With TAADs Why And When Should TEVAR of The Descending Thoracic Aorta Be Performed Prior To Open Type A Repair: Should The Procedures Be Staged

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Disclosures

- Consultant and Advisory Board Member
  - Terumo Aortic

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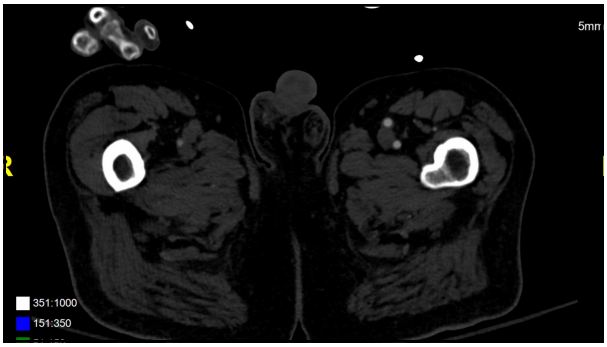
Case Presentation

- 65 y/o man presents w/ATAAD
- PMH: HTN, HLP, CKD (Baseline Cr 2.0)
- No chest pain, abdominal pain, or back pain
- Physical Exam
  - Pulseless right leg
- Echo: Evidence of Moderate to Severe AI
- Labs
  - Lactate 17.8
  - Creatinine 1.95
  - ABG 7.16/24.2/505/8.5



Background

- Operative mortality with Type A Aortic Dissection(TAAD) remains high at 20-25%
- In-hospital mortality is even higher in those with mesenteric malperfusion syndrome at 60-75%
- Optimal management strategies of such patients remains un-settled
- Endovascular first approaches with TEVAR followed by central repair are appealing to resolve the malperfusion

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Diagnosing Malperfusion is Challengeing

- Key components of diagnosis
  - History and physical exam
    - Abdominal pain along with chest pain
    - Pain out of proportion to exam
    - Hematochezia
    - Loss or diminished distal pulses
    - Paralysis
  - Laboratory values
    - Lactic Acidosis > 6-8
    - Abnormal liver function tests
    - Prolonged prothrombin times
    - Elevated creatinine
  - CT findings
    - Severely compromised flow in the visceral segment of the abdominal aorta

What is the role of a TEVAR first approach?

The "thoracic endovascular aortic repair-first" strategy for acute type A dissection with mesenteric malperfusion: Initial results compared with conventional algorithms

Bradley G. Leshnower, MD,[a] W. Brent Keeling, MD,[a] Yazan M. Duwayri, MD,[b] William D. Jordan, Jr, MD,[b] and Edward P. Chen, MD[a]

- Retrospective review from 2003 to 2017 of the Emory Aortic Database of 34 patients who presented with acute type A dissection with mesenteric malperfusion
- A total of 34 patients were identified
- 4 surgical strategies were employed which evolved overtime

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Treatment Strategies (Emory Experience)

- Ascending aortic replacement followed by exploratory laparotomy, bowel resection and fem-fem bypass as needed
- Axillary bifemoral bypass before sternotomy
- Ascending aortic replacement with antegrade TEVAR deployment
- TEVAR 1st Approach followed by delayed central repair

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Preoperative Demographics

TABLE 2. Preoperative demographic characteristics of treatment groups

Characteristic	ASC/LAP 2003-2017 (n = 13)	Ax-Bifem/ASC 2009-2013 (n = 3)	ASC/TEVAR 2009-2016 (n = 5)	TEVAR-1st 2012-2017 (n = 13)	*P* value
Age (y)	57 ± 14	51 ± 5	57 ± 15	50 ± 12	.520
Male	10 (77)	2 (100)	5 (83)	9 (69)	.865
Serum lactate (mmol/L)	4.6 ± 2.3	4.8 ± 1.8	3.7 ± 1.0	4.3 ± 2.4	.868
Prior cardiac surgery	1 (7.6)	1 (50)	0	1 (7.6)	.335
Renal malperfusion	6 (46.2)	1 (50)	2 (33)	8 (62)	.681
Ileofemoral malperfusion	2 (15.3)	2 (100)	3 (50)	7 (54)	.05
Spinal cord malperfusion	1 (7.6)	0	0	1 (7.6)	.999
Hematochezia	1 (7.6)	0	1 (17)	2 (15.3)	.738
Cardiac tamponade	2 (15.3)	2 (66.6)	1 (20)	0	.024*
Shock	0	1 (33.3)	0	3 (23.1)	.155
Severe aortic insufficiency	0	1 (33.3)	1 (20)	0	.050

