

The Impact of Preoperative Anemia on Outcomes of Acute Type A Aortic Dissection

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Background & Aims

- Preoperative anemia is associated with increased morbidity and mortality after cardiac surgery.
 - Bleeding
 - Hemodilution during cardiopulmonary bypass
- >50% of cardiac surgical patients are anemic
- We sought to evaluate the impact of preoperative anemia in patients undergoing surgery for acute type A aortic dissection (ATAAD).



Methods

- Retrospective institutional study from 2010-2023 of patients undergoing treatment for ATAAD.
- Patients stratified into propensity matched anemia (+) and anemia (-) groups based on standard gender-based cutoffs for anemia using hemoglobin (Hb) or hematocrit if Hb was unavailable.
- Anemia defined as hemoglobin value of < 13.5 gm/dl in men or < 12.0 gm/dl in women.



Results

- A total 454 patients included
 - 273 anemia (-)
 - 181 anemia (+)
- Among **women**, more patients were **non-anemic** (44.7% vs.32.6%, $p=0.01$).
- Anemic patients
 - **Older** at presentation (63 vs. 61 years, $p=0.04$)
 - **Higher incidence of diabetes** (15.5% vs. 8.1%, $p=0.0135$).
 - **Lower total albumin** (3.5 g/dL (3.1-3.8) vs. 3.8 (3.5-4), $p<0.001$)
 - **Longer CPB time** (195 mins (158-229) vs. 178 mins (149-218), $p=0.02$) and
 - **Longer cross clamp time** (128 mins (92.5-170) vs. 113 mins (92-151), $p=0.05$)
 - Comparable Circulatory arrest times (24.0 mins (20.0-33.0) vs. 25.0 mins (19.0-32.0), $p=0.672$).



Outcome	Anemia (-): 273	Anemia (+): 181	P-Value
30-day mortality	30 (11.0%)	22 (12.2%)	0.7026
In-hospital mortality	29 (10.6%)	18 (9.9%)	0.8164
One-year mortality	39 (14.3%)	32 (17.7%)	0.3297
Overall Mortality	62 (22.7%)	54 (29.8%)	0.0884
Postoperative stroke	16 (5.9%)	19 (10.5%)	0.0698
Reoperation	52 (19.0%)	32 (17.7%)	0.7132
Reoperation for bleeding	17 (6.2%)	15 (8.3%)	0.4011
Sepsis	10 (3.7%)	9 (5.0%)	0.4951
Prolonged ventilation	83 (30.4%)	64 (35.4%)	0.2692
Pneumonia	38 (13.9%)	21 (11.6%)	0.4722
Permanent pacemaker	4 (1.5%)	7 (3.9%)	0.1031
Renal failure	39 (14.3%)	31 (17.1%)	0.4117
Dialysis	32 (11.7%)	27 (14.9%)	0.3215
Postoperative transfusion	127 (46.5%)	110 (60.8%)	0.0029
RBC transfusion > 4 units	34 (12.5%)	32 (17.7%)	0.122
Discharge location			0.1974
Home	164 (60.1%)	95 (52.5%)	
Nursing facility	78 (28.6%)	66 (36.5%)	.
Other	31 (11.4%)	20 (11.0%)	.
Postoperative Hemoglobin	9.0 (8.3-10.0)	8.8 (8.1- 9.6)	0.0581
Postoperative Hematocrit	26.9 (24.9-29.7)	26.4 (24.2-28.9)	0.1241
Acute limb ischemia	6 (2.2%)	4 (2.2%)	0.9931
Length of stay	8.0 (6.0-14.0)	9.0 (6.0-15.0)	0.0402
Total ICU stay (hrs)	64.4 (37.3- 168)	85.3 (40.0- 153)	0.5674

