The Vascular Surgeon's Role In TAVR Procedures Via The Common Carotid Artery: Pitfalls And Technical Tips

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Disclosures

- No relevant disclosures

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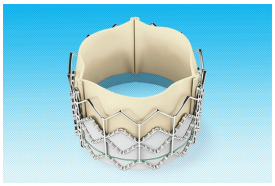
TAVR – Transcatheter Aortic Valve Replacement

- First TAVR performed in US in 2004
- PARTNER 3 and Evolut trials demonstrated superiority/noninferiority to surgery in low-risk patients



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TAVR – Transcatheter Aortic Valve Replacement

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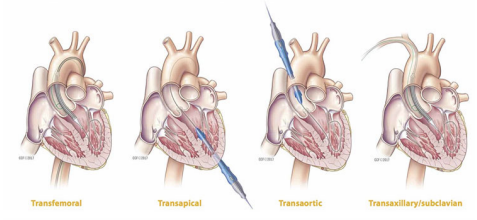
Standard and Alternate Access Approaches



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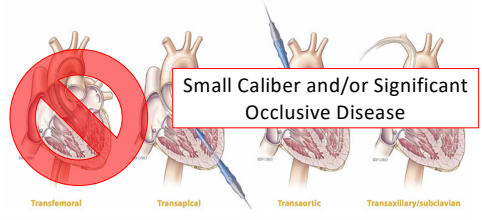
Standard and Alternate Access Approaches



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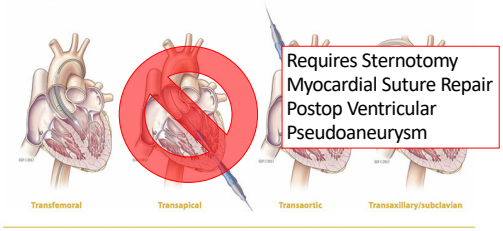
Standard and Alternate Access Approaches



Requires Sternotomy
Myocardial Suture Repair
Postop Ventricular Pseudoaneurysm

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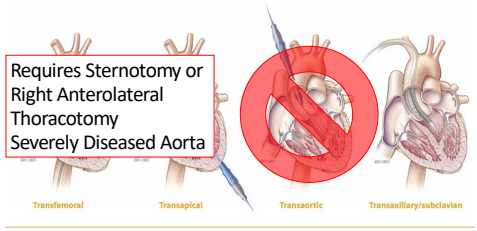
Standard and Alternate Access Approaches



Requires Sternotomy or
Right Anterolateral Thoracotomy
Severely Diseased Aorta

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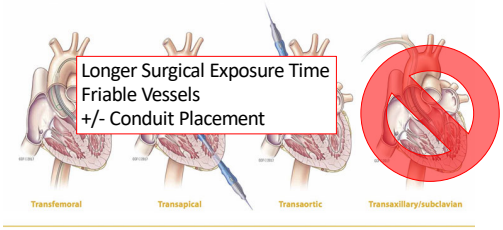
Standard and Alternate Access Approaches



Longer Surgical Exposure Time
Friable Vessels
+/- Conduit Placement

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Transcarotid Advantages

- Fast and straightforward exposure
- Generally common carotid has adequate caliber for large delivery sheaths
- Common carotid artery generally free of significant atherosclerotic disease
- Ipsilateral hemisphere protected from embolization
- Short working length
- Primary suture repair without prosthetic material

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Transcarotid

- Fast and straightforward exposure
- Generally common carotid has adequate caliber for delivery sheaths
- Common carotid artery generally free of significant atherosclerotic disease
- Ipsilateral hemisphere protected from embolization
- Short working length
- Primary suture repair without prosthetic material
- Appears to have lower stroke rate than other alternative accesses

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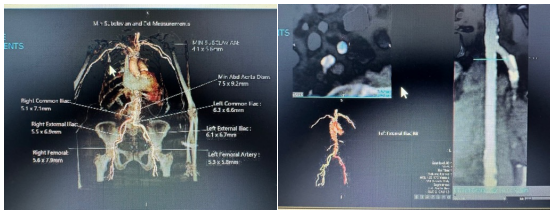
Pre-op Considerations

- Lack of standard transfemoral access



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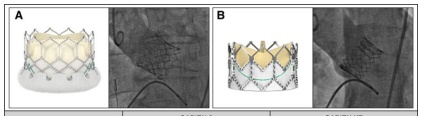
Typical Delivery Sheath Sizes



	SAPIEN 3			SAPIEN XT		
Prosthesis diameter	23-mm	26-mm	29-mm	23-mm	26-mm	29-mm
Prosthesis height, mm	18.0	20.0	22.5	14.3	17.2	19.1
Transfemoral sheath size	14-F	14-F	16-F	16-F	18-F	20-F
Transapical sheath size	18-F	18-F	21-F	24-F	24-F	26-F
Native annulus size on TEE, mm	18-22	21-25	24-28	18-21	22-24	25-27
Native annulus area, mm^2	338-430	430-546	540-680	314-415	415-530	530-660
Area derived diameter, mm	20.7-23.4	23.4-26.4	26.2-29.5	20.0-23.0	23.0-26.0	26.0-29.0

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Pre-op Considerations

- Arch anatomy – Bovine configuration
- Presence of Concomitant Carotid Bifurcation Disease
  - Duplex Ultrasound
  - CTA of Neck
- Presence of Common Carotid and Origin Disease
- Tortuosity
- Carotid Diameter
- Ergonomics

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Neuromonitoring

- While many transfemoral TAVRs are performed under local and regional anesthesia, alternative access are generally performed under general anesthesia
- EEG and SSEP
- Many centers employ neuromonitoring – its utility is still in question
- What can be done?? Raise BP?

