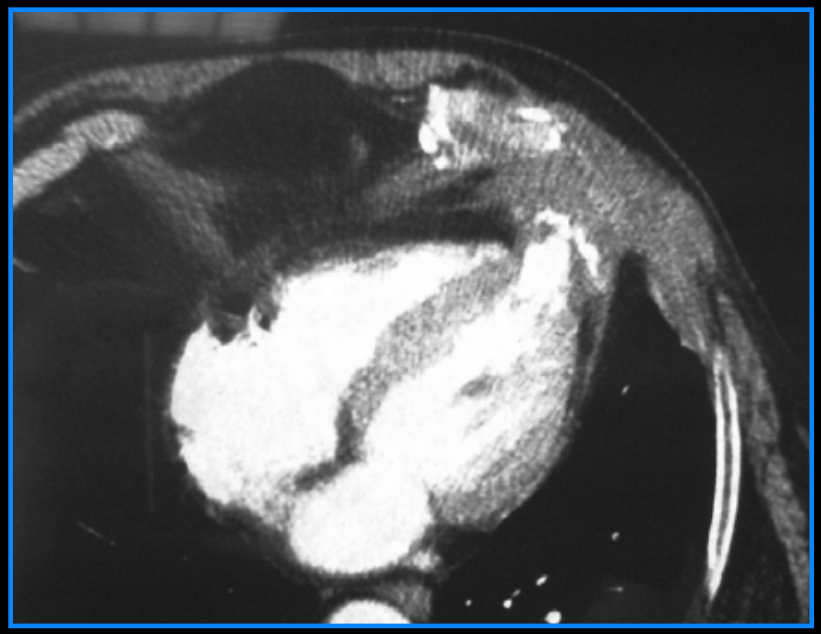
Miller et al.

Disadvantages of Transapical TAVR



Disadvantages of Transapical TAVR

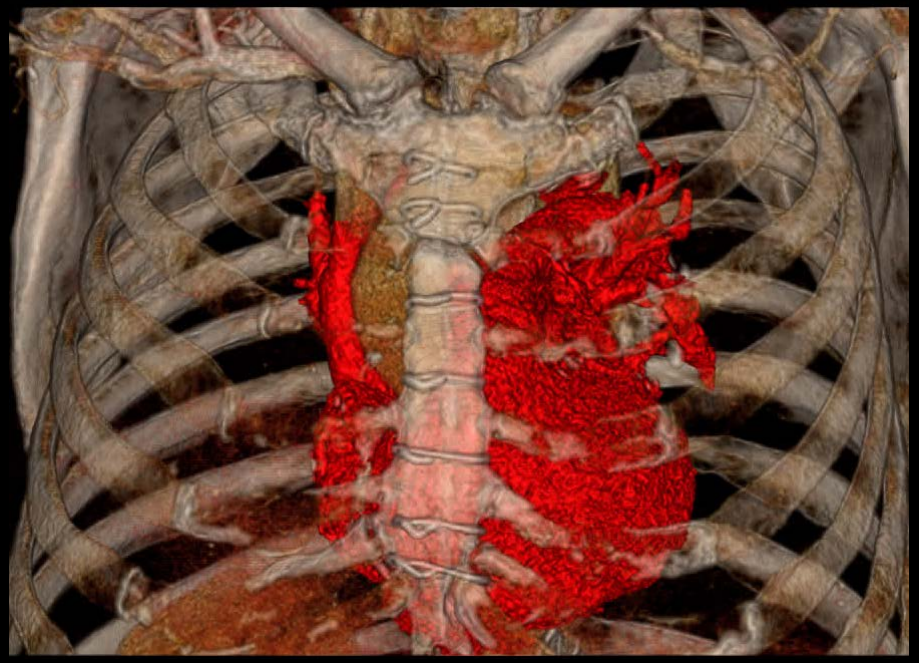




Barbash et al.

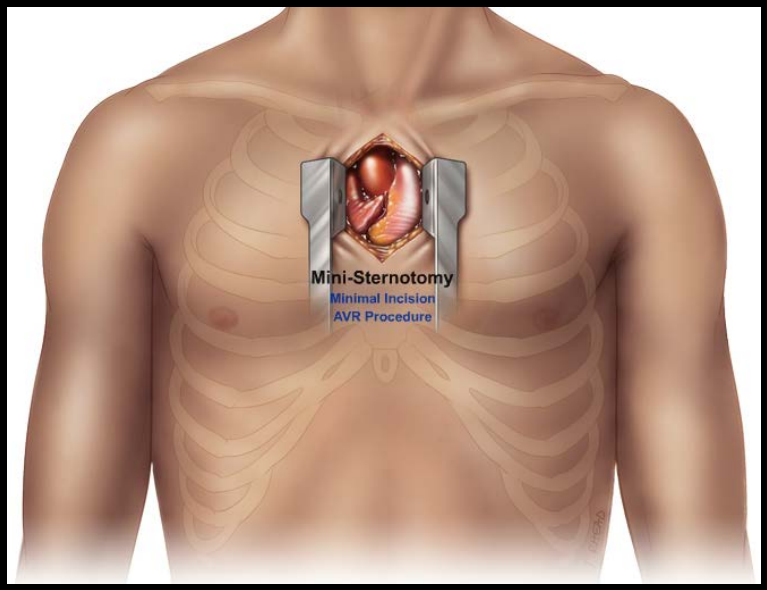
The Poor Transapical TAVR Candidate

- Severe COPD
- No previous sternotomy
- Immunocompromised
- Significantly ↓ ejection fraction



