

Minimally Invasive Aortic Valve Replacement: How We Do It

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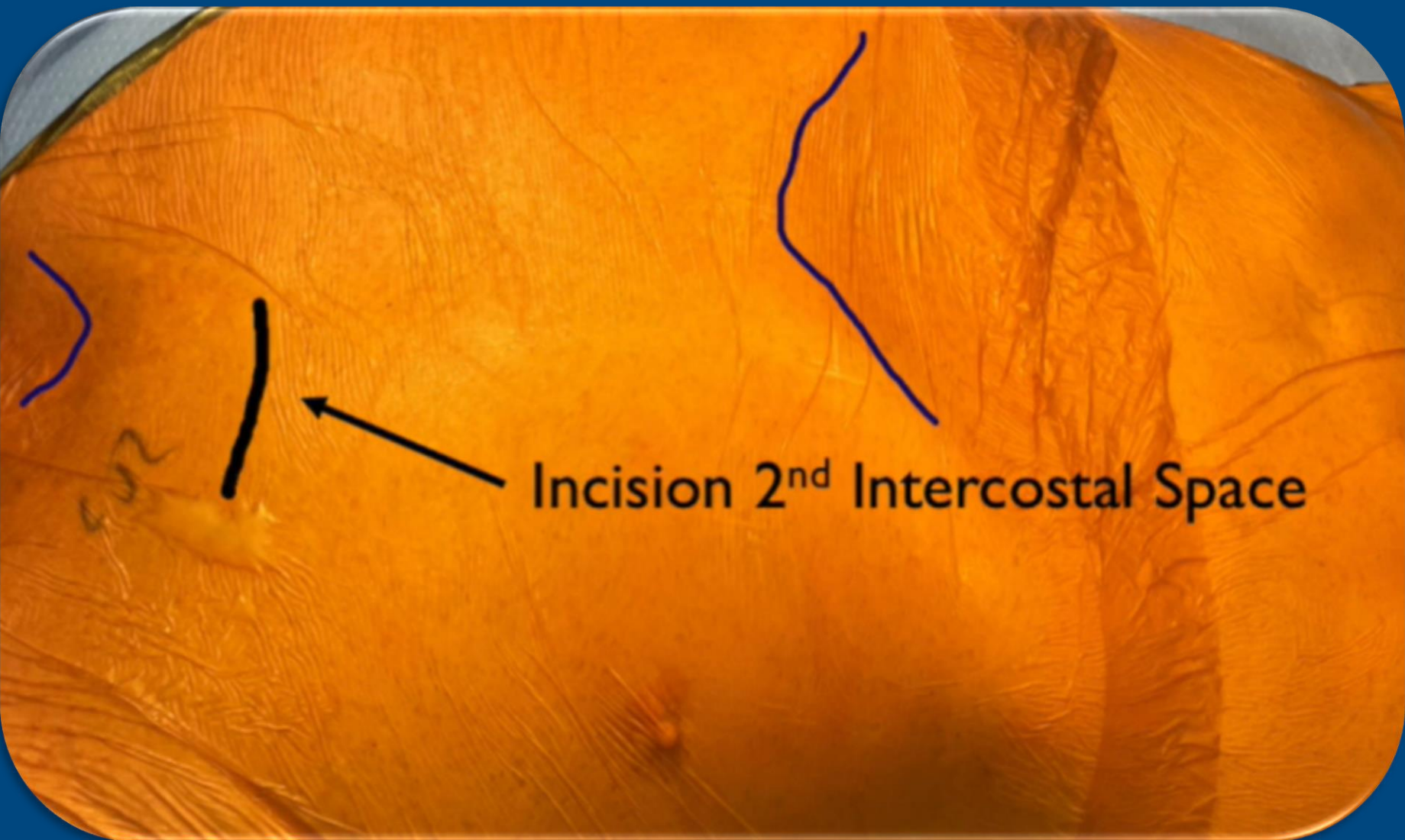


Background

Despite offering the benefits of enhanced recovery compared to sternotomy approaches, minimally invasive aortic valve replacement (AVR) has not achieved widespread adoption across the United States based on Society of Thoracic Surgeons (STS) Database data. Currently, less than 10% of SAVRs are performed minimally invasively. Our center has a 20-year history performing minimally invasive cardiac surgery. For isolated aortic valve disease, the right anterior mini-thoracotomy (RAMT) approach represents a reproducible standard at our center and a viable alternative to transcatheter aortic valve replacement. We present a case video that illustrates step by step how we perform a minimally invasive AVR.

