Advances in the Endovascular Repair of Complex Aortic Dissections: Timing of Interventions, Adjunctive Techniques, and Outcomes

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Disclosures

Cook

Medtronic

Gore

Shockwave

Introduction to Timing of Interventions

- Importance of Timing:
  - Type B Aortic Dissection (TBAD) presents a challenge in balancing the risks of early versus delayed interventions.
  - Decision-making focuses on reducing mortality while minimizing complications.

Reference: Nienaber CA, European Heart Journal, 2021

Why Consider TEVAR in UTBADS?

- Key Studies:

- INSTEAD-XL trial: Demonstrated improved aortic remodeling and lower aortic-specific mortality.

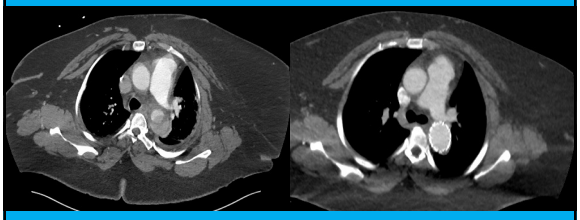
- STABLE II trial: Showed improved aortic remodeling with adjunctive endovascular techniques (Petticoat).

- ADSORB Trial: Showed improved aortic remodeling.

Reference: Nienaber CA et al., Circulation, 2013; Brunkwall J et al., Journal of Vascular Surgery, 2017

TEVAR for UTBADS

Before | After



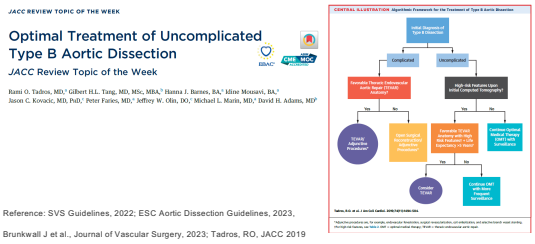
- Aortic remodeling may protect against aneurysm formation.

Timing of TEVAR in Acute UTBADS

- Individualized Decision-Making:

- Consider patient comorbidities, aortic anatomy, and risk of complications.

- Monitor closely for changes in aortic diameter or signs of malperfusion.


JACC REVIEW TOPIC OF THE WEEK

Optimal Treatment of Uncomplicated Type B Aortic Dissection

JACC Review Topic of the Week

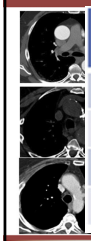
Rami O. Tadros, MD,[1] Gilbert H.L. Tang, MD, MSc, MBA,[2] Hanna J. Barnes, BA,[1] Aline Mousavi, BA,[1] Jason C. Kovacic, MD, PhD,[3] Peter Faries, MD,[4] Jeffrey W. Olin, DO,[5] Michael L. Marin, MD,[1] David H. Adams, MD[1]

Reference: SVS Guidelines, 2022; ESC Aortic Dissection Guidelines, 2023, Brunkwall J et al., Journal of Vascular Surgery, 2023; Tadros, RO, JACC 2019

Timing is Crucial

Introduction to Type B Aortic Dissection (TBAD)

Society for Vascular Surgery and Society of Thoracic Surgery Reporting Standards for Type B Aortic Dissections



CHRONICITY	Time from Onset of Symptoms
Hyperacute	< 24 hours
Acute	1-14 days
Subacute	15-90 days
Chronic	> 90 days

JVS Journal of Vascular Surgery

Lombardi et al. *J Vasc Surg, March 2020*

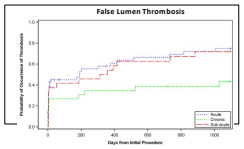
VIRTUE Registry: 30-day Early-term Key

Procedural Outcomes	Acute (n=50)	Sub-Acute (n=24)	Chronic (n=26)
Technical Success	98% (49)	100% (24)	96.2% (25)
Type I Endoleak	2% (1)	0%	0%
Retrograde Type A Dissection	0%	0%	0%