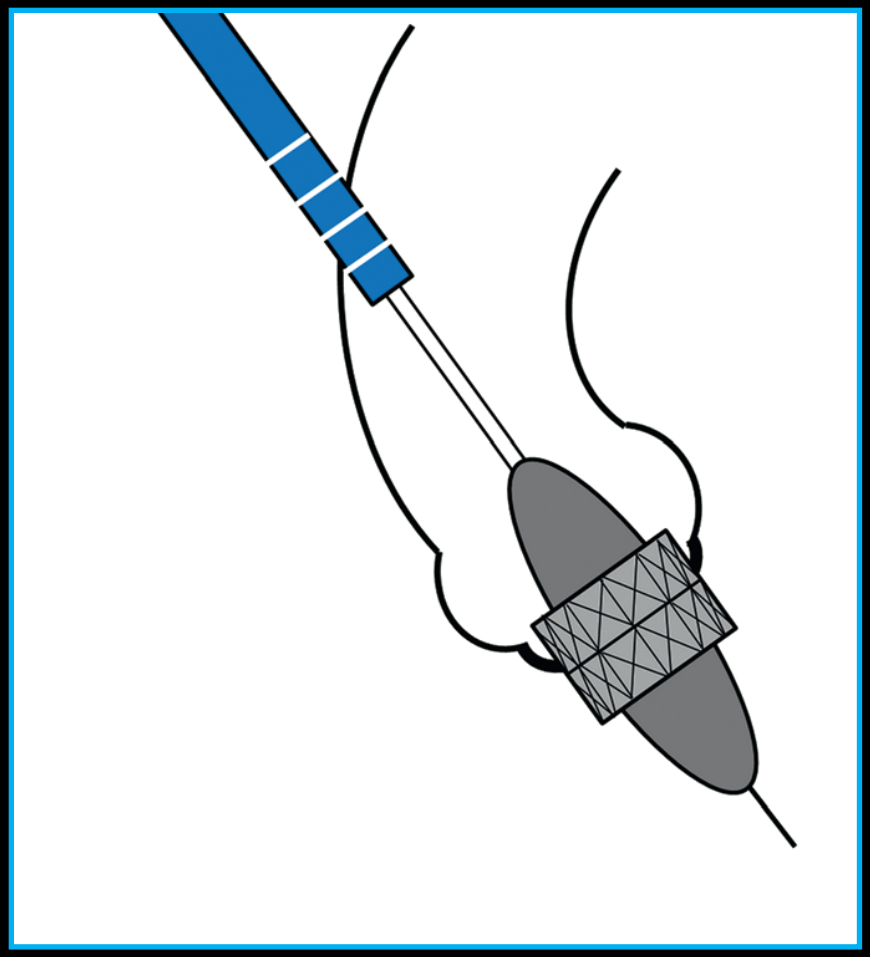
Transaortic TAVR

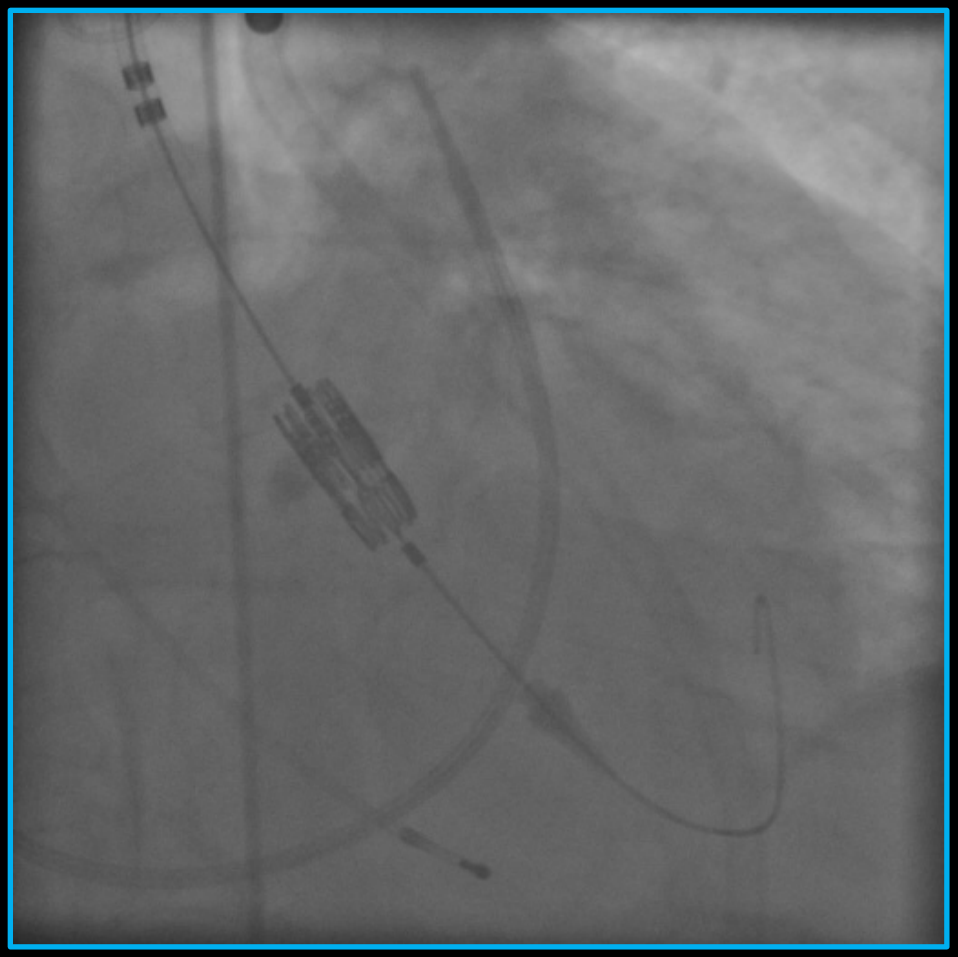
- Mini-sternotomy incision
- Avoids TAVR-TA risks
  - Bleeding
  - Ventricular dysfunction
  - Less pulmonary dysfunction



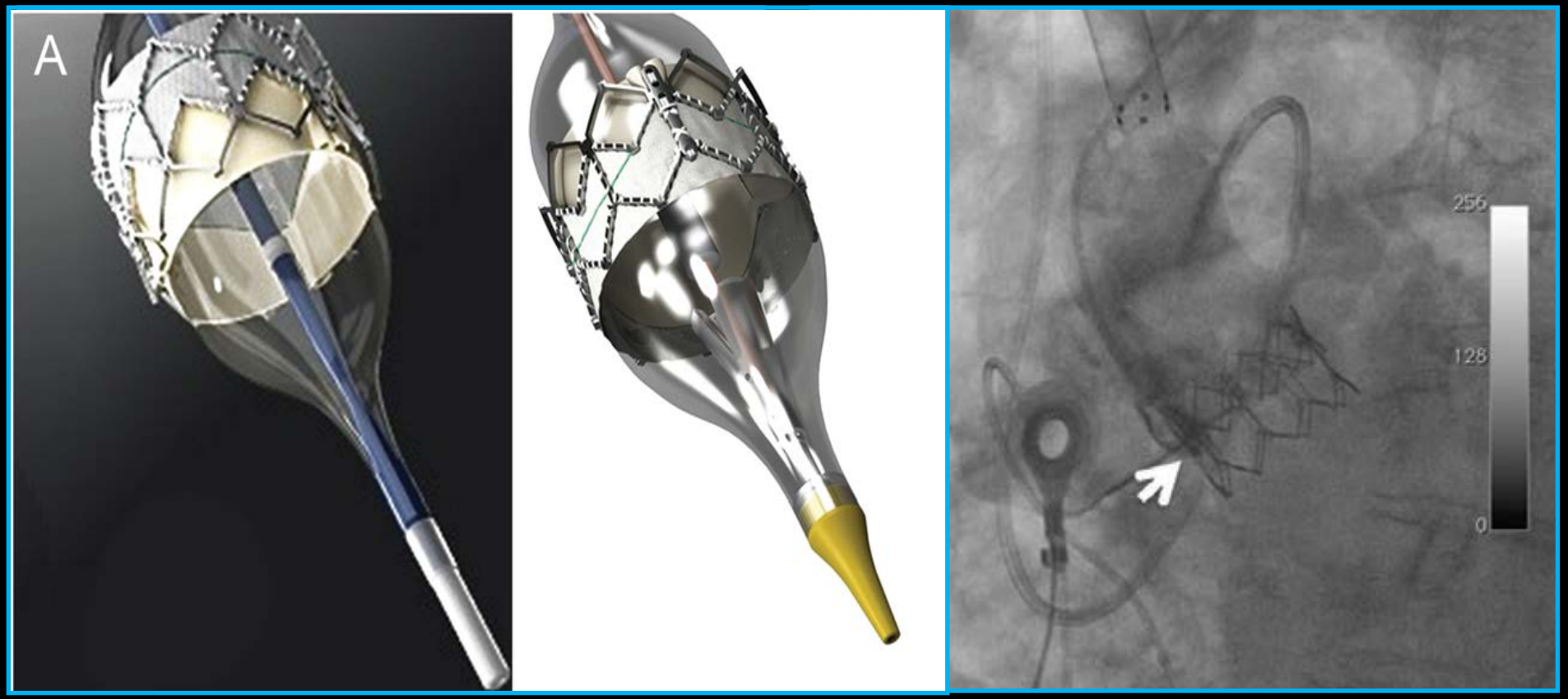
- Preserves the advantages of TA: ease of positioning, avoidance of arch manipulation
- Can be safely performed in most patients