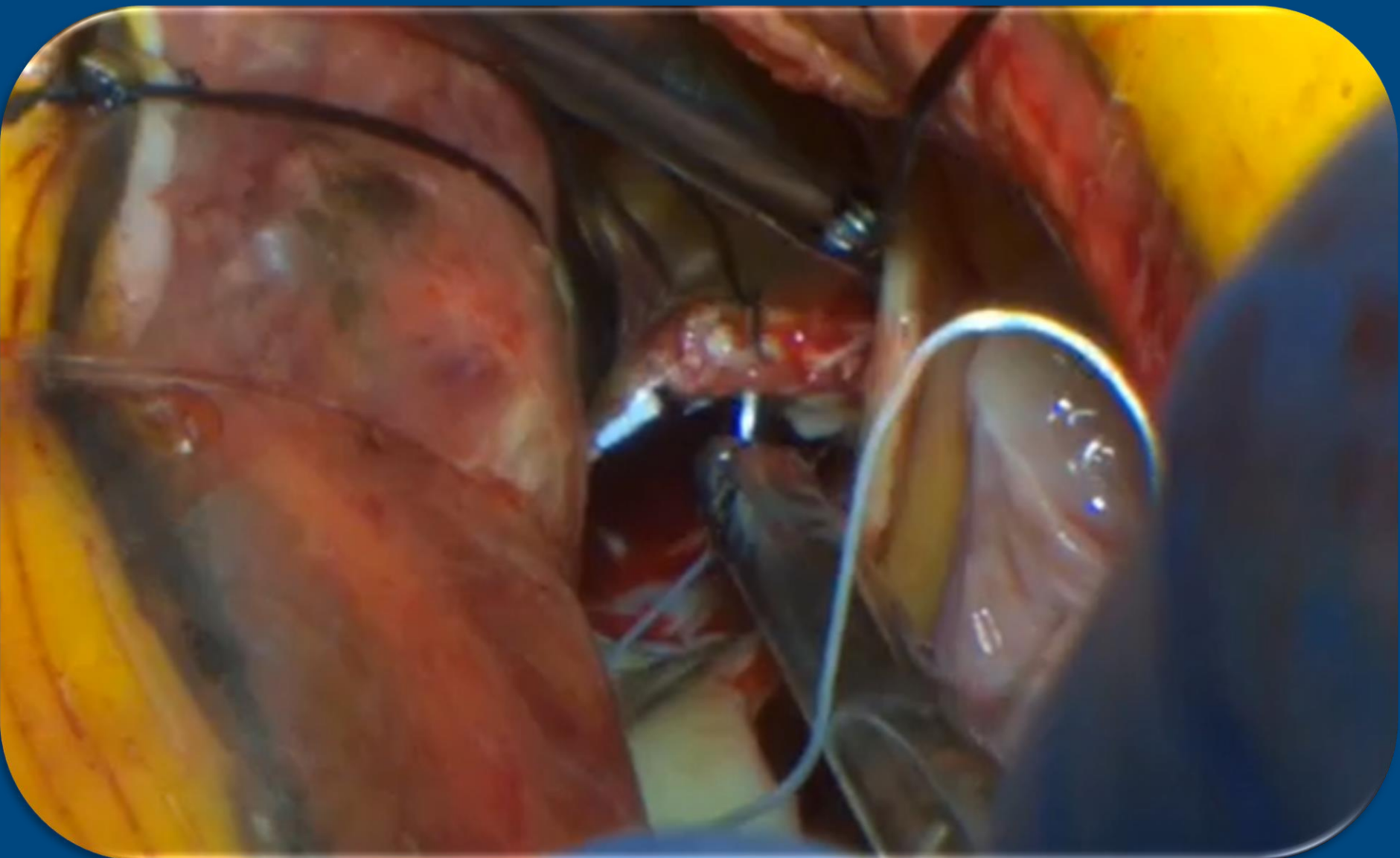
Case Video Summary:

A 66-year-old male with recent shortness of breath with exertion and a new systolic heart murmur on physical exam was found on echocardiogram to have severe aortic stenosis. He was referred for consideration of aortic valve replacement. The case video shows step by step performance of a minimally invasive aortic valve replacement done through a RAMT approach.



