

Readmission Burden and Longitudinal Survival Among Patients Requiring Tracheostomy After Surgery for ATAAD.

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Background

- The management of patients who survived surgery for acute type A aortic dissection (ATAAD) presents significant challenges.
- Tracheostomy requirement often correlates with complex clinical pathways and increased resource utilization.
 - There is a notable lack of comprehensive data analyzing longitudinal survival outcomes in this specific patient group

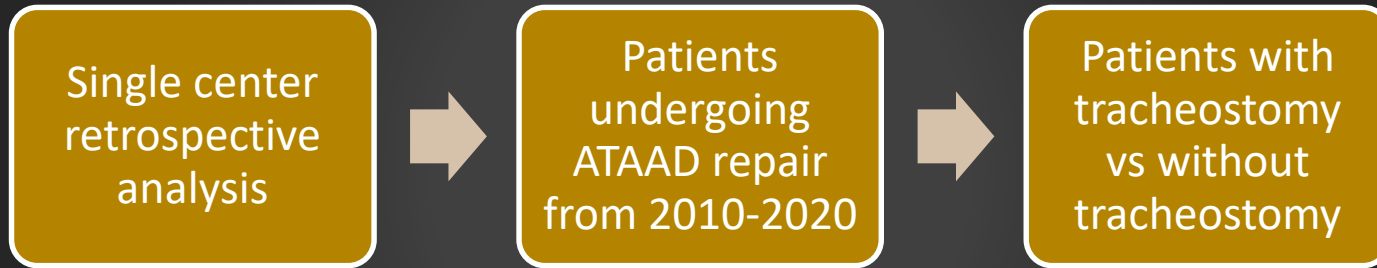


Objective

To characterize the impact of requiring a tracheostomy on readmission rates within 1-year and survival after surgical repair of ATAAD



Methods - Study Design



Methods - Analysis

Perioperative variables across tracheostomy groups

Kaplan Meier function and Cox regression analysis for long-term survival

Resource utilization was defined by the number of readmissions during the first year after the index operation.



Results – Baseline demographic and clinical variables

Variable	No tracheostomy (n=500)	Tracheostomy (n=52)	p-value
Age (years)	61.3 ± 13.4	63.6 ± 12.1	0.23
Female	193 (38.60)	27 (51.92)	0.06
Race			
Caucasian	415 (83.00)	39 (75.00)	0.35
African American	66 (13.20)	10 (19.23)	
Other	19 (3.80)	3 (5.77)	
Body mass index (kg/m ²)	29.9 ± 6.55	32.1 ± 8.63	0.02
Hypertension	379 (75.80)	46 (88.46)	0.03
Diabetes mellitus	48 (9.60)	11 (21.15)	0.01
Chronic lung disease	66 (13.20)	12 (23.08)	0.05
Smoke status			
Never	103 (20.60)	11 (21.15)	0.43
Within 1 yr prior surgery	53 (10.60)	9 (17.31)	
Other smoking	174 (34.80)	14 (26.92)	
Others (unknown)	170 (34.00)	18 (34.62)	
Peripheral vascular disease	174 (34.80)	17 (32.69)	0.76
Coronary artery disease	67 (13.40)	8 (15.38)	0.69
Tamponade, rupture, or shock	154 (30.80)	15 (28.85)	0.77
Any malperfusion syndrome	145 (29.00)	26 (50.00)	0.002



Results – Operative outcomes

Variable	No tracheostomy (n=500)	Tracheostomy (n=52)	p-value
In-hospital mortality	47 (9.40)	7 (13.46)	0.34
Total postoperative length of stay (days)	10.1 ± 7.82	37.9 ± 22.6	<0.001
Postoperative pneumonia	34 (6.80)	26 (50.00)	<0.001
New-onset cerebrovascular accident	16 (3.20)	8 (15.38)	<0.001
Mechanical ventilation time (hours)			
Mean ± SD	26.8 ± 45.8	201.5 ± 263.0	<0.001
Median (IQR)	10.0 (5.6-23.0)	82.7(20.6-337.5)	<0.001
New-onset hemodialysis	44 (8.80)	23 (44.23)	<0.001
Reexploration for excessive bleeding	41 (8.20)	10 (19.23)	0.009
Residual aortic regurgitation (≥ moderate)	7 (1.40)	0 (0.00)	0.39
1-month follow-up ejection fraction	56.8 ± 8.59	53.7 ± 16.3	0.05