Transaortic TAVR

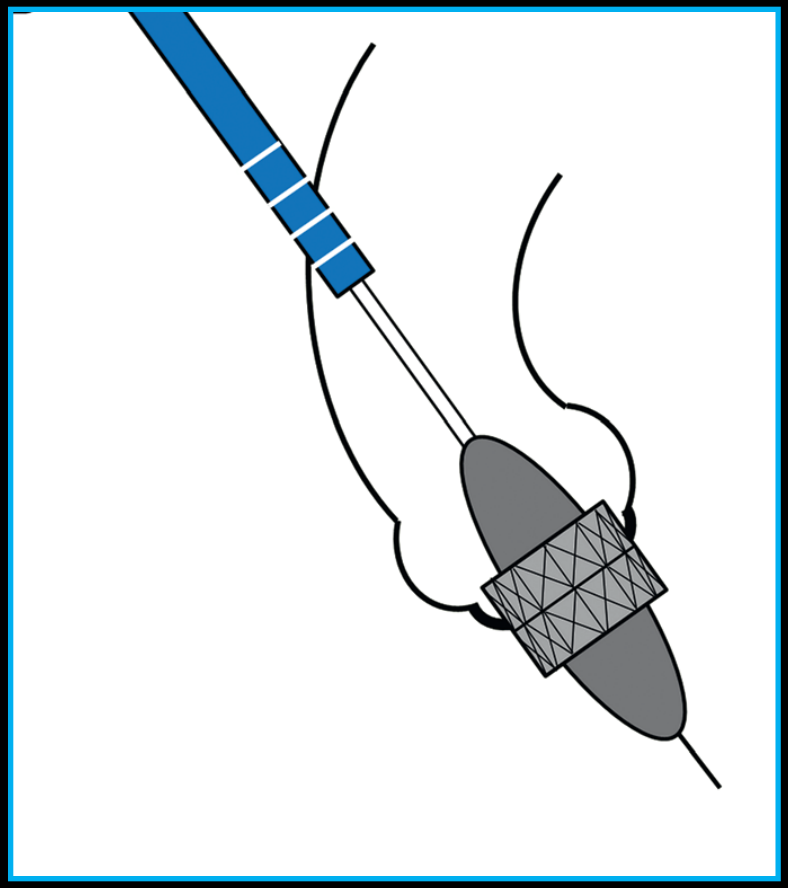


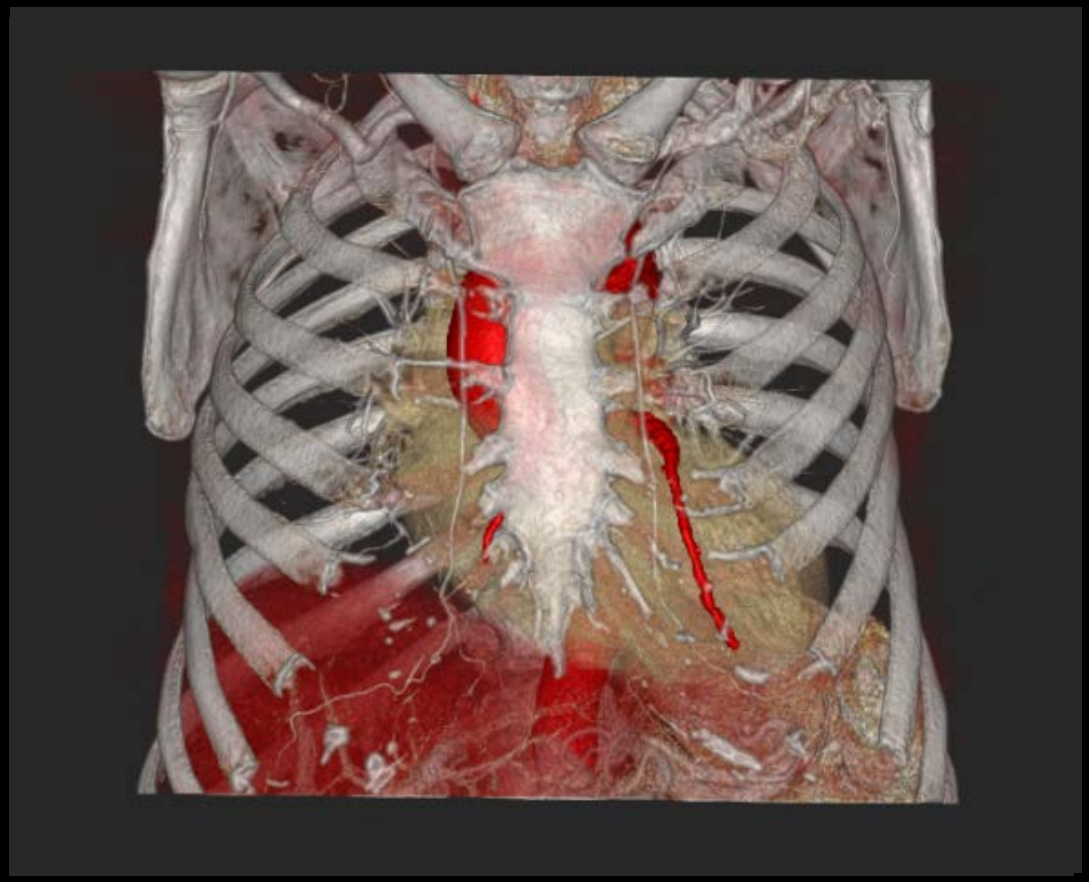


Transaortic TAVR

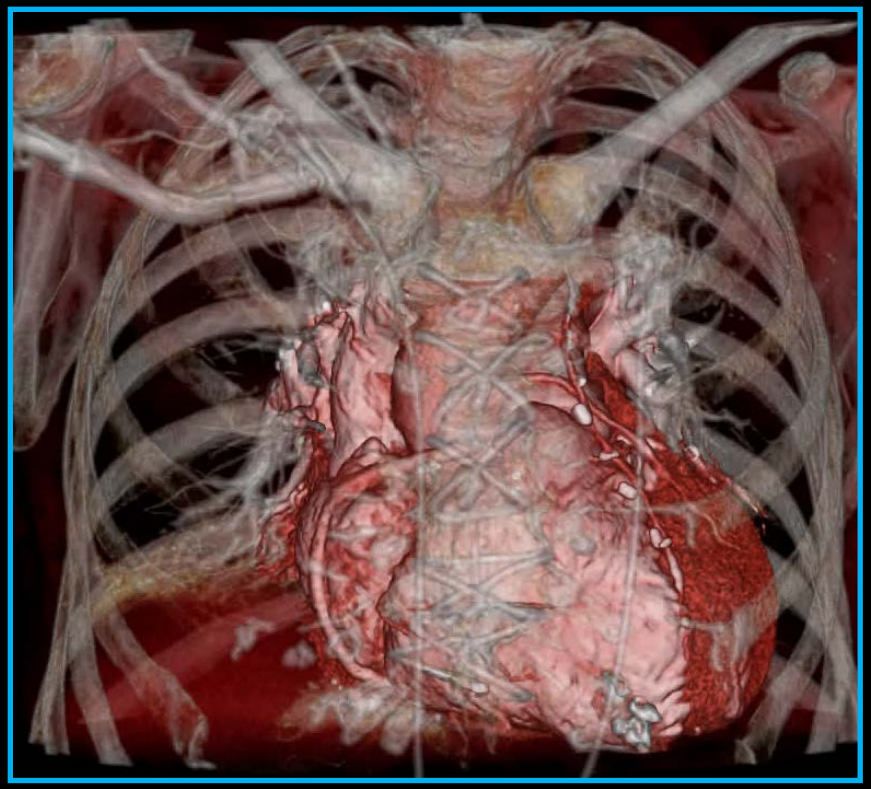


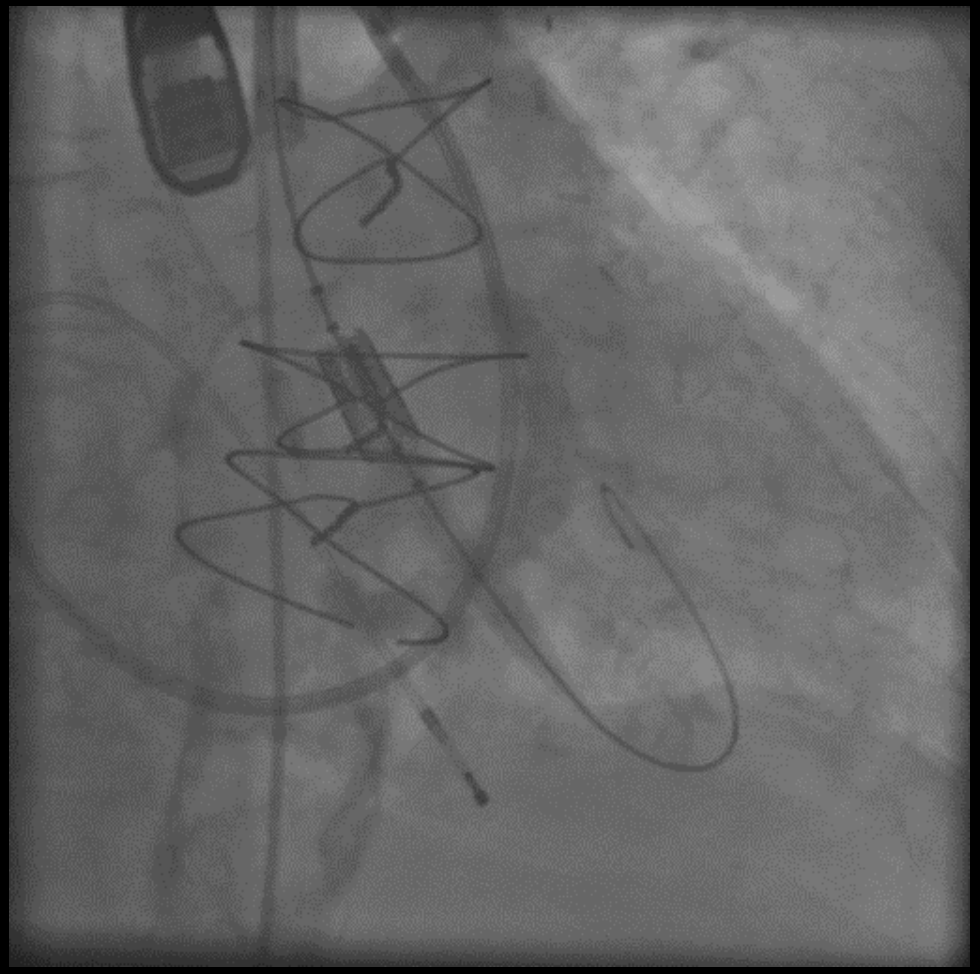
Transaortic TAVR



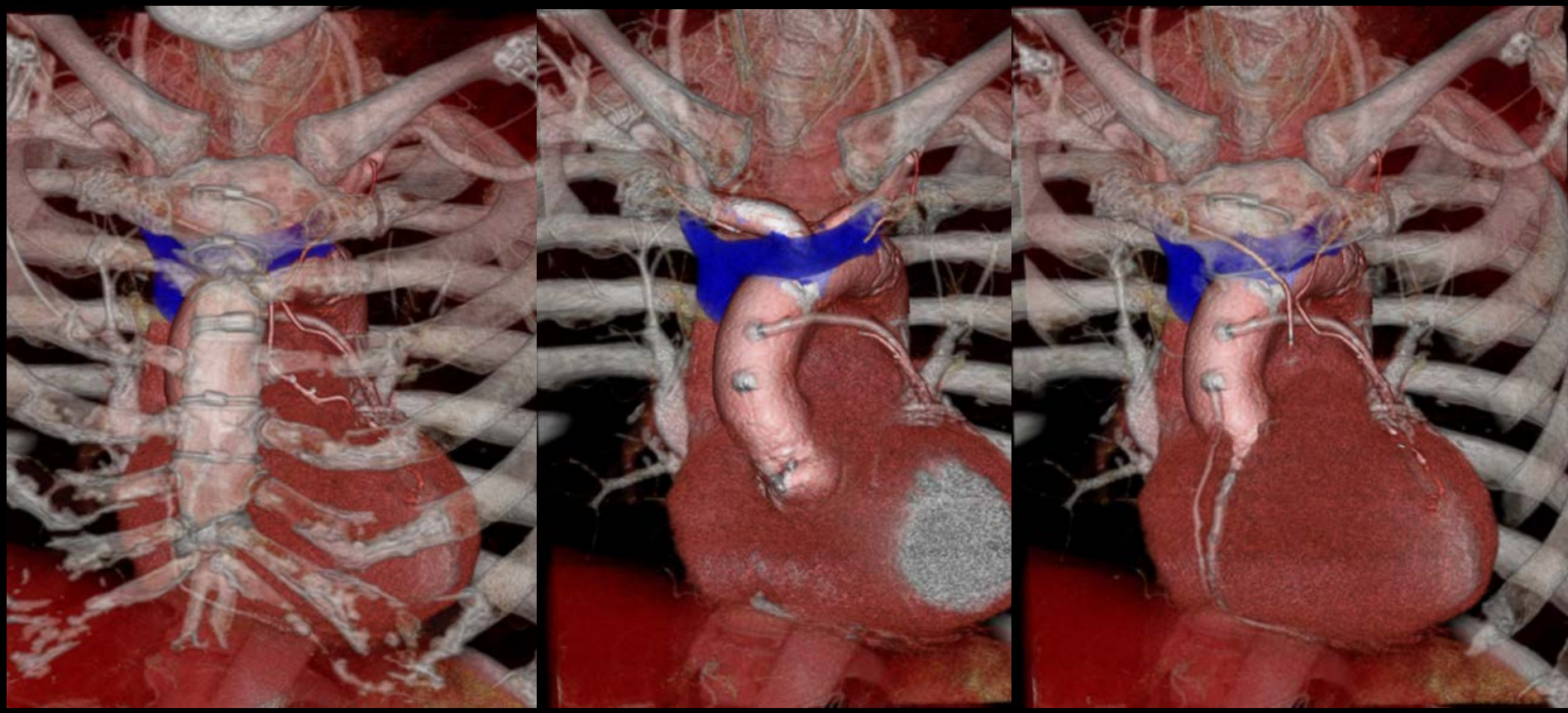