Results

Comparison of outcomes between anemia (-) and anemia (+) groups



Results

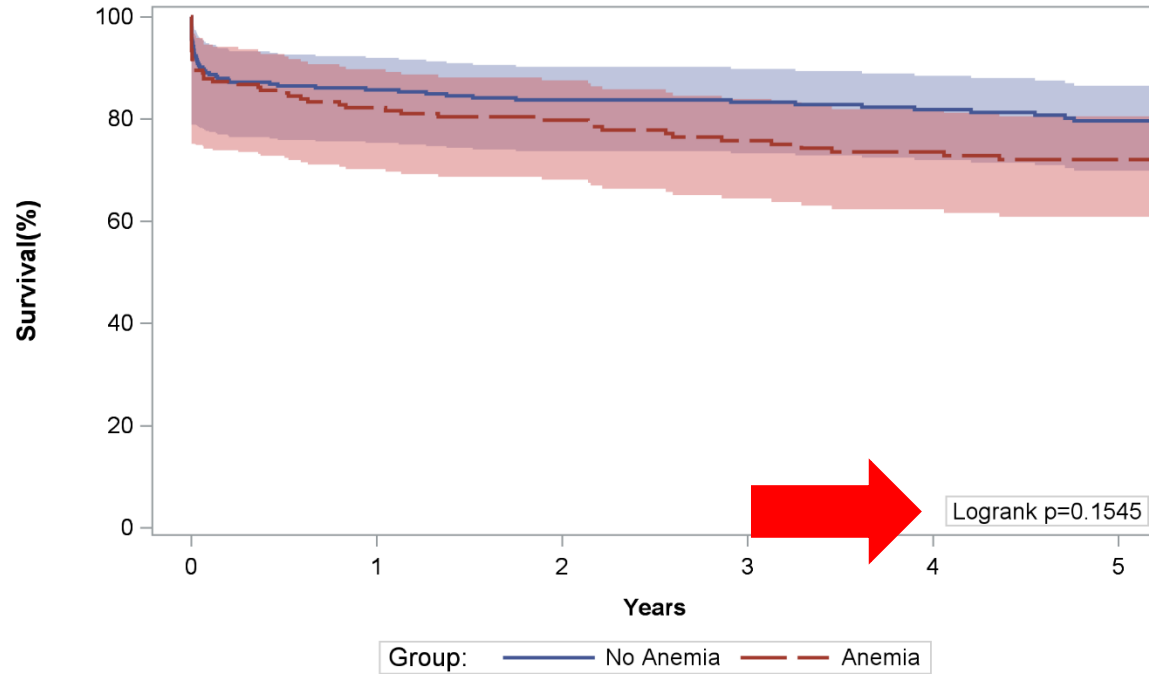
Parameter	HR	95% CI		P-value
Anemia	1.111	0.615	2.006	0.727
Female	0.858	0.534	1.377	0.525
Current smoker	1.503	0.952	2.373	0.081
COPD	2.27	1.467	3.511	<.0001
Hypertension	1.053	0.631	1.755	0.844
Prior Heart Failure	0.945	0.426	2.094	0.889
Prior CABG	0.983	0.464	2.082	0.964
Hematocrit	0.992	0.938	1.049	0.769
Age	1.025	1.006	1.043	0.008
BMI	0.999	0.98	1.018	0.883
Perfusion time	1.013	1.009	1.017	<.0001
Cross-clamp time	0.991	0.986	0.996	< .0001

Cox proportional hazards model for mortality



Results

Kaplan-Meier survival plot comparing survival in the anemia (-) and anemia (+) groups up to 5 years