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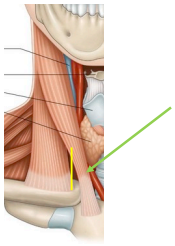
Surgical Approach



Vertical Incision Between Sternal and Clavicular Heads of Sternocleidomastoid

Vertical Incisions Have Improved Ergonomics Of Sheath Delivery and Allowed Better Access for Extensive Repair if Necessary

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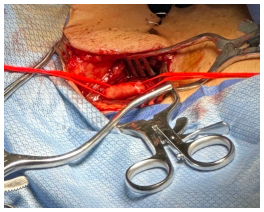
Cervical Exposure and Sheath Access



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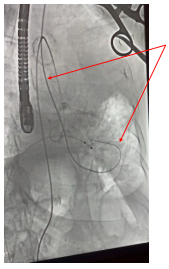
Stiff Wire Placement in LV Across Native Valve



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Device Prep

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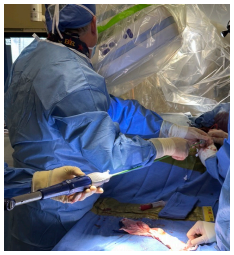
Exchange for Delivery Sheath and Introduction of Device



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Rapid Pacing and Hemodynamic Intolerance

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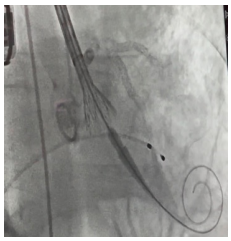
Deployment and Echocardiographic Confirmation



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Rapid Pacing and Hemodynamic Intolerance

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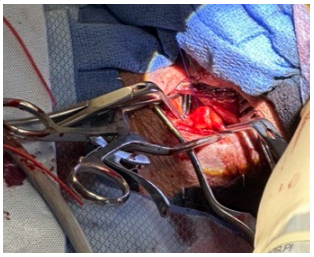
Removal of Sheath and Primary Repair of Arteriotomy



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Outcomes

A meta-analysis of transcarotid versus transfemoral transcatheter aortic valve replacement

Daniel P McGrath, Masashi Kawabori, Benjamin Wessler, Frederick Y Chen, Yong Zhan

Catheter Cardiovasc Interv. 2021 Oct 98(4): 767-773

Results: Five studies, including a total of 2470 patients, were included in the study with 1859 patients in the TF group and 611 patients in the TC group. The TC group had higher prevalence of peripheral vascular disease, while the patients in the TF group was older. Meta-analysis revealed that there was no significant differences between the two groups with regard to 30-day mortality (p = 0.09), stroke (p = 0.28), new dialysis (p = 0.58), major bleeding (p = 0.69), or pacemaker implantation (p = 0.44). The TF group had a higher incidence of vascular complications (3.9% vs. 2.3%; OR 2.22; 95% CI [1.13, 4.38]; p = 0.02).

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Outcomes

Comparable Outcomes for Transcarotid and Transfemoral Transcatheter Aortic Valve Replacement at a High Volume US Center

Brandon M Jones, Vishesh Kumar, Shih Ting Chiu, Ethan Korngold, Robert W Hodson, Kateri J Spinelli, Eric R Kirker

Semin Thorac Cardiovasc Surg 2022; 34(2):467-474

Of 1,465 TAVR procedures, 1319 (90%) were TF and 146 (10%) were TC. Procedure time and length of stay did not differ between groups. Unadjusted 30-day stroke (TF = 2.0%, TC = 2.7%, P = 0.536) and mortality (TF = 2.1%, TC = 2.7%, P = 0.629) were similar between groups. PSW 30-day stroke (odds ratio (OR) (95% confidence interval (CI)) = 0.8 (0.2-2.8)) and mortality (OR (95% CI) = 0.8 (0.2-3.0)) were similar between groups. Unadjusted and PSW 30-day major/life threatening bleeding, major vascular complications, and myocardial infarction did not differ between groups. Survival at one year was 90% (88%-92%) for TF patients and 87% (81%-93%) for TC patients (unadjusted P = 0.28, PSW hazard ratio = 1.0 (0.6-1.7)). Transcarotid TAVR is associated with similar outcomes compared to transfemoral TAVR at an experienced, high-volume center.

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Billing

- At present, no specific code exists for trans-carotid access for TAVR
- Current billing paradigms have both a cardiologist and cardiac surgeon present and charging for procedure…precluding a co-surgeon or assistant code
- If an extensive repair, patch, or endarterectomy is performed…

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Why Vascular Surgeons Play an Important Role

- Familiarity with cervical exposure of CCA
- Occasional need for complex repair/ endarterectomy
- Management of concomitant occlusive disease
- Experience interpreting and managing neuromonitoring
- Multidisciplinary Collaboration for Programmatic Development

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Unanswered Questions

- Concomitant Carotid Bifurcation Disease
  - Ipsilateral
  - Contralateral
  - Prior Stroke
  - Simultaneous Carotid Endarterectomy or Stenting
    - Staging of Procedures
  - Intolerance and Shunting
    - Utility of Neuromonitoring

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