Transaortic TAVR-Redo Sternotomy

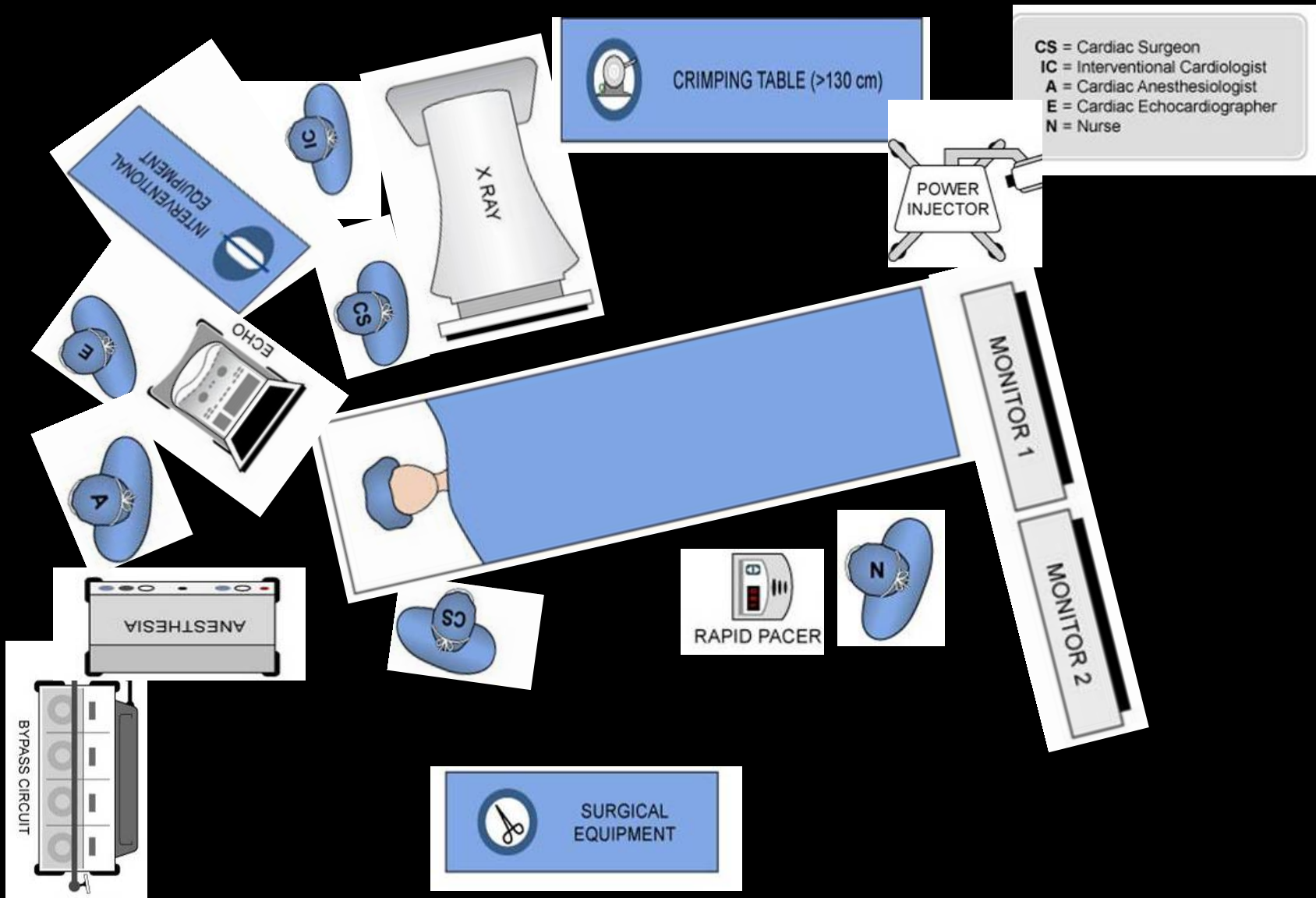




Transaortic TAVR-Redo Sternotomy

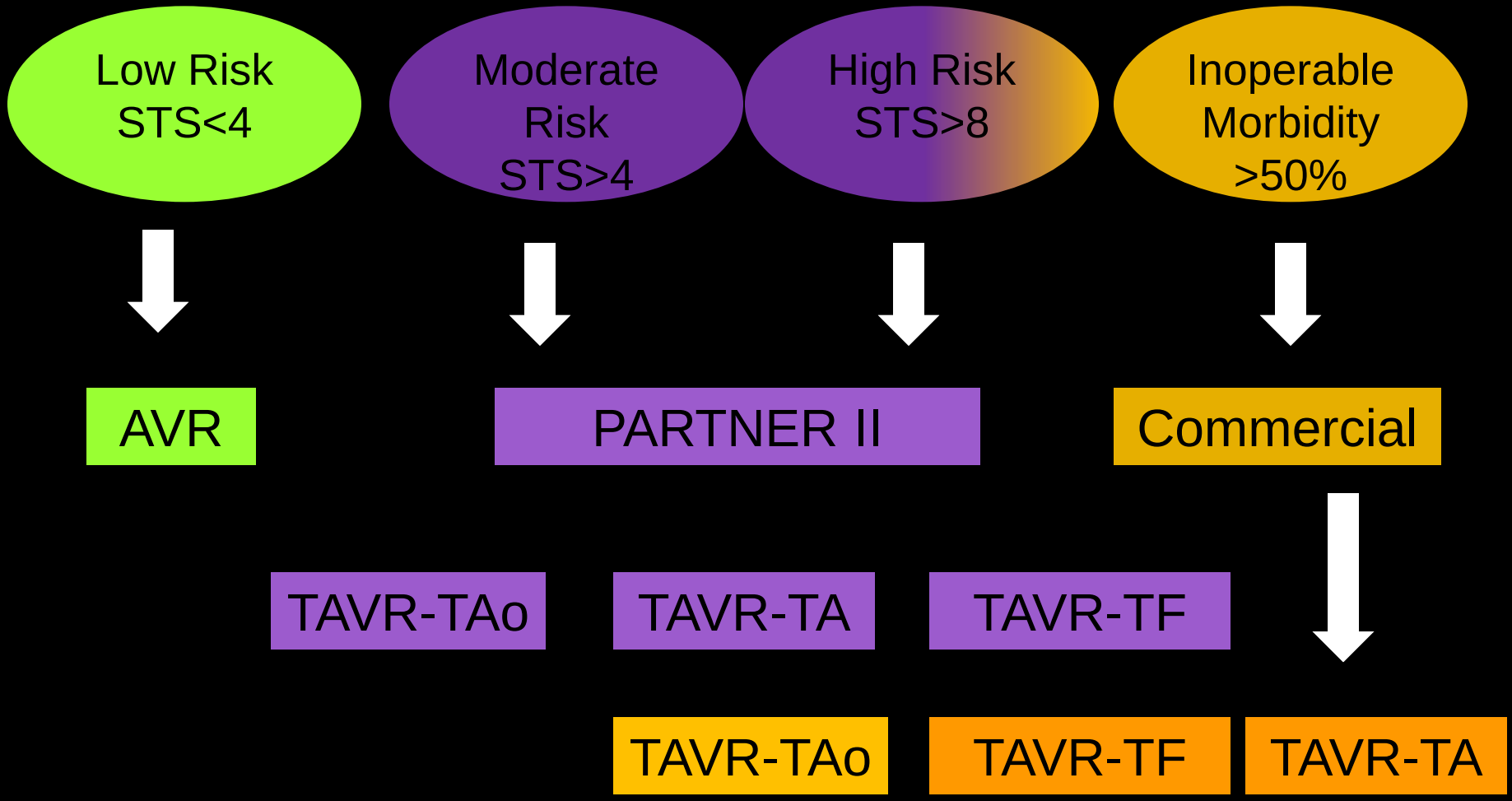


TAVR-TAo Operating Room Setup
Mini-J Sternotomy



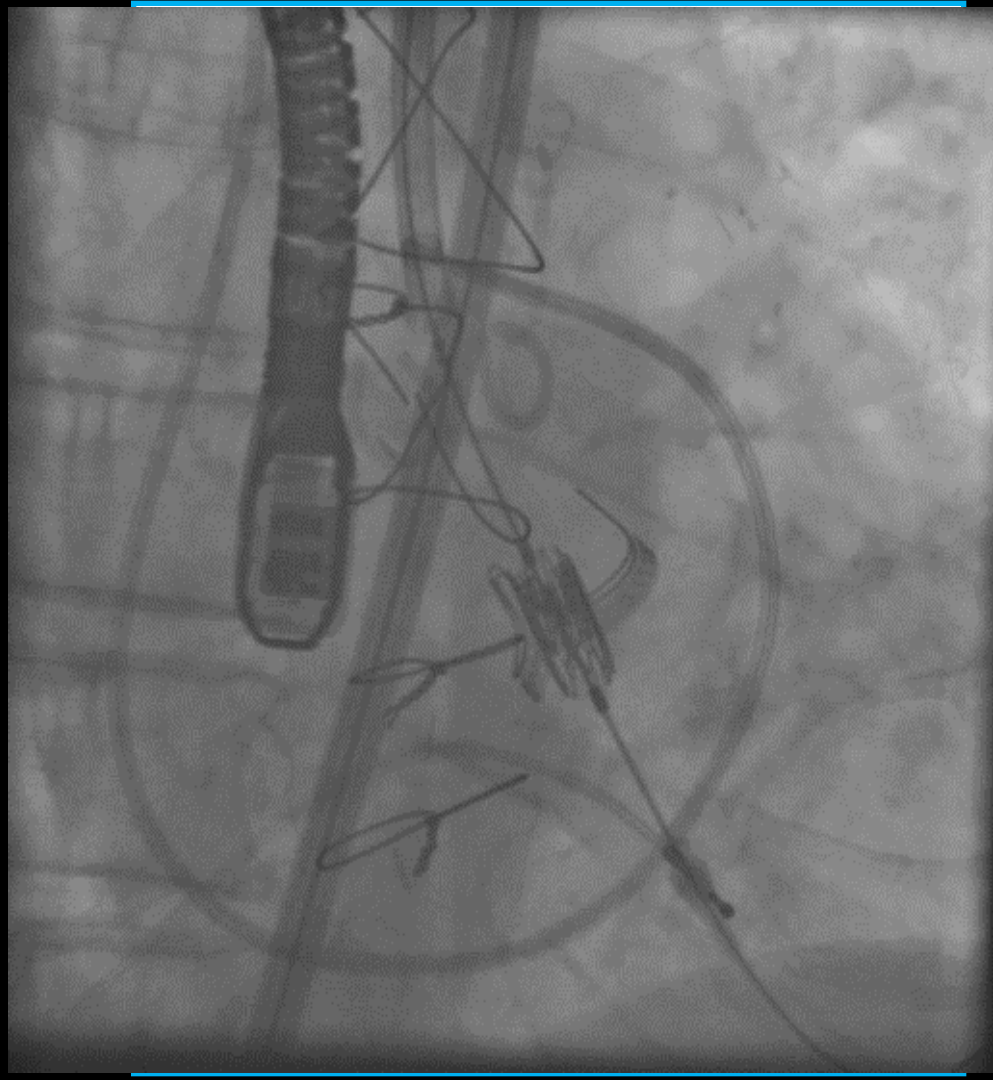

3
1
2