Results – Readmission Burden

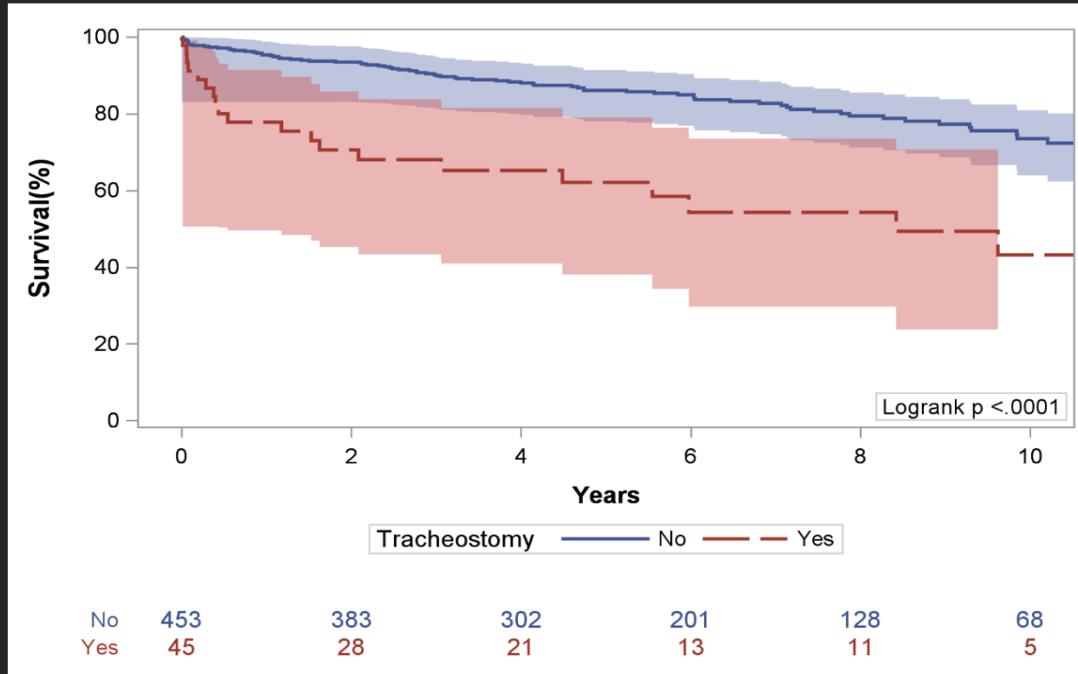
Rate of Readmission within 1-year	No Tracheostomy	Tracheostomy	P value
First readmission - Any	29.58%	44.23%	0.03
ICU First readmission	16.10%	34.62%	<0.001

Time to readmission (days)	No Tracheostomy	Tracheostomy	P value
First readmission	269 (21-1158)	67 (8-230)	0.01
ICU First readmission	501 (51-1469)	106 (27-364)	0.05

1-year readmission number		No Tracheostomy	Tracheostomy	P value
First readmission	Mean \pm Std	0.36 \pm 0.83	0.63 \pm 1.01	0.02
	Median (IQR)	0 (0-0)	0 (0-1)	0.01
ICU First readmission	Mean \pm Std	0.17 \pm 0.46	0.35 \pm 0.59	0.007
	Median (IQR)	0 (0-0)	0 (0-1)	0.001



Results – Long Term Survival



KM estimate of survival after discharge

	1 year	5 years	10 years
No Tracheostomy	95.3 (93.2-97.8)	86.1 (82.5-89.3)	73.5 (67.2-79.3)
Tracheostomy	77.8 (64.6-88.6)	62.1 (46.8-76.2)	43.2 (25.0-62.3)



Results – Longitudinal Survival

Multivariable Cox proportional-hazards regression model for mortality after surgery for acute Type A aortic dissection (excluding death in hospital)

Variable	Hazard Ratio	95% CI	p-value
Tracheostomy	1.76	1.03, 3.00	0.040
Age (years)	1.03	1.01, 1.05	0.001
Female (ref: male)	0.73	0.47, 1.12	0.150
African American (ref: Caucasian)	1.88	1.10, 3.21	0.020
Hypertension	1.75	0.95, 3.22	0.075
Diabetes mellitus	2.36	1.44, 3.86	<0.001
COPD	1.44	0.90, 2.30	0.125
Postoperative hemodialysis	2.73	1.59, 4.69	<0.001



Limitations

- Limited **Generalizability**: Findings from a single-center analysis in Western Pennsylvania may not be generalizable to a broader population.
- **Sample size**: The uneven distribution of patients among racial groups and the smaller sample size of black patients might limit the statistical power to detect meaningful differences.
- **Confounding Factors**: A single-center analysis may not adequately control for potential confounding variables



Conclusions

- Requiring a tracheostomy after surgical repair of ATAAD has a significant impact on increased mortality during the first year.
- Higher readmission burden in patients with tracheostomy highlights the substantial resource utilization associated with this patient population.
- These findings highlight the importance to optimize comprehensive postoperative protocols of care, aiming to enhance rehabilitation and manage resource utilization effectively for improved long-term survival after ATAAD surgery.

