Overcoming Challenging Aortic Anatomy: from Hostile Necks to Tortuous Iliac arteries

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Introduction

- Late results demand progress
- Reduce late complications
- Understand predictors
- Develop Strategies
When does EVAR Fail?

• Schanzer et al; Circulation 2011
  – 41% sac enlargement at 5 yrs
  – 31% outside liberal IFU
  – 58% outside strict IFU
  – Independent factors
    • Neck >28mm
    • Angulation>60%
Adverse Outcome In EVAR with Hostile Neck Anatomy

>28cm diameter; <15/10mm length; angle>60; calcification; thrombus; conical.

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<th>Early type I endoleak</th>
<th>Peri-op mortality</th>
<th>Late type I endoleak</th>
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<td>HNA</td>
<td>199</td>
<td>98%</td>
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HNA: Hostile neck anatomy  
FNA: favorable neck anatomy  
* p<0.05
Unrealistic Expectation compromises fixation and seal

• Neck*
  – Thrombus**
  – Diameter
  – Angulation
  – Wall quality

• Iliac disease and tortuosity*

**Patel SD et al. EJVES 2014 Apr;47(4):374-9
Overcoming Angulation

• Flexible
• Re-positionable
  – Anaconder
  – Aorfix*

– GORE Excluder with C3 delivery**

The Neck’s Not That Bad?

- Standardised technique
- Subjectivity
- Coronal vs Saggital
- 3D Workstation
- Influence of supra-renal angulation

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Liverpool C3 Experience: GREAT Registry

37 Pts; angle 47.5°: 7 repositions (19%); angle 62°
Strategy

- Choose ipsilateral side
  - “C” shape not “S”

- Orientate Excluder
  - Flexible plane accommodates the angulation
Deployment technique

• Start High
  – Angulation hinders advancement once part deployed
• Challenge renal artery
• Trial deployment
  – conform to angles?
• Change cranial tilt
Optimising neck placement through Re-deployment
Optimising neck placement through Re-deployment

- Moderate coronal/sagittal angulation
- Effective repositioning

“Hypotenuse Effect”
Use Adjuncts

- Retrospective analysis of 44 pts with hostile neck
- Gore excluder +/- C3 (24/20)
- Need for Aortic cuff 36%
  - 13% C3
  - 65% standard delivery ($p=0.005$)
- No type I endoleaks 2/12

Tortuous Iliac Arteries

- Recognition
- Calcification
- Access
- Rotation
- Accurate limb deployment
  - Conformable limb
Limb shortening in tortuous iliacs

- *Whittaker et al. JVS 2005;41:575-83*
- Path alteration in Gore limbs
- 11% deployed >10mm shorter than centre lumen line.
  - Iliac tortuosity
  - Rotation (73%)
Iliac limb conformability

• 3 main devices compared
• Limb complications significantly higher in tortuous iliacs
• EVAR significantly reduced iliac tortuosity index
• GORE limbs reduced tortuosity index less

Tortuous Iliac Arteries

• Elephant Trunk
• Pre-op measurements
• Intra-op measurement
• Conformability
• Generous length
  – Accommodate tortuosity
• Length/extension options
Accommodating Iliac Tortuosity

Consertina Effect

Incremental impaction
Tortuous Iliac Arteries

- Rotation common

- Correction unpredictable
  - Helicopter shaft
Tortuous Iliac Arteries

• Rotation common
• Correction unpredictable
  – Helicopter shaft
  – Deflate valve
• Anticipate
  – re-introduce
• Accept X legs
  – cannulation benefit
Summary

• Outcomes influenced by
  – Hostile neck anatomy
  – Neck angulation
  – Iliac tortuosity

• Accurate deployment aided by repositionable graft

• Limb conformability can accommodate tortuous iliac arteries

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