Is there an ideal route of access?

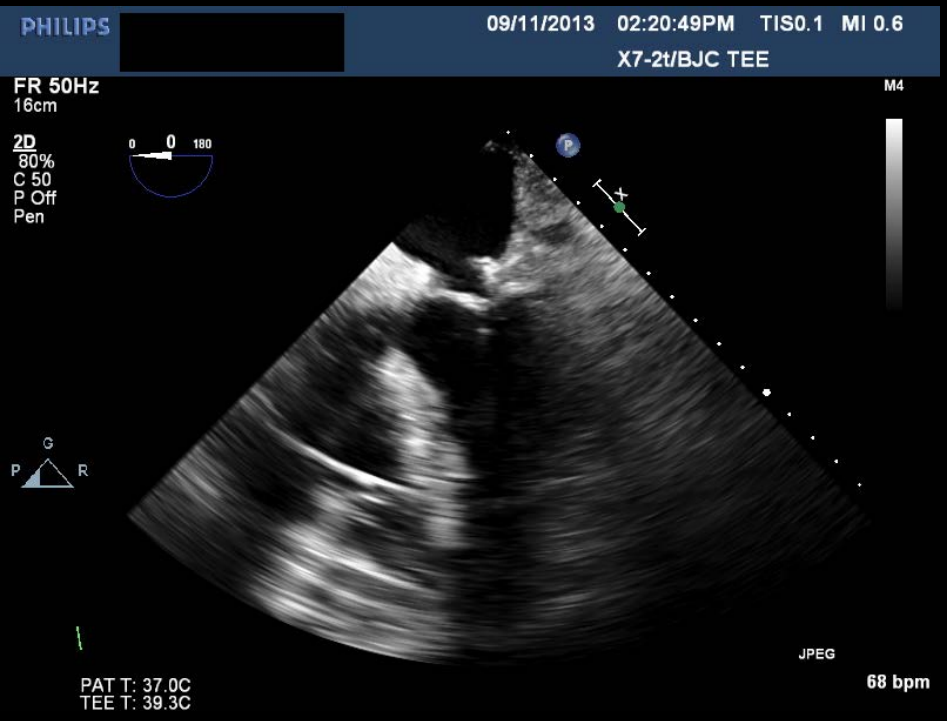


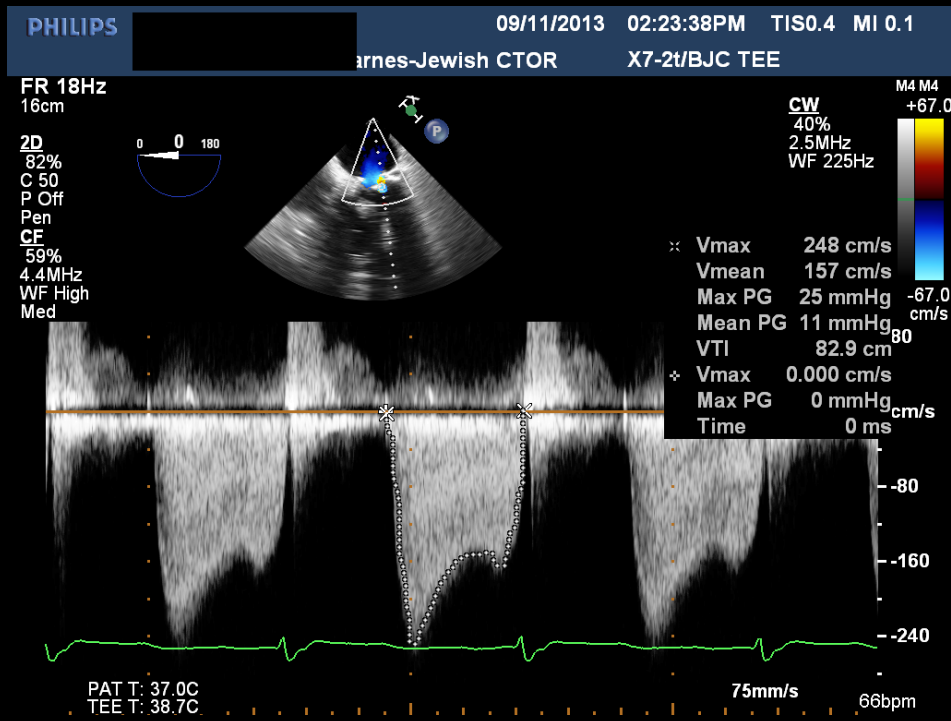
Special Circumstances

- Degenerated aortic valve prostheses
- Mitral procedures
  - Valve in valve
  - Valve in ring
  - Native mitral stenosis