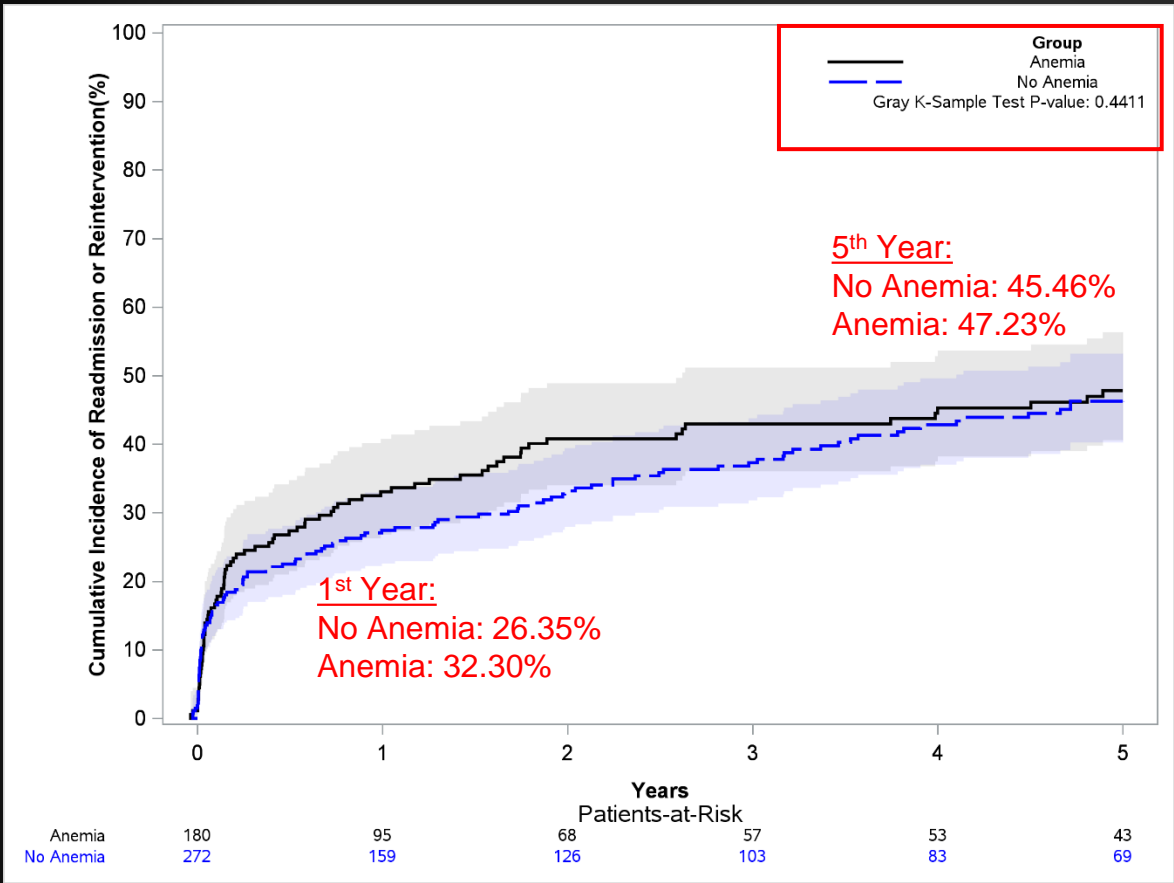


No Anemia	273	225	197	177	159	138
Anemia	181	143	124	106	99	88

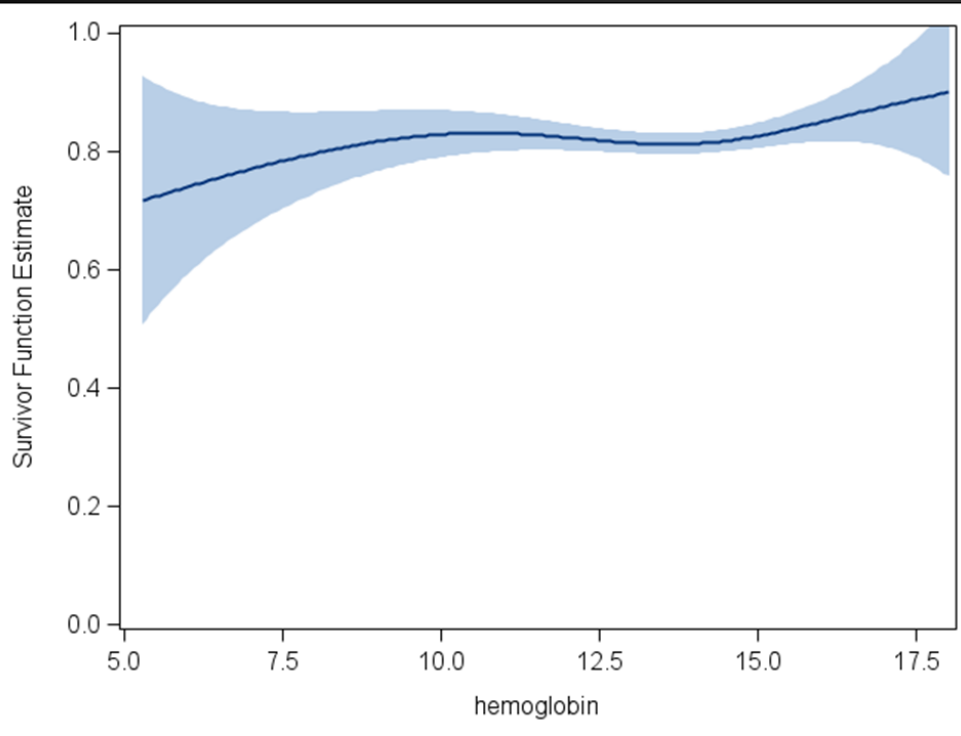


Results

Comparison of cumulative incidence of readmission or reintervention between anemia (-) and anemia (+) groups



