Predictors of surveillance imaging non-compliance among patients with TEVAR for blunt thoracic aortic injury

Boris Pekar, Matthew Anderson, Rupak Mukherjee, Jean Marie Ruddy
Medical University of South Carolina

Background

- Blunt Thoracic Aortic Injury (BTAI) is the second leading cause of death for patients with blunt trauma.[1]
- Thoracic endovascular aortic repair (TEVAR) reduces morbidity and mortality but requires long-term imaging and adherence to this protocol is poor.[2]

Objective

- Evaluate predictors of post-TEVAR non-compliance

Methods

- A retrospective study on 23 patients was conducted using the Medical University of South Carolina Aortic Center Database (2015-2025)
- Inclusion criteria were age >18 years and TEVAR for BTAI
- Demographic, comorbidity, hospital course, and follow-up data were collected
- The Distressed Communities Index (DCI) score was derived by ZIP code
- Time-to-event analysis defined lost to follow up (LTFU) as the failure event
- Statistical analysis included Chi squared, T-tests, and Kaplan Meyer survival

Results

Table 1: Baseline Demographics of the Study Population Stratified by Loss to Follow-up (LTFU) Status

Variable	Total (n=23)	LTFU "no" (n=9)	LTFU "yes" (n=14)	P value
Age	44.4 ± 12.2	44.9 ± 20.9	43.7 ± 15.7	0.88
Male	18 (78.3%)	7 (77.8%)	11 (78.6%)	1.00
White	9 (39.1%)	4 (44.4%)	5 (35.7%)	1.00
Single	14 (63.6%)	6 (75%)	8 (57.1%)	0.65
Non-Smoker	18 (78.3%)	8 (88.9%)	10 (71.4%)	0.61
Diabetes Mellitus	20 (87.0%)	9 (100%)	11 (78.6%)	0.25
HTN	9 (39.1%)	2 (22.2%)	7 (50%)	0.23
COPD	2 (8.7%)	1 (11.1%)	1 (7.1%)	1.00

Table 2: Clinical Complexity of the Study Population Stratified by Loss to Follow-up (LTFU) Status

Variable	Total (n=23)	LTFU "no" (n=9)	LTFU "yes" (n=14)	P value
GCS Score	4 ± 1.4	3.4 ± 1.7	4.6 ± 1	0.12
ICU Days	11.3 ± 13.3	16.4 ± 18.7	8 ± 7.4	0.14
Ward Days	5.8 ± 8.7	3.7 ± 5.5	7.1 ± 10.2	0.36
BTAI Grade 4	7 (30.4%)	4 (44.4%)	3 (21.4%)	0.36
Head Injury	9 (39.1%)	6 (66.7%)	3 (21.4%)	0.08
Limb Injury	12 (52.2%)	5 (55.6%)	7 (50%)	1.00
Abdominal Injury	11 (47.8%)	5 (55.6%)	6 (42.9%)	0.7
Abdominal Surgery	6 (26.1%)	2 (22.2%)	4 (28.6%)	1.00
Bowel Resection	2 (8.7%)	0 (0%)	2 (14.3%)	0.5
ISS Score	14.8	49.9 ± 20	35.1 ± 7.7	**0.0196**

Table 3: Accessibility Factors of the Study Population Stratified by Loss to Follow-up (LTFU) Status

Variable	Total (n=23)	LTFU "no" (n=9)	LTFU "yes" (n=14)	P value
DCI Score	62.6 ± 26.2	63 ± 27	62.3 ± 26.7	0.96
Crowfly Miles from ED	43.14 ± 33.3	42.8 ± 44.1	43.3 ± 27.3	0.97
Uninsured	7 (30.4%)	3 (33.3%)	4 (28.6%)	1.00
“Distressed” and “At Risk”	12 (54.6%)	4 (50%)	8 (57%)	1.00
Discharge: Home	14 (60.9%)	4 (44.4%)	10 (71.4%)	0.38
Distance from Facility <20 miles	9 (40.9%)	6 (75%)	3 (21.4%)	**0.022**

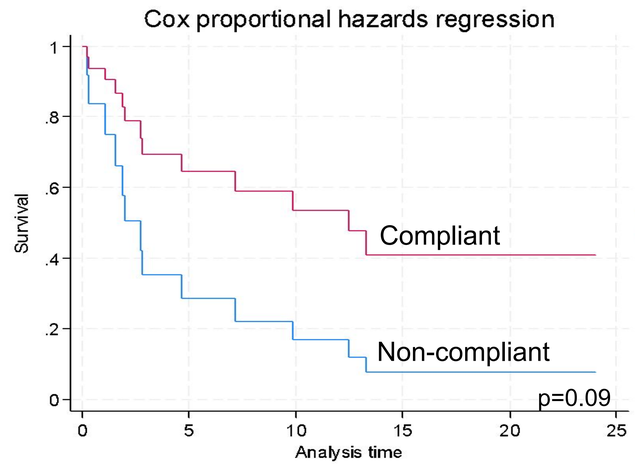

Figure 1. Survival analysis out to 24 months indicated no significant difference for Compliant (red) versus Non-compliant (blue) patients following TEVAR for BTAI (p=0.09)

Limitations

- Because South Carolina has higher poverty and economic distress compared to the national average, this study may not have been able to detect impact and may not apply to other populations

Conclusions

- Targeted, patient-centered surveillance strategies are needed, especially amongst rural populations, patients with concurrent complex injuries, and those discharged to a non-home location
- Telehealth or imaging at regional health network locations
- To fully understand this complex problem, further investigation with a larger database may be indicated

REFERENCES

1. Abdou H, Elansary NN, Darko L, DuBose JJ, Scalea TM, Morrison JJ, Kundi R. Postoperative complications of endovascular blunt thoracic aortic injury repair. Trauma Surg Acute Care Open. 2021;6(1):e000678. doi:10.1136/tsaco-2021-000678
2. Antoniou GA, Kontopodis N, Rogers SK, Golledge J, Forbes TL, Torella F, Verhagen HJM, Schermerhorn ML; International Risk Stratification in EVAR (IRIS-EVAR) working group. Editor's choice – Meta-analysis of compliance with endovascular aneurysm repair surveillance: the EVAR surveillance paradox. Eur J Vasc Endovasc Surg. 2023;65(2):244–254. doi:10.1016/j.ejvs.2022.10.033