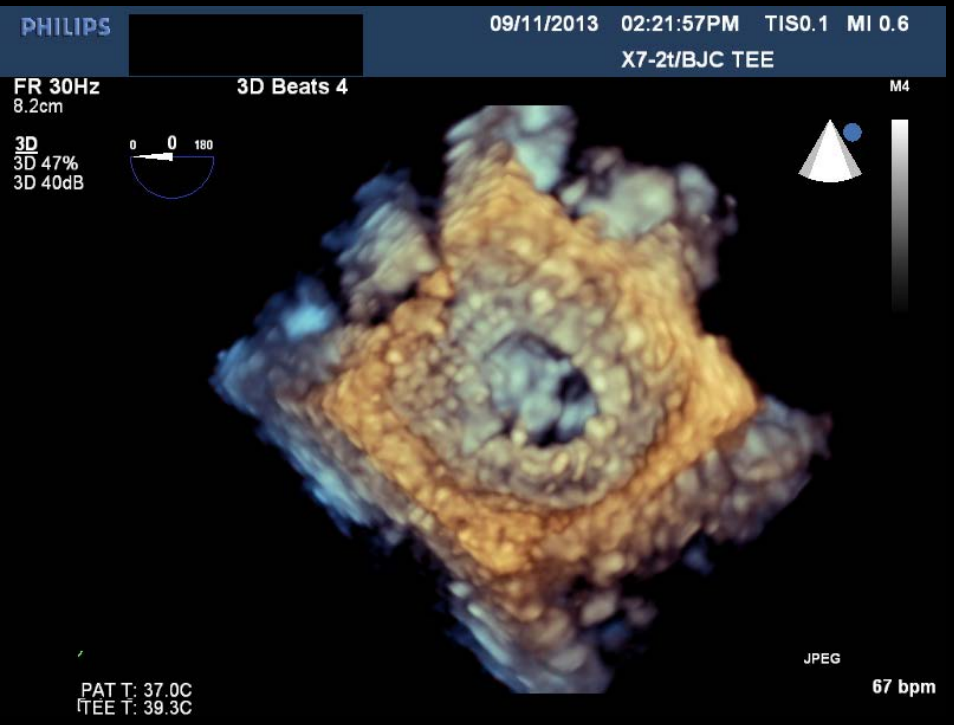


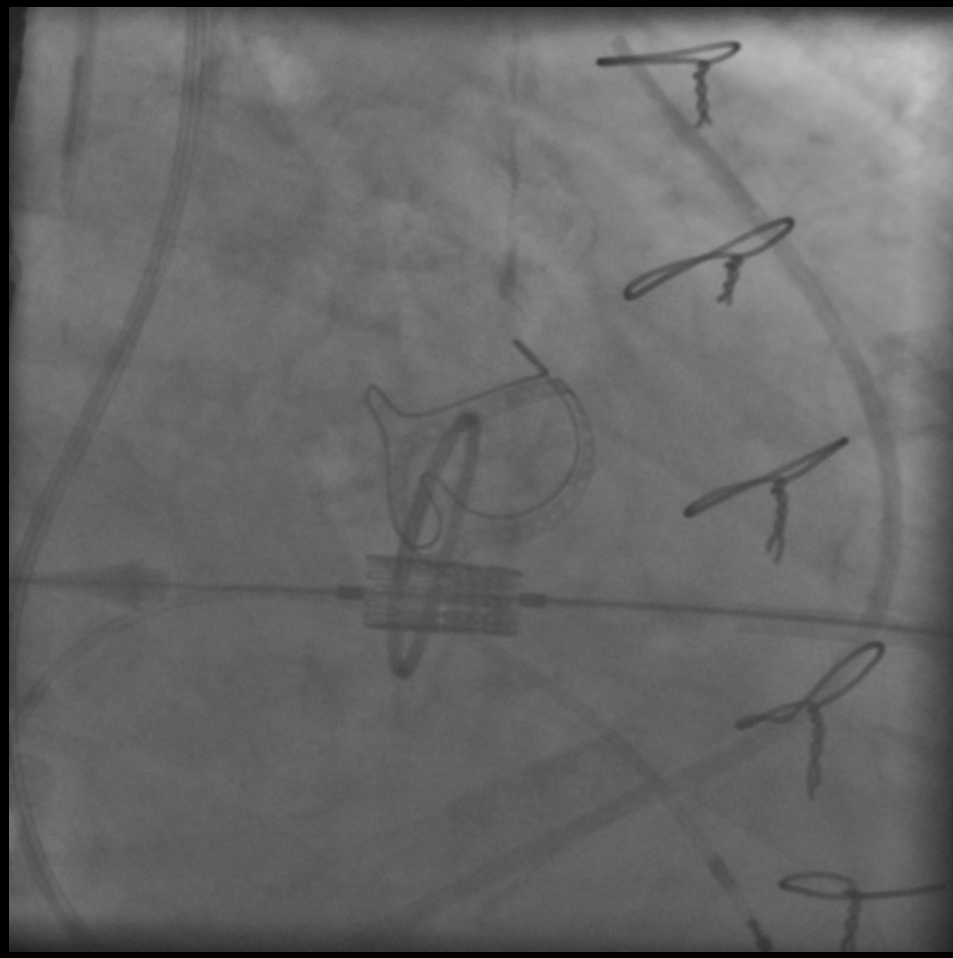
Special Circumstances



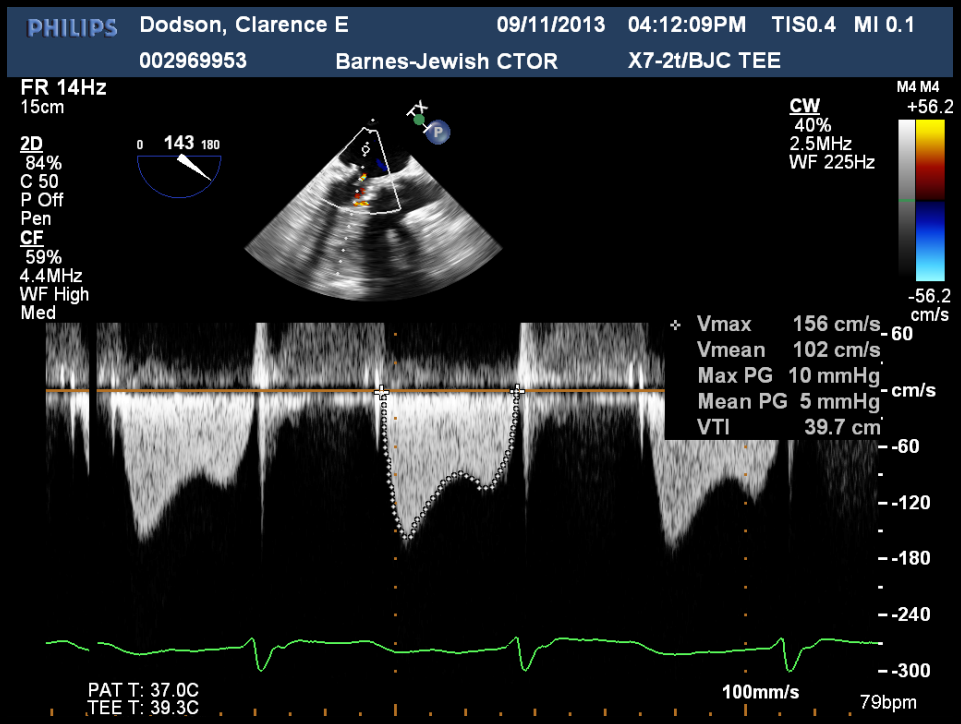


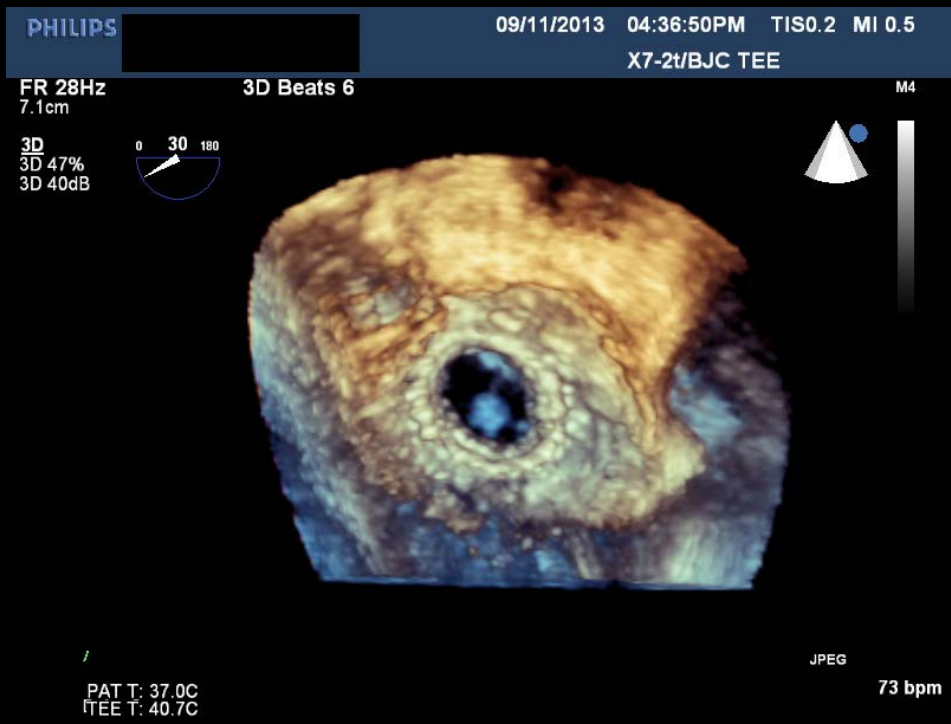
Special Circumstances





Special Circumstances





TAVR Conclusion

- Transapical and transfemoral approaches remain complementary approaches and have their unique advantages and disadvantages.
- A transfemoral-first strategy has been adopted at most US institutions and TF implantation remains the most commonly used approach around the world.
- The availability of smaller, lower profile sheaths will increase the number of patients who are candidates for a TF approach.