Results

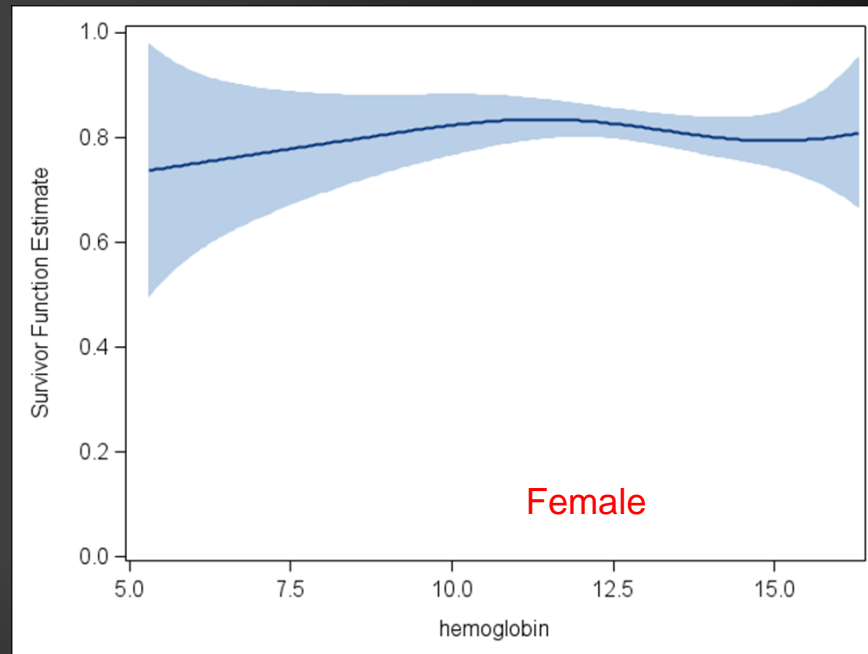
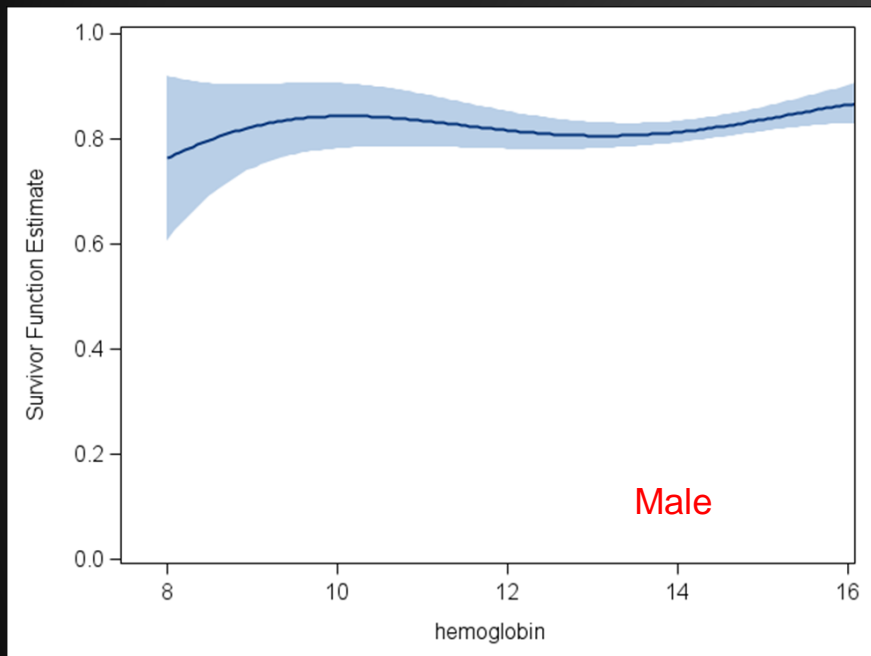


Spline plot showing the non-linear relationship between hemoglobin levels and survival in ATAAD patients



Results

Spline plots showing the non-linear relationship between hemoglobin levels and survival in ATAAD patients by male and female gender



Discussion

- Anemia widely prevalent in ATAAD population
- Anemia conferred some additional risk of morbidity \neq significant survival difference
- Risk of reintervention not impacted by anemia
- Non-linear relationship between Hb and survival may shed light on optimum range of Hb for ATAAD patients



Conclusion

- ❑ Preoperative anemia is not associated with worse survival in ATAAD
- ❑ Anemia appears to be a bystander with other comorbidities that impact survival and outcomes after surgery for acute type A aortic dissection

