Fenestrated Aortic Stent-Grafts for Complex Aortic Aneurysms

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THE PERIPHERAL EVENT OF THE YEAR
Disclosures

Speaker’s Bureau:
- Astra Zeneca
- Abbott Vascular
- Volcano Corporation
- Spectranetics
- Maquet
- Reflow Medical

Consultant:
- Penumbra
- Spectranetics

Grant/Research Support:
- Spectranetics
- Bard
- Medtronic
- Veryan Medical
- Terumo
- Cordis
- Reflow Medical

Medical/Scientific Boards:
- Boston Scientific
- Abbott Vascular
Fenestrated Systems (FEVAR)

• The Need:
  • Increasing frequency of complex AAA with short seal zones (>25%)
  • Juxtarenal, Pararenal, Thoracoabdominal Aneurysms
  • Preserve perfusion while obtaining seal
  • Traditional approach calls for open repair in these patients with VRB
    • VRB patients had higher mortality (5.8% vs. 4.4%, p < 0.001) and more complications including acute renal failure (9.5% vs. 6.0%, p < 0.001), acute mesenteric ischemia (2.0% vs. 1.2%), and bowel resection (1.1% vs. 0.8%, p < 0.01)
    • 10 Times Greater Mortality if ARF

• Chimney/Snorkel/Parallel/Sandwich Stent Grafting

• True Fenestrated Stent Grafts
  • Hypogastric Preservation
  • Renal Preservation
  • Thoracoabdominal Systems

“Poor Man’s” FEVAR/BEVAR

- Snorkel/Chimney/Parallel Stents for Juxtarenal AAA
  - First Described by Greenberg, et al. in 2001 to Salvage and Unintentionally Covered Renal During EVAR
  - Utilize Viabahn, VBX (Balloon Expandable Viabahn), or ICast to Preserve Renals, SMA, Celiac
  - Primary Patency 94% (Secondary 95.3%) with 5.7% Type 1 Endoleaks at Mean 17.4 mo in PERICLES Registry
  - Favorable with Downward Renals via 7Fr Brachial Sheaths
  - Can be Done with Emergent Cases when “Off the Shelf” FEVAR/BEVAR Not Available

Retrograde Snorkels

- Snorkel/Chimney for Juxtarenal AAA
  - Sometimes anatomy is unfavorable for snorkel from above
  - Retrograde is an option
  - Longterm patency is less clear, but may be a bailout
Parallel Stent Grafts in Ruptures

- Patient with Slow Ruptured Juxtarenal AAA
- Endograft Placed 2 Months Earlier
- Graft Migrated Down, Aneurysm Sac Grew Rapidly and Patient Had Frank Rupture in Cath Lab
  - Team Approach
  - One Operator Delivering Main Body from Below
  - One Operator Delivering Snorkels from Above
  - Time to Seal Approximately 30 Minutes
Sandwich Grafts

- Hypogastric Preservation
  - Mansour, et al.- Bilateral Exclusion and Hypogastric Coiling Associated with Significant Dysfunction, Buttock Claudication, and Rare Skin Necrosis (Partly Mitigated with Revascularization of One Hypogastric or Unilateral Involvement)
  - Modified Sandwich Graft Technique (Lim, et al.)
    - Viabahn in IA
    - Ispi Limb Extension
    - Significant Overlap to Prevent Gutter
    - No Type 1B at Mean 17 Mo F/U; 67% Sac Regression > 5 mm

Bifurcation Systems (BEVAR)

- Dedicated Hypogastric Preservation
  - Avoid Gutters and Associated Type 1B Endoleaks
  - Hypogastric Preservation in Appropriately Sized Vessels (Combined with Standard EVAR Devices)
    - Cook ZBIS (OUS)
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  - Gore Iliac Excluder (US/OUS)

Courtesy W.L. Gore
Fenestrated Systems (FEVAR)

• Zenith Fenestrated (ZFen)
• Custom-made with small or large fenestrations, and a top scallop to accommodate the SMA
• Favorable patency rates (Primary Patency 81% at 5 Years; Secondary 97%)
• Cons:
  • 4 Week Wait Time
  • Angulation Can Make Renal Cannulation Difficult
  • Large Size (20 Fr)
  • Minimum 4 mm Neck
  • Less Than 40 Degrees Neck Angulation
  • Intraoperative Morphology Different From CTA Sizing
Fenestrated Systems (FEVAR)
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- Vasculatek Anaconda (OUS)
- Custom-made with Fenestrations to Accommodate Renals and Mesenteric Vessels.
- Fenestrations can be Rotated
- French EFEFA Registry
  - At 12 and 24 months: Primary Patency Rate was 97.2% and 96.3%; Freedom from aneurysm-related reintervention rate was 96.3% and 88.0%
  - At 24 months, there were 7 type II ELs (12.7%) and a significant reduction in aneurysm maximum transverse diameter in 70.4%.
  - Five limb occlusions occurred at 1-year and 1 at 2-year follow-up (7.0%).

ChEVAS

- Nellix Chimney Endovascular Aortic Sealing
  - Combine Aneurysm Sealing with Parallel Stent Graft Technique for Visceral Vessels
- Ascend Registry (154 Pts)- Thompson
  - 3% Late Type 1A Endoleaks in 3/4 Vessel Visceral ChEVAS (Zone 6- Celiac Level, Highest Surgical Operative Mortality)
  - No Persistent Endoleaks
- US Trial Planned