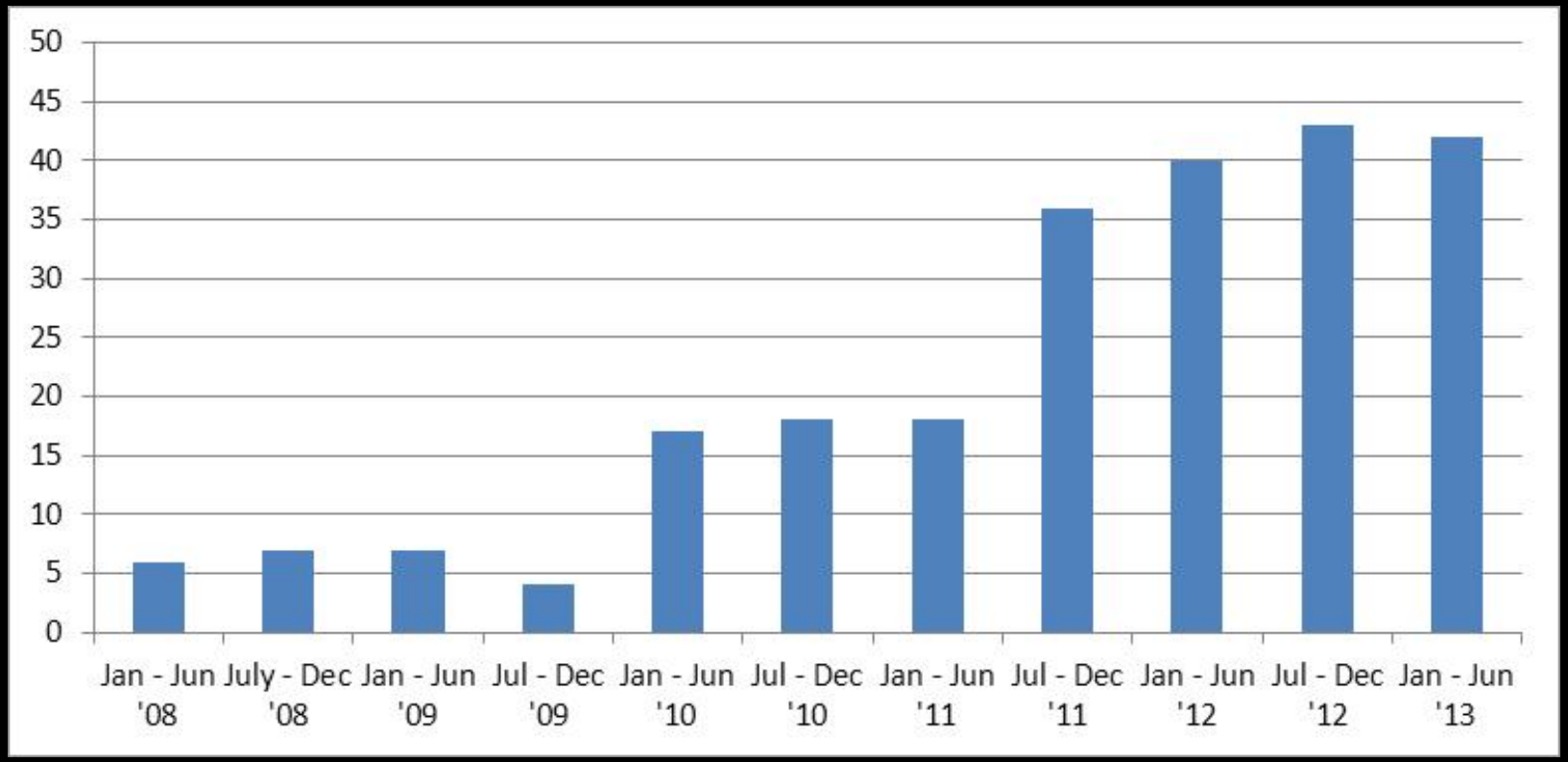
TAVR Conclusion

- Transaortic procedures will play an increasing role in the future and overcome some of the problems associated with TA insertion.
- TAVR physicians need to be familiar with all approaches and should tailor the implant strategy to the the particular patient.

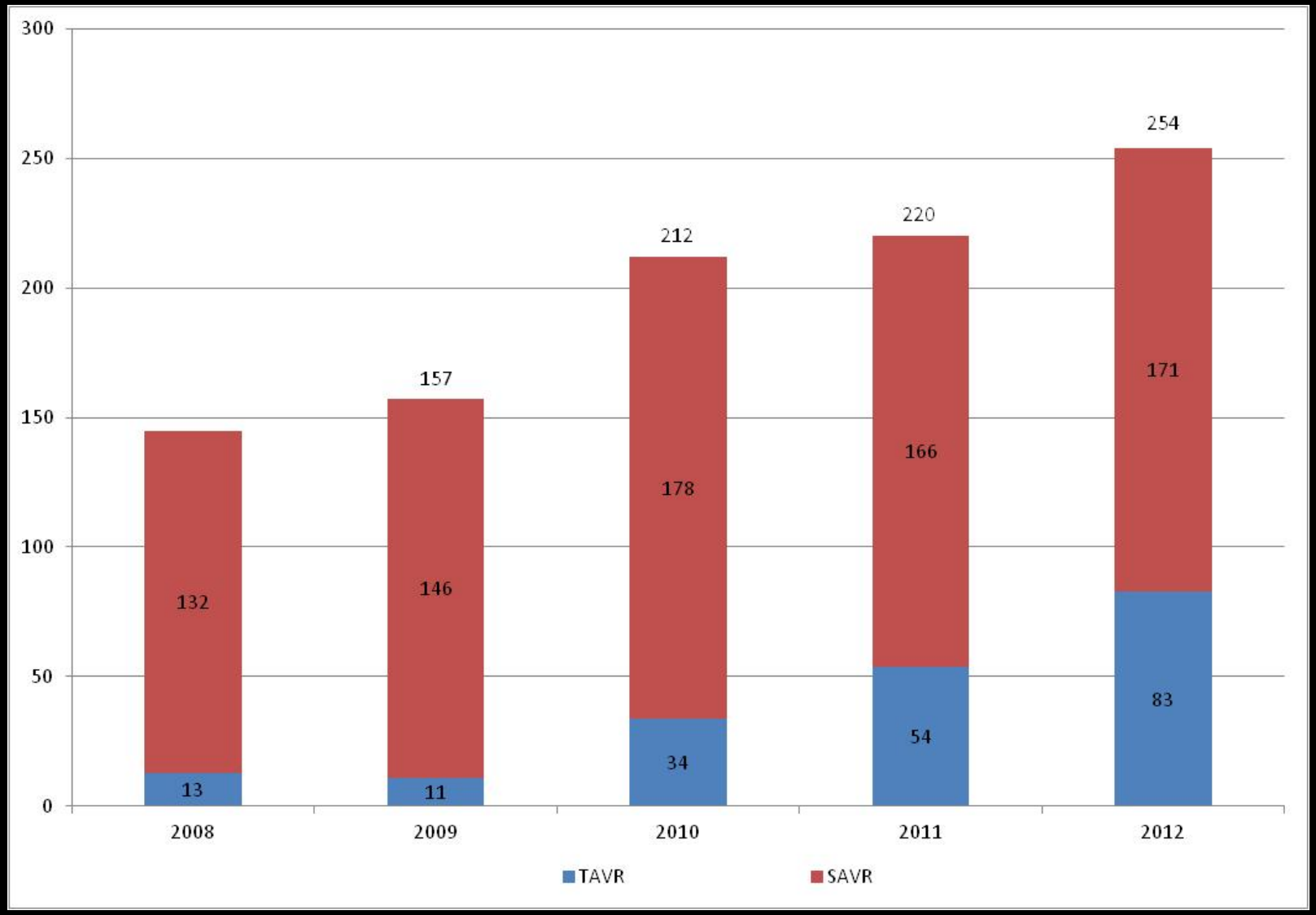
Washington University TAVR Experience

- PARTNER I
  - Transapical 55
  - Transfemoral 45
- PARTNER II
  - Transapical 29
  - Transfemoral 49
  - Transaortic 16
  - Valve in Valve 11 (5TA, 6TF)
- Commercial
  - Transfemoral 33
  - Transapical 22
  - Transaortic 29

