Thoracic Endovascular Aortic Repair for Penetrating Aortic Trauma

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Disclosures

- None

Aortic Trauma

- Aortic injury is one of the most common causes of death after traumatic injury
- Blunt aortic injury (BAI) was historically associated with in-hospital mortality rates >30%
- The advent of endovascular therapy significantly reduced mortality for BAI patients to <10%

Aortic Trauma

- Penetrating (either from gun shot or stab wounds) aortic injury (PAI) has traditionally been treated via an open repair with mortality rates ~50%

- Case series have demonstrated the feasibility of TEVAR for PAI, though no large studies have established the characteristics associated with this injury pattern or outcomes of TEVAR

Purpose

Determine outcomes associated with TEVAR for penetrating aortic injury and how these patients compare with blunt aortic injury patients

Methods

- Vascular Quality Initiative (VQI) database from 2011-2022 for patients undergoing TEVAR
  - Patients with traumatic injuries included
  - Excluded patients with missing mechanism
- Baseline characteristics, zone and severity of aortic injury, and outcomes were recorded
- Compared BAI to PAI patients

Study Population

- 1,867 patients -

73% Male

Age 39

Hypertension 27%

Smoker 33%

Grade 3 Injury (Psuedoaneurysm) 55%

Grade 4 Injury (Transection) 16%

Aortic Related Re-Intervention 1.3%

Death 8.2%

BAI vs. PAI

	Blunt	Penetrating	
	1808	59	
Male	1332 (73.7%)	39 (66.1%)	0.195
Age	39.5 (28-57)	35 (23-59)	0.400
Race			<0.001
African American	344 (19.1%)	27 (45.8%)	
White	1143 (63.4%)	20 (33.9%)	
Other	316 (17.5%)	12 (20.3%)	

BAI vs. PAI

	Blunt	Penetrating	
	1808	59	
Grade of Aortic Injury			0.001
1 – Intimal Tear	130 (7.5%)	4 (7.3%)	
2 – Intramural Hematoma	310 (17.8%)	9 (16.4%)	
3 – Pseudoaneurysm	1011 (58.2%)	22 (40%)	
4 – Transection	286 (16.5%)	20 (36.4%)	

BAI vs. PAI

	Blunt	Penetrating	
	1808	59	
Proximal Extent of Injury			<0.001
Zone 0	11 (0.6%)	1 (1.9%)	
Zone 1	24 (1.4%)	1 (1.9%)	
Zone 2	291 (17.1%)	7 (13.0%)	
Zone 3	1130 (66.5%)	9 (16.7%)	
Zone 4	204 (12%)	17 (31.5%)	
Zone 5	37 (2.2%)	16 (29.6%)	

BAI vs. PAI

	Blunt	Penetrating	p
	1808	59	
Any Complication	484 (26.9%)	15 (25.4%)	0.803
Spinal Ischemia	17 (1%)	0 (0)	0.755
Myocardial Infarction	30 (1.7%)	2 (3.4%)	0.434
Stroke	66 (3.7%)	3 (5.1%)	0.913
Dialysis	60 (3.4%)	3 (5.1%)	0.764
Aortic Related Re-Intervention	24 (1.3%)	0 (0)	0.236
Death	149 (8.2%)	5 (8.5%)	0.813

Conclusions

- PAI occurs more commonly in zones 4-5 of the thoracic aorta and often presents with higher grade aortic injury when compared to BAI.
- TEVAR for PAI has excellent in-hospital survival (8.5% mortality) compared to historical mortality rates (~40-50%).
- An endovascular first approach may lead to improved survival for PAI.