Advances for Endograft Treatment of Type A Aortic Dissections: Why and How are the Next Generation Endografts Better

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Disclosures
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TEVAR for type B aortic dissection

Entry tear closure with TEVAR has been successful


TEVAR for TAAD

• Only few case series reported in the literature.
• Most is by Ye C, et al from China. (ESVS 2011; 42:787-794)
• Treated 45/161 TAAD patients with TEVAR from 2001 to 2009.
• Technical success rate 97.8% and 30-day mortality 6.7%.

No other large series followed.....

Problems with TEVAR for TAAD

reconstruction of aortic branches are necessary

Sizing of stent graft difficult
Location of entry unclear
No proximal landing zone
Any complications may be fatal ...

Next generation endografts

Branched endograft for arch aneurysm

Zenith A branch
Gore thoracic branch endoprosthesis (TBE)
Feasibility of next generation endografts

How will next generation endografts accommodate TAAD??

Cases reviewed

172 TAAD patients (2007-2015, @Keio University and Saiseikai Central Hospital)

Exclusion (41 cases)
- For inadequate preoperative CT scans
- Location of entry tear unclear even using the operative record

131 TAAD patients (62.6% male, mean age 63.3 ± 14.5, mean height 162.8 ± 10.2 cm)

Centerline of flow (CLF)

- All the measurements were based on the centerline of flow (CLF) technique.
- CLF was created by using the semi-automatic center line extraction algorithms on the Vincent® workstation (Fuji Film Medical, Tokyo, Japan).

Anatomical analysis results

Location of dissection and entry tear

Anatomical characteristics (length)
Anatomical characteristics (diameter)

- **Max Asc Ao**: 47.8 ± 7.3 mm
- **Prox landing zone**: 43.6 ± 6.3 mm
- **STJ**: 39.3 ± 6.0 mm
- **Arch at IA**: 40.5 ± 5.5 mm
- **Proximal landing zone**: 2 cm distal to STJ
- **Arch at lt CCA**: 37.4 ± 5.2 mm
- **Arch at lt SCA**: 34.6 ± 5.4 mm
- **Distal landing zone**: 30.9 ± 4.1 mm
- **Lt SCA**: 10.3 ± 1.6 mm
- **Lt CCA**: 8.5 ± 1.6 mm
- **IA**: 15.2 ± 2.8 mm
- **Aorta (proximal neck)**: 40.3 ± 9.6 mm
- **BRE Junction**: 47.4 ± 7.6 mm

Feasibility results

**IFU for Zenith A-branch**
- Aortic diameter of 24-38 mm at the landing zone
- Neck length > 20 mm
- STJ-IA distance > 59 mm
- Branch vessels diameter of 8-20 mm
- Branch length > 36 mm
- ICA-left CCA angle < 45°

**Feasibility with Zenith A-branch**
- Aortic diameter of 24-38 mm at the landing zone
- Neck length > 20 mm
- STJ-IA distance > 59 mm
- Branch vessels diameter of 8-20 mm
- Branch length > 36 mm
- Without dissection at branch vessels
- ICA-left CCA angle < 45°

### Feasibility
- 34/131 (23.7%)
- 94/131 (71.8%)
- 129/131 (98.5%)
- 91/131 (69.5%)
- 87/131 (65.9%)
- 73/131 (55.7%)
- 9/131 (6.9%)
- 125/131 (95.4%)
Summary ①

It seems larger devices are anatomically more feasible for the treatment of TAAD

- 6.9% for Zenith A-branch
- 45.8% for GORE TRE

Stent graft induced new entry

- Area of total aorta: $1332.5 \pm 380.2 \text{ mm}^2$ (650 – 2706 mm$^2$)
- Area of true lumen: $632.6 \pm 325.1 \text{ mm}^2$ (26 – 1342 mm$^2$)

- Area oversizing ratio (AOR) = \((\text{total aorta} - \text{true lumen}) / \text{true lumen}\)
- AOR > 3.5; significant risk for stent graft induced new entry
- Mean AOR: $2.43 \pm 4.79$
- AOR > 3.5; 16/131 (12.2%)
- AOR > 3.0; 25/131 (19.1%)

Detection of entry tear

- Even with the good quality CT scans analyzed with latest three dimensional workstation, we could not detect 61 entry tears (35%).
- Is there better way to detect the entry tear??

Take home message

- New design stent graft
- Proper sizing method
- Better detection of entry tear

Thank you !!!!