Access

- S/M Alexis Soft Tissue Retractor
- Transverse aortotomy extended down LCS and NCS
- Aortic valve excised and annulus debrided in standard fashion

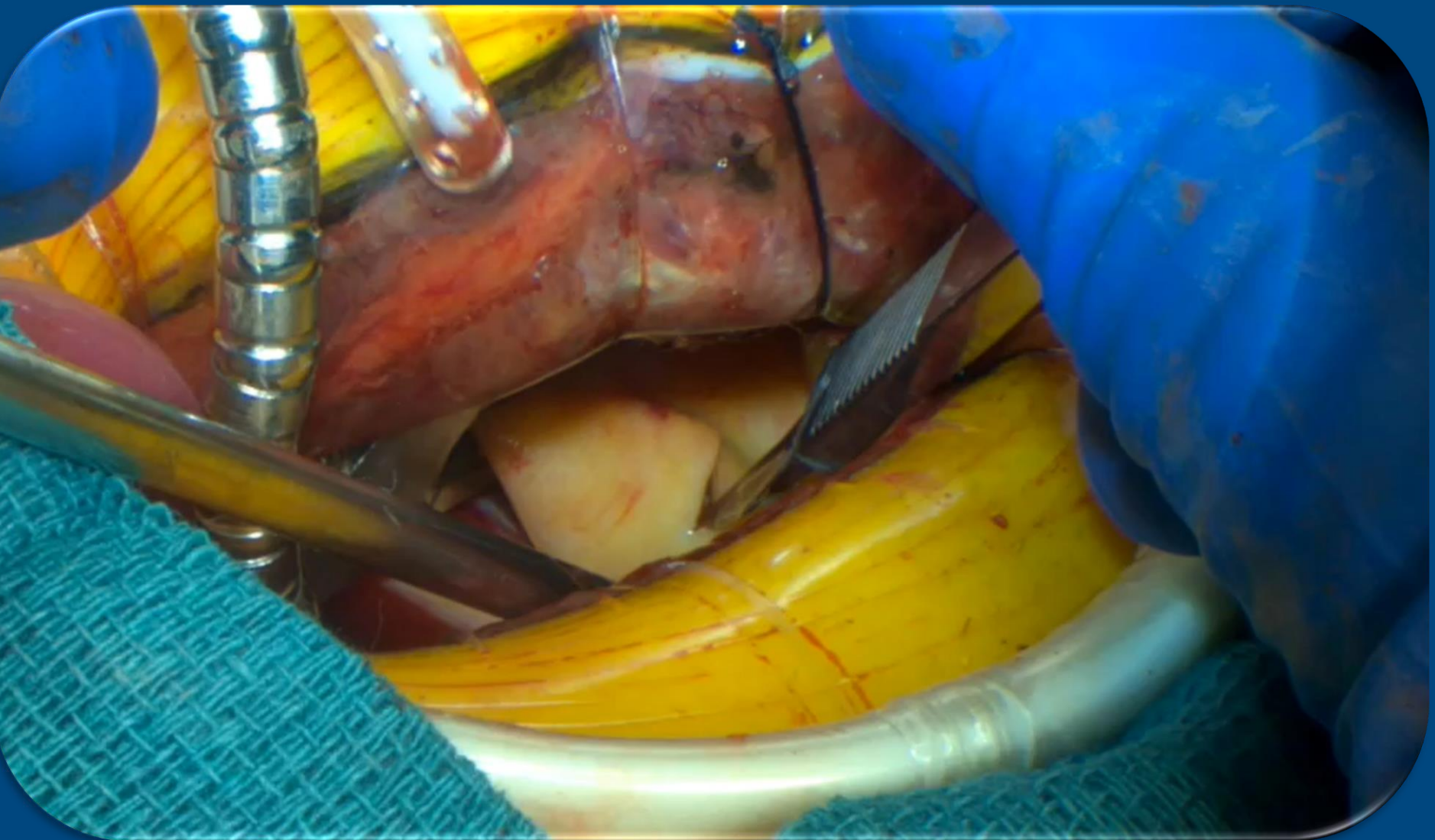


Implantation/Closing

- Careful suture placement in sewing cuff- PVL not acceptable
- Sutures secured using titanium fasteners
- Aortotomy closed with running 4-0 prolene suture
- Pacing wires prior to cross-clamp removal

