Percutaneous Transapical Access for Thoracic Endovascular Repair

Atman P. Shah MD FACC FSCAI
Co-Director, Hans Hecht Cardiac Catheterization Laboratory
Clinical Director, Section of Cardiology
Associate Professor of Medicine
The University of Chicago
Disclosures

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Company

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Medtronic

Abbott Cardiovascular
Maquet
Medtronic
AstraZeneca
Physio-Control
St. Jude Medical
Edwards
Zoll
None
None
Case

- 58 yo male presents to clinic with a Type B dissection and a history of controlled hypertension

- One year later, he presented with a Type A dissection and had emergent Bentall procedure (composite graft replacement of the aortic valve, aortic root, and ascending aorta with reimplantation of coronary arteries)

- CT showed residual dissection across arch and aneurysmal degeneration of descending thoracic aorta

- The ascending aorta graft was replaced

- Taken to OR for TEVAR, however could not access true lumen from femoral approach

- Brachial access and wire to femoral artery, but device could not be advanced through tortuosity
Alternative Access Routes

1. Transiliac: direct puncture or iliac conduit for device delivery

   - Reports of increased bleeding with IC (Nazara and Tsilimpantis)
   - Endoconduits: balloon fracturing of the iliac plaque using a noncompliant balloon in a previously placed covered stent, resulting in controlled rupture of the artery
   - Balloon expandable sheaths: used in TAVR, allows for controlled balloon expansion and fracture to the required ID for device accommodation
Alternative Access Routes

2. Transaxillary

- Readily identifiable in the deltopectoral groove
- Sizing is similar to the femoral artery
- Need coaxiality at the proximal landing zone when landing in the arch
- Avoids retroperitoneum and chest, improved outcomes anecdotally
Alternative Access

3. Transcarotid

- Initially performed with shunts, patch repair, or conduit
- CCA approached medial to the SCM, ensuring the vessel is free of disease

- TAVR: 96 patients underwent TC access for TAVR and no major bleeds or vascular complications, but CVA rate of 6.3%
4. Transaortic: can be approached via RP, abdominal, thoracic, or sternal incision.

   - Commonly utilized in the context of aortic arch debranching and antegrade deployment of a stent into the aortic arch

5. Transcaval access: puncture of the abdominal aorta via the IVC

   - Femoral venous access followed by puncture with biopsy needle, then closure with an amplatzer plug

   - Used in TAVR access (19 patients) with no deaths or major bleeds, recently reported with TEVAR
Surgical Transapical Access is More PrimeTime

- In patients with severe PAD, transapical access is a tried and true technique, these patients are generally sicker.
- Surgeons have experience with TA access especially with VAD.
- Hybrid Melody valve procedures, involving RV access is a very attractive option.
- Given the proliferation of novel trans-mitral devices, larger bore access to the left ventricle will continue to be an essential surgical access point.
3D volume rendered CTA

Dudiy et al. EuroIntervention 2014
Technique

- General anesthesia, prefer double lumen tube intubate to deflate the left lung while ventilating the right lung, to allow for clear path
Technique

- Palpate LV apex
- Utilize 2D TTE to confirm apical location
Watch Out

- Femoral/radial arterial access, and angiography of LAD or LIMA to ensure that access point does not involve the artery
Allows incredibly easy access to the left sided defects

Wire into LA via mitral PV Leak

QuickCross into SVC via RA Gerbode
Plugging Holes
Complex TEVAR
Final LV grams
Techniques for Percutaneous Closure

- 5Fr and smaller, ok to use pressure, no need for device closure
- No FDA approved device for apical closure

Figure 6. Devices used for completely percutaneous transapical access closure. AMPLATZER family devices: A) Muscular Ventricular Septal Defect Occluder; B) Duct Occluder; C) Vascular Plug II. Systems for closure of surgically exposed transapical access: D) CardioClose; E) Apica ASC; F) Permaseal.
Need to Truly Plug the Last Hole
Conclusions

- Percutaneous transapical access allows catheter therapy of complex LV and RV disease
- It can also be of use in patients with complex aortic disease undergoing TEVAR
- More studies are need to assess its utility for alternative access
- Dedicated LV apical closure devices are also necessary
Thank You
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