Options for Treatment of Aortic Arch Pathology: When Open, Hybrid, Fenestrated or Branched TEVAR, or Chimney TEVAR

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I have nothing to disclose

Current Approaches for Arch

- **Open Repair**
  - Total arch replacement

- **Hybrid Techniques**
  - Hybrid arch replacement
  - Debranching + TEVAR
  - Extra-anatomic bypass + TEVAR

- **Total Endo Techniques**
  - Fenestrated stent-graft
  - Branched stent-graft
  - Chimney technique

Outcomes of Fuwai Hospital

Aortic Surgery in 2017: Open 1357, Endo 466, Hybrid: 108

TEVAR in Fuwai Hospital & Second Xiangya Hospital (Nov 2015-Nov 2016)

- Single Endo 325
- Double Endo 180
- Single Chimney 203
- Double Chimney 28
- Triple Chimney 9
- Single Fenestration 518
- Double Fenestration 152
- Triple Fenestration 22
- Arch Branch Revascularization 22
- Single Stentgraft 139
- Double Stentgraft 22
- Triple Stentgraft 2

Disclosure of Conflicts

I have nothing to disclose
Case characteristics:
Entry tear near the LSA; Diameter of the ascending aorta was 4.6cm; Aortic valve disfunction

- Avoided DHCA, regular CPB
- Extended landing zone in prosthetic graft, reduce retrograde TAAD
- Antegarde and retrograde delivery could be selected
- Reduced complication compare with total arch replacement

Hybrid Arch Replacement

Hybrid II: Debranching + TEVAR

Advantages:
1. Extension of landing zone for healthy aorta
2. One-stage repair supra-aortic branches pathologies

Branched Stent-grafts

Fenestration Technique

Advantage:
1. Reduce the operation time: < 45 minutes
2. More fit to the anatomy of the aortic arch
3. Less endoleak
Fenestration for Aortic dissection combined with Abbrant subclavian

Aneurysm combined with local dissection, whole aortic arch involved, we have to make triple fenestration and add two big stent-grafts to the aorta.

Small fenestration and balloon expansion to make accurate fenestration size

Case characteristics:
1. Entry tear close to the LSA
2. LSA close to LCCA (Easily covered by chimney graft)

Double fenestration for both the LCCA and LSA

Indications for another graft deployment:
1. Undesirable orientation of the fenestration (Indicated by DSA/IBP/Pulse)
2. Target branches combined with stenosis, dissection or other pathologies
3. Endoleak occurred between fenestration and target vessel

Another graft for fenestration?
By Which Access?

Access:
- Femoral access: less invasive but more technically difficult
- Brachial or carotid access: easier but adding incisions

In-situ Fenestration

Balloon expandable puncture needle

Live case transmission for the Complex Cardiovascular Catheter Therapeutics (C3, Orlando, U.S.A).

On June 20th, a TBAD patient with hostile angle of LSA was treated by in-situ fenestration

In-vitro Fenestration for LCCA and In-situ Fenestration for LSA

- The LSA was involved by the huge aneurysm
- The LCCA was close to the LSA
- Stent-graft should be placed proximal to the LCCA

In-vitro Fenestration for LCCA and In-situ Fenestration for LSA

- The aneurysm was well sealed without endoleaks

In-vitro Fenestration for LCCA and In-situ Fenestration for LSA

- The aneurysm was well sealed without endoleaks
In-vitro Fenestration for IA and LCCA + In-situ Fenestration for LSA

Fenestration technique, branched stent-graft are promising, what can we use before that?

Search for a method featured:
- Easy to accomplish by current device
- Could be used in bailout situation
- Minimal invasive
- Less complication

Chimney Approach Special designed skirt-stenting graft

Chimney + Snorkel

Case characteristic
- 80 years old man
- LSA stenosis
- Type III aortic arch
- Thoracic aortic aneurysm

Chimney is very useful for aged patients

Single/Double Chimney 2017 JVS

Overall results:
- Technical Success Rate: 98.6%
- 84.2% free from any EL
- 80.6% free from any adverse events

Chimney with endoleaks

6 months
18 months later

Endoleaks can be observed for a few months
Newly designed chimney graft
The Skirt Stent-graft

First In Man Cases
May 14th 2018 in Indonesia

First In Man Cases
May 14th 2018 in Indonesia

First In Man Cases
Performed in Yunnan Fuwai Hospital

Conclusions
• Conventional open surgery has gradually been replaced.
• Hybrid technique could be chosen for pathologies involving the ascending aorta or the aortic root.
• Fenestration technique is well-accepted and chimney is still a promising method, branch stent-graft is in developing.
• Total endovascular repair to treat aortic arch pathologies is the wave of the future.

Thank you for your attention
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