30d Outcomes	Acute (n=50)	Sub-Acute (n=24)	Chronic (n=26)
Mortality 30d + in-hospital	12% (6)	0%	0%
Stroke	8% (4)	0%	0%
Spinal Cord Ischemia	2% (1)	0%	3.8% (1)

VIRTUE Registry- 3-year Mid-term Key

3-Year Outcomes	Acute (n=50)	Sub-Acute (n=24)	Chronic (n=26)
Deaths	18.0% (9)	4.2% (1)	23.1% (6)
RTAD	4.0% (2)	0.0%	0.0%
FF All-Cause Mortality	81.7%	95.8%	75.7%
FF Secondary Procedures	71.7%	68.8%	57.2%



- Chronic clinical group had significantly lower false lumen thrombosis vs. sub-acute or acute groups (p=0.035)

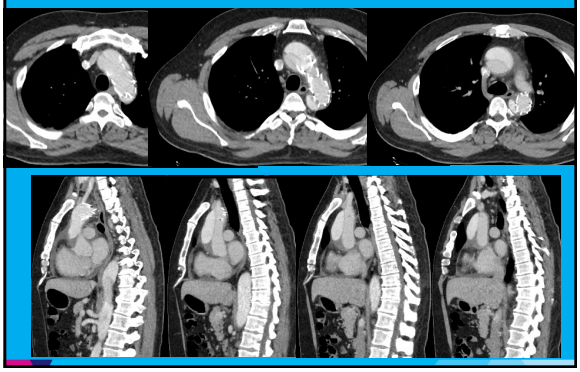
Timing of TEVAR in Acute UTBADS

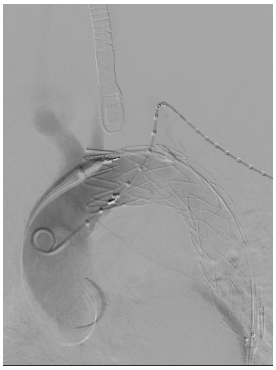
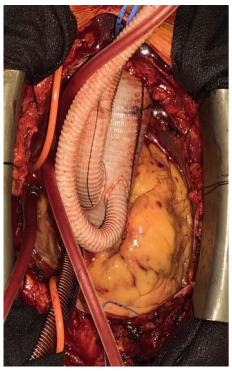
- Optimal Timing Debate:

- Early Intervention (within 14 days):
  - Pros: Reduces risk of aortic rupture, promotes early remodeling.
  - Cons: Higher risk of procedural complications in acute phase
    -RTAD

Reference: SVS Guidelines, 2022; ESC Aortic Dissection Guidelines, 2023, Brunkwall J et al., Journal of Vascular Surgery, 2023

Retrograde Type A Dissection (RTAD)



Timing of TEVAR in Acute UTBADS

- Optimal Timing Debate:

- Delayed Intervention (15-90 days):

  • Pros: Lower procedural risks due to better patient stabilization and selection.

  - Aorta remains malleable → Favorable remodeling

  • Cons: Risk of aneurysmal degeneration and complications

  -Malperfusion

  -Progression

Reference: SVS Guidelines, 2022; ESC Aortic Dissection Guidelines, 2023, Brunkwall J et al., Journal of Vascular Surgery, 2023

Timing of TEVAR in Acute UTBADS

- Optimal Timing Debate:

- Late Intervention (more than 90 days):

  • Pros: Can provide an alternative to open surgical repair.

  • Cons: Higher risk of procedural complications in the chronic phase.

  - Less favorable remodeling.

  - Requires adjunctive techniques.

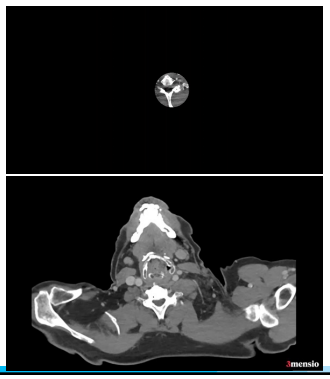
Reference: SVS Guidelines, 2022; ESC Aortic Dissection Guidelines, 2023, Brunkwall J et al., Journal of Vascular Surgery, 2023