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Outcomes

TABLE 3. Operative data and outcomes

Variable	ASC/LAP (n = 13)	Ax-Bifem/ASC (n = 3)	ASC/TEVAR (n = 5)	TEVAR-1st (n = 10)	*P* value
Cardiopulmonary bypass time (min)	151 ± 32	208 ± 37	214 ± 71	263 ± 98	.046*
Crossclamp time (min)	90 ± 20	131 ± 82	144 ± 55	178 ± 78	.056
hypothermic circulatory arrest time (min)	33 ± 10	36 ± 7	37 ± 18	43 ± 15	.530
Bladder temp at hypothermic circulatory arrest (°C)	25 ± 4.4	25 ± 3.5	26 ± 4.2	27 ± 1.6	.510
Deep hypothermic circulatory arrest (%)	7 (53.8)	1 (33.3)	2 (40)	1 (10)	.154
Moderate hypothermic circulatory arrest (%)	6 (46.2)	2 (66.6)	3 (60)	9 (90)	.154
Antegrade cerebral perfusion (%)	8 (61.5)	3 (100)	4 (80)	10 (100)	.096
Retrograde cerebral perfusion (%)	3 (23.1)	0	1 (20)	0	.339
Hemiarch	13 (100)	3 (100)	4 (80)	8 (80)	.355
Root replacement	0	1 (50)	1 (17)	2 (20)	.083
Length of thoracic endovascular aortic repair	n/a	n/a	150 ± 32	211 ± 55	.028
Renal failure	8 (62)	2 (100)	4 (66)	2 (20)	.059
Postoperative bowel necrosis or acidosis	10 (77)	0	4 (66)	0	<.001*
Mortality	9 (69)	0	4 (66)	3 (30)	.108

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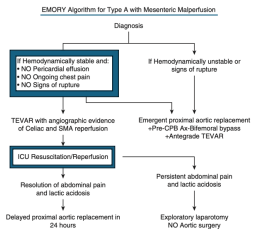
Treatment Algorithm



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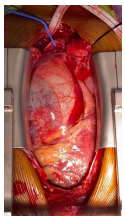
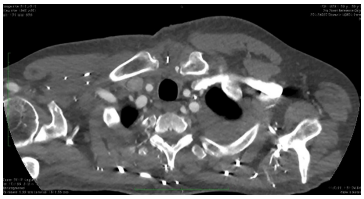
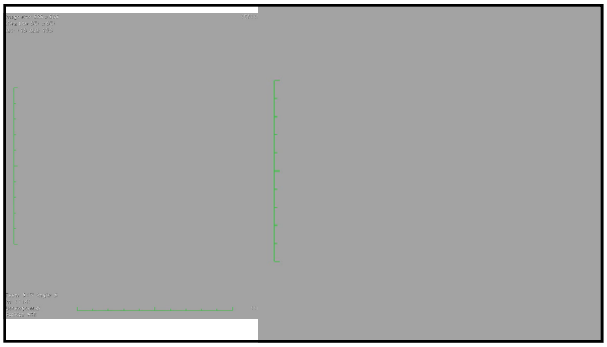
Clinical Case 1

- Type A12 Dissection
- Patient underwent emergent ascending aortic repair with valve sparing root without antegrade TEVAR
- Despite repair, the patient had persistent abdominal pain with and elevated lactate and creatinine



Pre-operative CT Scan





Conclusions

- Identification of patients with TAAD and malperfusion is challenging
- Abdominal pain and elevation in lactate levels may be late findings
- TEVAR 1st approaches can serve as a bridge to central repair and may identify unsalvageable cases
- TEVAR 1st is contraindicated in certain scenarios
- Staging the repairs allows for resolution of the ischemic insult prior to CPB