Endovascular repair of Type B aortic dissection, importance of device design on outcomes

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Disclosure

Speaker name: THEODOROS KRATIMENOS

I have the following potential conflicts of interest to report:

- [ ] Consulting
- [ ] Employment in industry
- [ ] Stockholder of a healthcare company
- [ ] Owner of a healthcare company
- [ ] Other(s)

- [x] I do not have any potential conflict of interest
ACUTE COMPLICATED TBAD

- TEVAR is indicated for complicated hyperacute, acute, or subacute TBADs with rupture and/or mal-perfusion and favorable anatomy for TEVAR. (Class of Recommendation [COR] I, Level of Evidence [LOE] B-nonrandomized [NR])

- Open surgical repair for complicated hyperacute, acute, or subacute TBADs should be considered for those patients with unsuitable anatomy for TEVAR. (COR IIA, LOE B-NR)
It is well known that stent-graft conformability and apposition in the landing zones play a crucial role in the outcome of an endovascular procedure in terms of durability and aorta remodeling.

**Endoleak outcomes with different stent-graft generations in a 25-years thoracic endovascular aortic repair experience**

Stefano Gennai, Nicola Leone, Luigi A Maria Bartolotti, Tea Covic, Antonio Lauricella, Francesco Andreoli, Giuseppe Saitta, Roberto Silingardi

**Results:** A total of 509 TEVAR were included with a 44.3 ± 42.5 months mean follow-up.

**Conclusion:** Endoleak occurred in a non-negligible percentage of TEVAR patients. A significant reduction of endoleak incidence over evolving stent-grafts generations was registered. Newer stent-graft generations demonstrated better long-term endoleak. Data about long-term outcomes require ongoing updates to prove both the reliability and the durability of newer stent-graft generations.
127 patients

The stent-graft was repositioned at its intermediate diameter in 79 patients (62.2%), and the angulation feature was applied in 64 cases (50.4%), mainly to improve proximal wall apposition and orthogonality in the aorta.

The desired effect was achieved in 60 cases (93.8%).

There was no device compression, bird-beak configuration, fracture, or graft occlusion.

Conclusion: In the SURPASS registry, the use of the CTAG device with ACS showed promising outcomes despite the challenging pathologies. The new delivery system enables a controlled staged delivery with in situ adjustments during positioning, facilitating the treatment of complex aortic disease.
Clinical Case: 69 y/o male with complicated type B aortic dissection because of refractory pain and uncontrollable hypertension
Conclusions:

Acute aortic dissection was found to be the major predicting factor for distal SINE development, followed by increased distal Over Size (dOS) and Taper Ratio (TR) which is defined as proximal landing diameter distal landing diameter)/proximal landing diameter.

The use of tapered stent grafts might be beneficial for patients with high expected dOS and TR.

In the rare case of dSINE occurrence, even when re-intervention is required, the long term prognosis is good.
With the SG deployed in the patient, peak von Mises stress was found in the distal landing zone where SINE occurred at 3-month follow-up.

Kan et al. Front Physiology 2021
Better use:

- **Tapered stent-grafts**
- **Longer stent-grafts** in order to overcome descending thoracic aorta tortuosity and angulation
Clinical Case: Complicated Acute type b Aortic Dissection

51 y/o male, type b dissection 5 days ago, Uncontrollable hypertension and unrelenting pain despite optimal medical therapy

2 stent grafts, 1 straight (prox) and 1 tapered (distal)

30 DAYS post TEVAR f-up CT

TL: expanded,
FL: totally thrombosed,
Satisfying descending Thor. Ao remodelling
• **Landing zone dependent**: LZ0=6.8, LZ1=2.4, LZ2=4.1, LZ3-4=1.3

• **Pathology Specific**: TAA: 0.9%
  - Acute dissection 8.4%,
  - Chronic dissection 3%

• **Timing**: Intra-op 21%, <30d – 50%, >30d – 29.1%

• **Proximal Endograft Configuration**: Proximal bare stent (Talent/Valiant): 2.8%
  - Non bare stent (Gore/Cook): 2.4%
  - No significant difference

• **Endograft Oversize**
Overall, 27 European centers and 1 Chinese center....., a total of 4750 TEVAR procedures

Conclusions—The incidence of rAAD was low (1.33%) in the present analysis with high mortality (42%). Patients undergoing TEVAR for type B dissection appeared to be most prone for the occurrence of rAAD..... Importantly, the majority of rAAD cases were associated with the use of proximal bare spring stent grafts with direct evidence of stent graft–induced injury (semirigid device design) at surgery or necropsy in half of the patients.

A systematic review and meta-analysis of retrograde type A aortic dissection after thoracic endovascular aortic repair in patients with type B aortic dissection

10,600 patients: Pooled meta-analysis showed that the incidence of RTAD with proximal bare stent TEVAR was 2.1-fold higher than with non-bare stents: risk ratio was 1.55 (95% CI: 0.87-2.75; P = .13).

Conclusion: RTAD is rare after TEVAR but with high mortality, especially in the first month post-TEVAR with acute TBAD patients at greater risk as well as those treated with proximal bare stent endografts.
Clinical case: TEVAR post Frozen Elephant Trunk.

Male 48 y/o, history of FET for type A dissection 6 months ago, now presents with:

1. TL compression distally of the surgical graft,
2. FL patency and
3. Descending thoracic aorta diameter enlargement
4. Distal re-entries

Pre Stent grafting CT
Pre and Post stent-grafting DSA
30 days f-up CT: Excellent aortic remodelling, TL expanded, FL compressed
Early and Long-term Results of ePTFE (Gore TAG®) versus Dacron (Relay Plus® Bolton) Grafts in Thoracic Endovascular Aneurysm Repair

Luca Mezzetto 1, Lorenzo Scorsone 2, Roberto Silingardi 3, Stefano Gennai 3, Nicola Leone 3, Gabriele Piffaretti 4, Gian Franco Verardi 2


Conclusions: ePTFE-Gore TAG and Dacron-Relay Plus Bolton in DTAA presented similar early and late results in terms of mortality, SCI, EL, and TEVAR-related reinterventions. Effectiveness of TEVAR procedure was confirmed by the high rate of graft shrinkage and it was not influenced by endograft fabric.

Five-year results of the STABLE II study for the endovascular treatment of complicated, acute type B aortic dissection with a composite device design

Joseph V Lombardi 1, Thomas G Gleeson 2, Jean M Pen neton 3, Benjamin W Starnes 4, Michael O Dake 5, Stephan Haulon 6, Peter J Mossop 7, Edem Segbela 8, Priti Bhadrak 8; STABLE II investigators

Multicenter Study 


Objective: To provide 5-year outcomes of the use of a composite device (proximal covered stent graft + distal bare stent) for endovascular repair of patients with acute, type B aortic dissection complicated by aortic rupture and/or malperfusion.

Conclusions: These 5-year outcomes indicate a low rate of dissection-related mortality for the Zenith Dissection Endovascular System in the treatment of patients with acute, complicated type B aortic dissection. Further, these data suggest a positive influence of composite device use on false lumen thrombosis. Continuous monitoring for distal aortic growth is necessary in all patients.
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