Adjunctive Strategies and Techniques

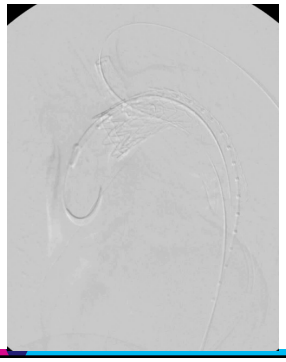
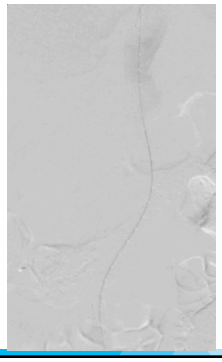
1. Primary stent grafting with Petticoat
2. BEVAR/ FEVAR
3. Candy Plug Technique
4. FL embolization
5. Closing Fenestrations
6. Knickerbocker
7. STABALIZE
8. Cheese Wire
9. Laser aortic septectomy
10. Electrified Wire

Petticoat

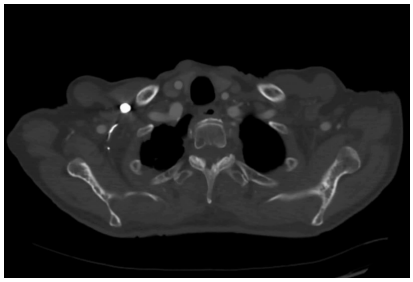
STABLE II trial: Showed improved aortic remodeling

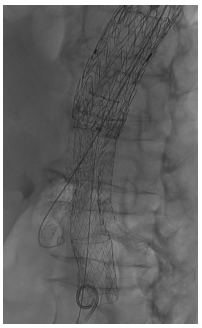
TBE with distal extension for complex TBAD

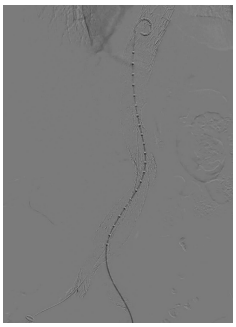



3 month follow-up, repeat CTA c/a/p - Increased size (>6cm) of pararenal AAA with worsening dissection