Washington University TAVR Volume

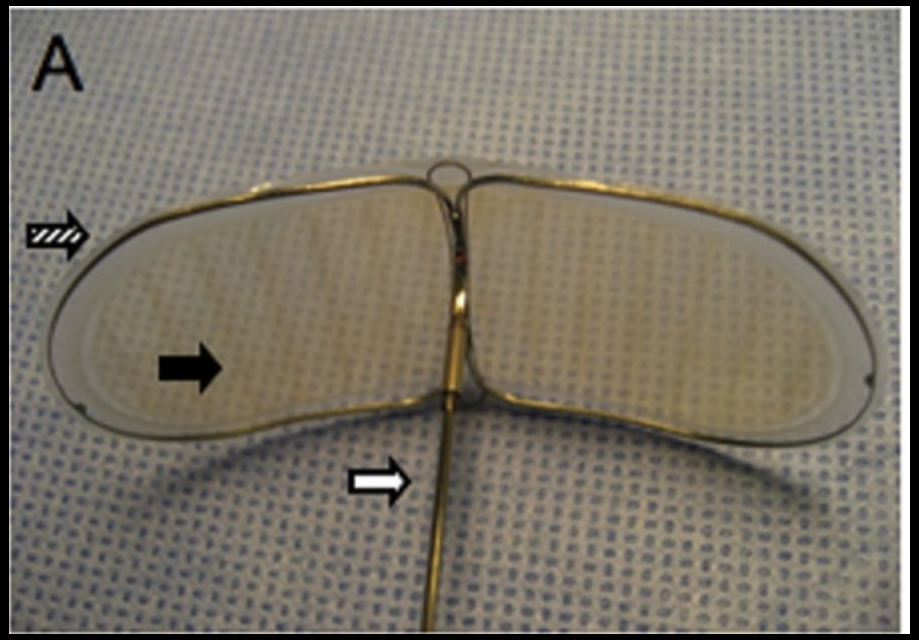


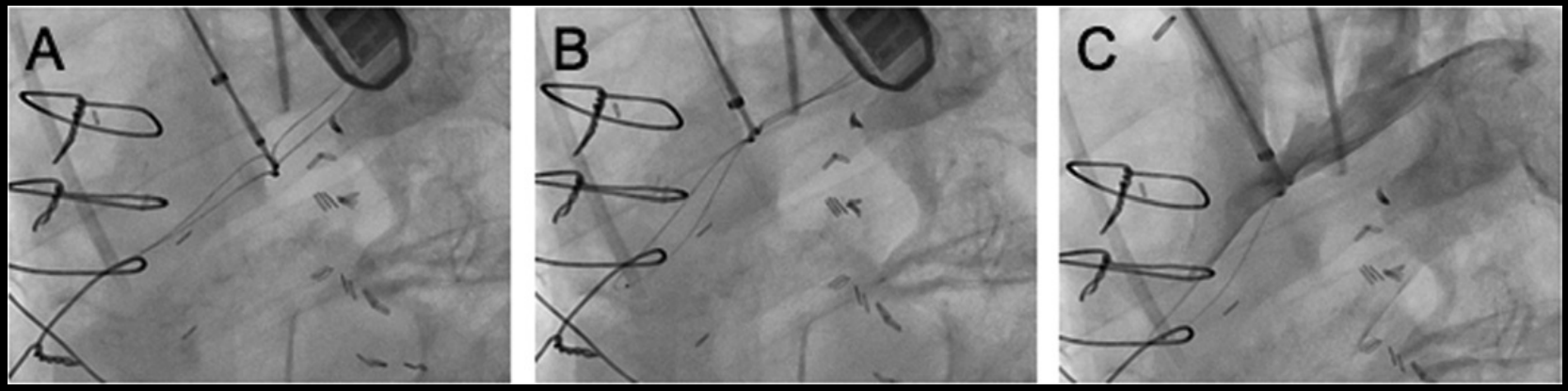
Washington University AVR Volume



Future directions

- Reducing stroke

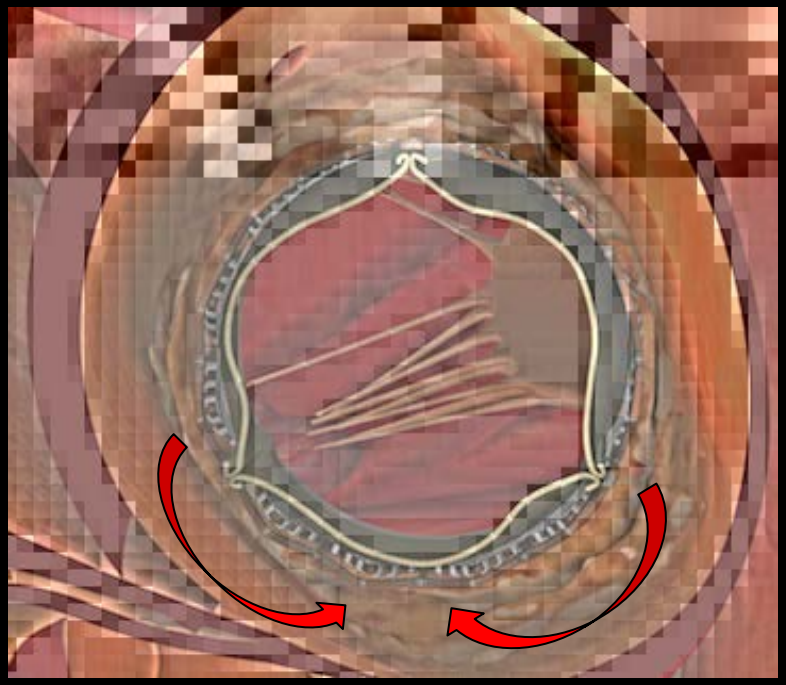




J Am Coll Card Interv 2010

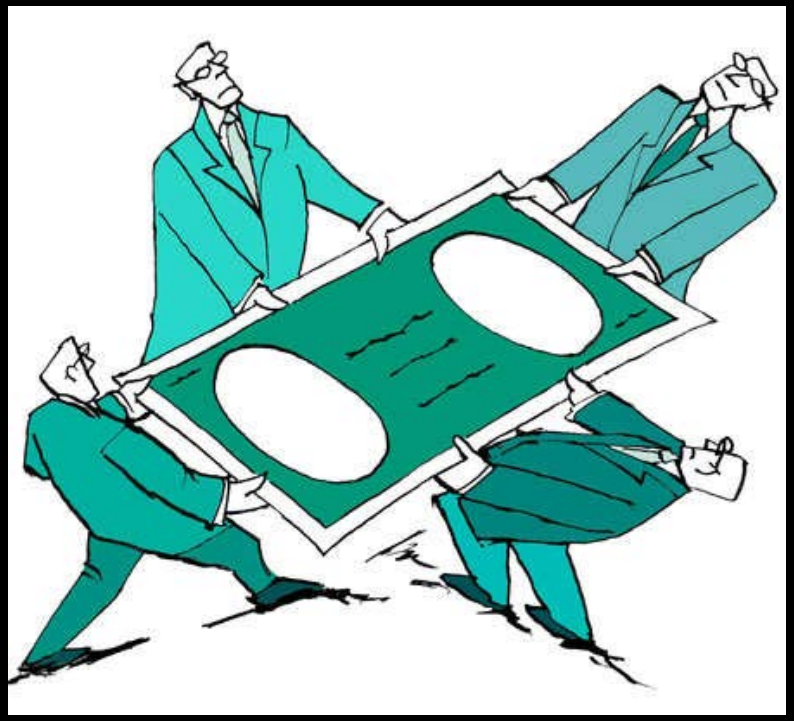
Future directions

- Reducing stroke
- Eliminating paravalvular leaks



Future directions

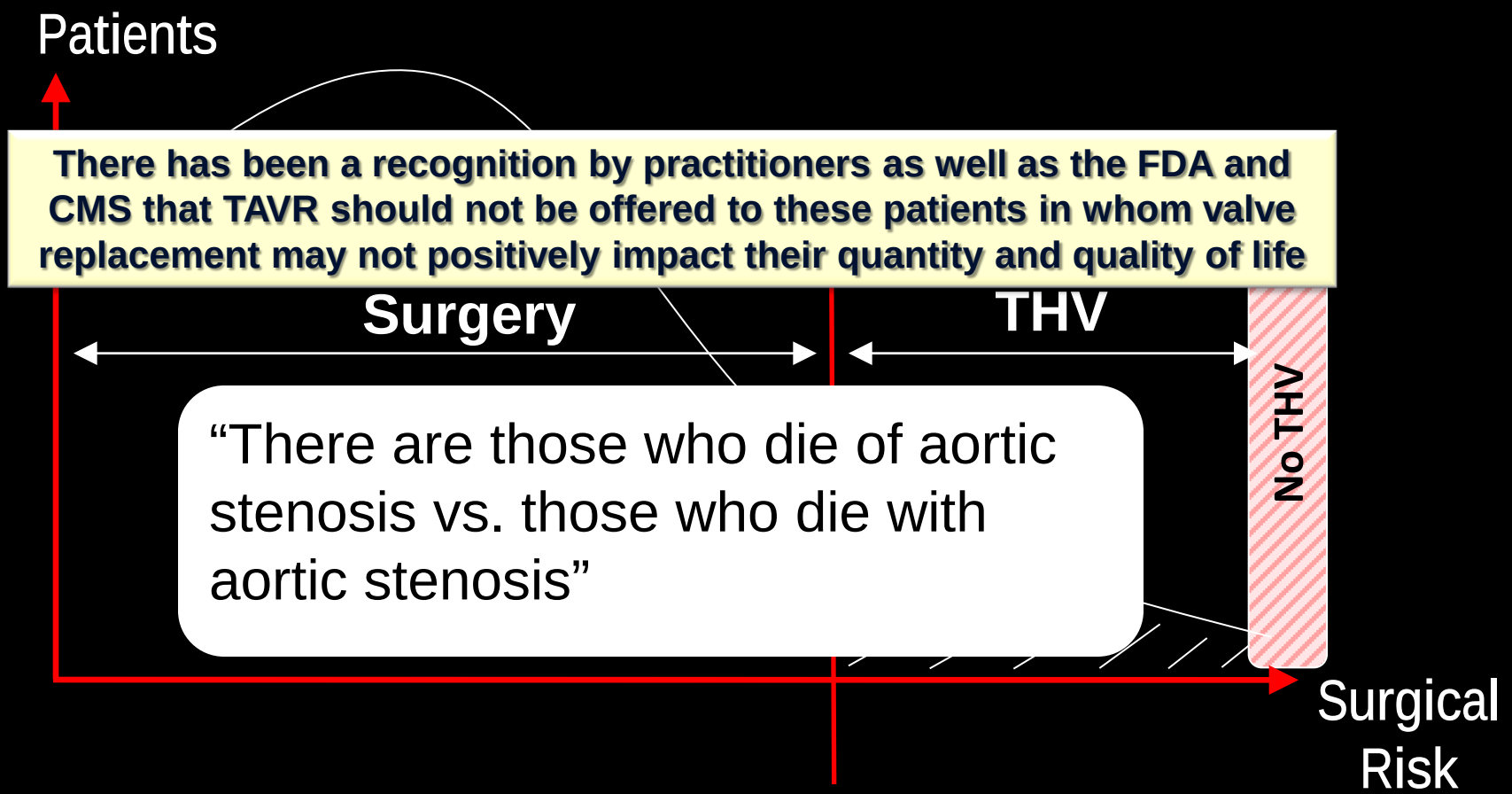
- Reducing stroke
- Eliminating paravalvular leaks
- Reimbursement



Future directions

Patient Selection

Some patients may not be suitable THV candidates



It’s a team effort…

- Cardiologists
- Cardiac Surgeons
- Anesthesiologists
- Hybrid OR team
- RN’s and ANP’s
- Research nurses

Thank you for your attention.