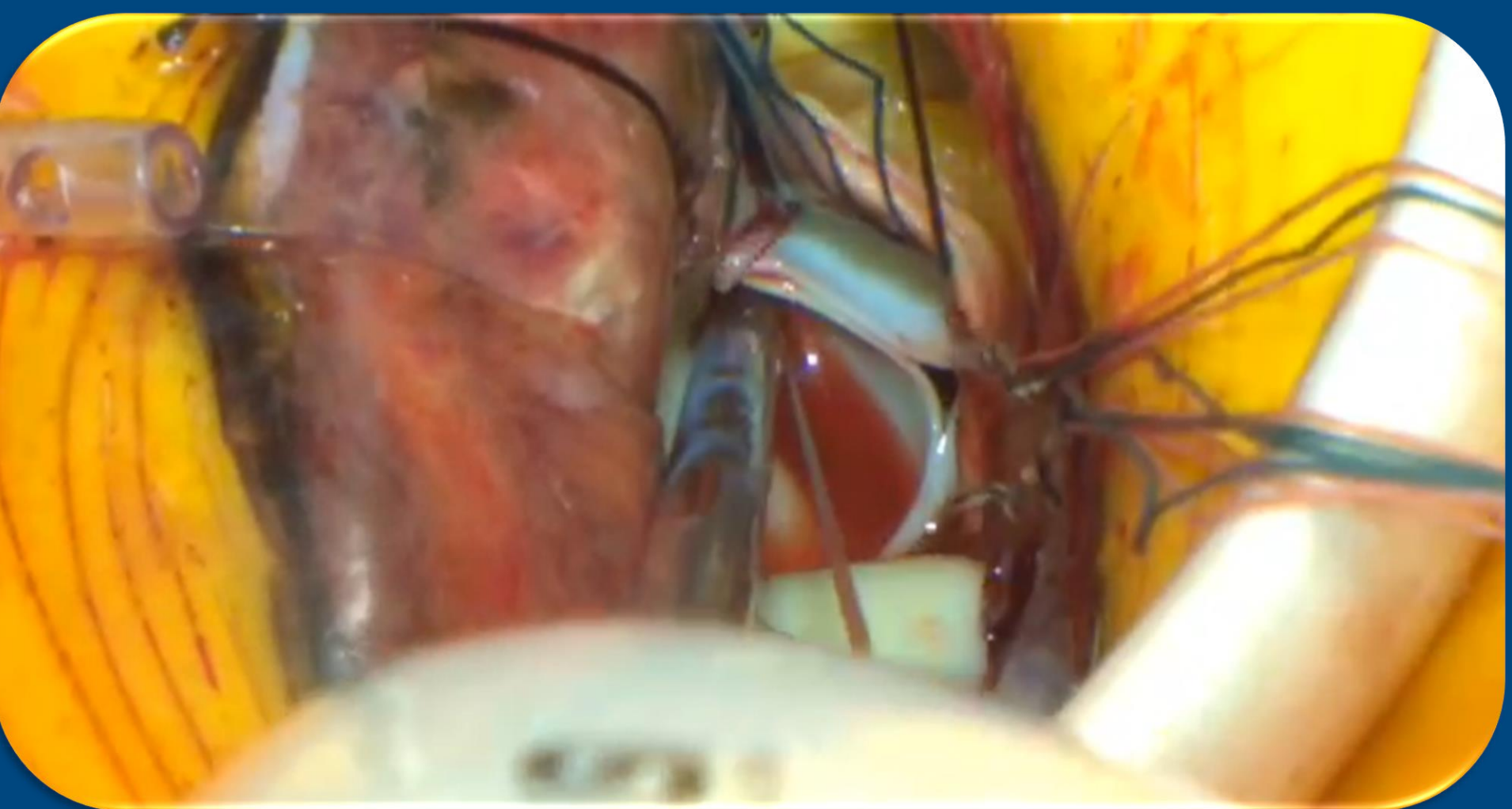
Set-up

- Plan RAMT access in the 2nd IC space
- TEE guided fem-fem cannulation, unless severe PVD
- LV Vent in LSPV
- Antegrade del Nido cardioplegia
- Pericardial stays secured through skin



Suture Placement

- Start at Left/Non-Commissure and move clockwise
- Use previously placed suture to improve exposure
- **Needle angle critical**
- **Be comfortable not seeing entire annulus**
- **Extreme focus on each stitch**



Results

Preoperative Characteristics	
Total Number of MIAVR's	559
Mean Age (Years)	69
Gender- Male	62.65%
Average STS PROM	1.63%
Postoperative Complication Rates	
Post op Bleed Return to OR	2.68%
Reop for other Cardiac Reasons	0.54%
Reop for Non Cardiac Reasons	1.25%
Post op Sepsis	1.07%
Post op Stroke	0.36%
Post op Prolonged Ventilation >24 hours	4.11%
Post Op Tracheostomy	0.54%
Post op Renal Failure	0.36%
Post op New Dialysis	0.18%
Post Op Pacemaker/ICD	0.54%
Post Op Atrial Fibrillation	24.33%
Readmission within 30 days	4.65%
Mortality (Operative/30 day)	0.72%

Conclusion

Minimally invasive AVR can be safely performed for essentially all patients with isolated aortic stenosis by adhering to basic principles that simplify the procedure. We believe the lessons learned through our 20-year experience can be adopted by other centers.