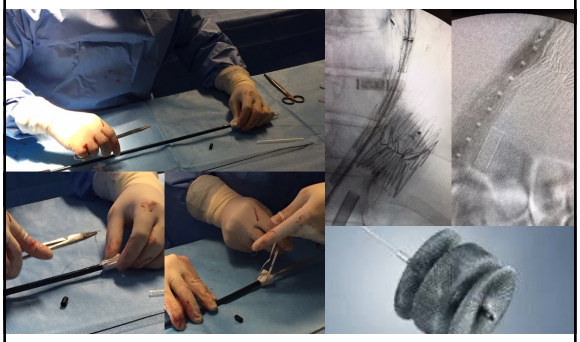


TAMBE for TBAD with Aneurysm

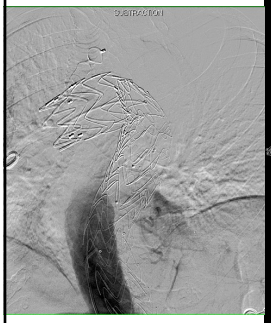


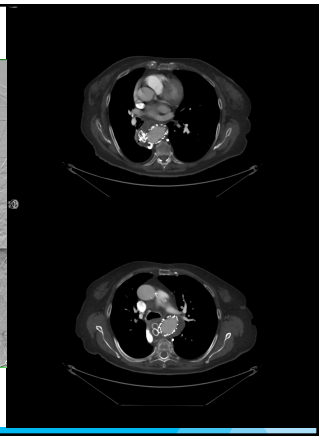


The Candy Plug technique



False Lumen Embolization

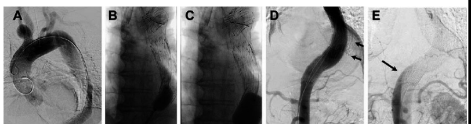


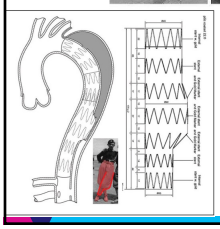


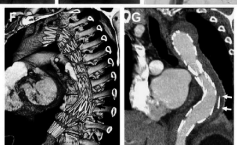
Closing Fenestrations

Septal Occluder

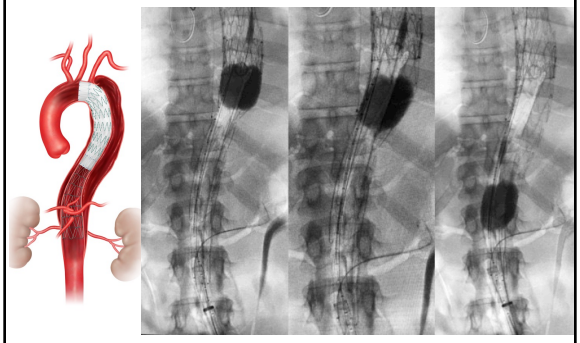
Knickerbocker Technique



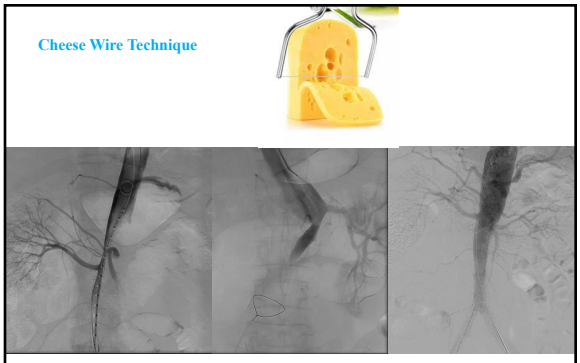




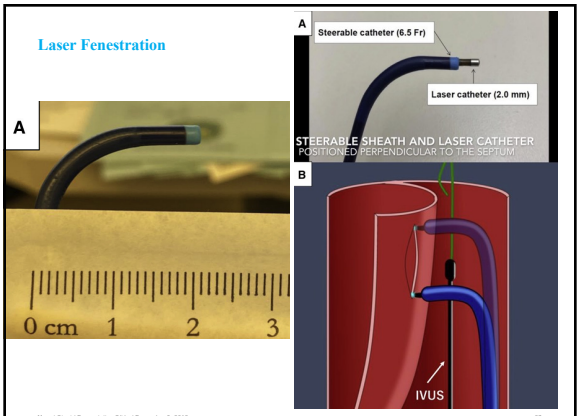
STABALIZE



Cheese Wire Technique

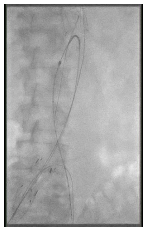


Laser Fenestration

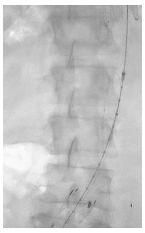


Electrified wire Septotomy

- A wire was introduced from the true to the false lumen under direct IVUS guidance
- This wire was then snared from the contralateral femoral access
- An 0.035 catheter was advanced over the wire and exchanged through and through for an 0.018 Astato wire with a physician modified kink in the center



- The snared Astato wire was then connected to a cautery on either end
- Under IVUS and fluoroscopy, the septum was divided
- Slow traction on the 0.018 wire was used while the cautery was activated to facility the septotomy



Conclusion and Recommendations

- Key Takeaways:

- Timing of TEVAR is crucial in managing UTBADS effectively.

- Balance the benefits of early intervention with the risks associated with the acute phase.

- Guidelines support individualized patient assessment and use of high-risk features identified on CT imaging for decision-making.

- Recommendation:

- Continue research and refine protocols based on emerging clinical evidence.

- IMPROVE-AD

References

- • Nienaber CA, European Heart Journal, 2021.
- • Nienaber CA, Kische S, Rousseau H. European Heart Journal, 2020.
- • Brunkwall J et al., Journal of Vascular Surgery, 2023.
- • SVS Guidelines, 2022; ESC Aortic Dissection Guidelines, 2023.
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- • Tadros, RO et al., Journal of the American College of Cardiology, 2019

Thank you!