



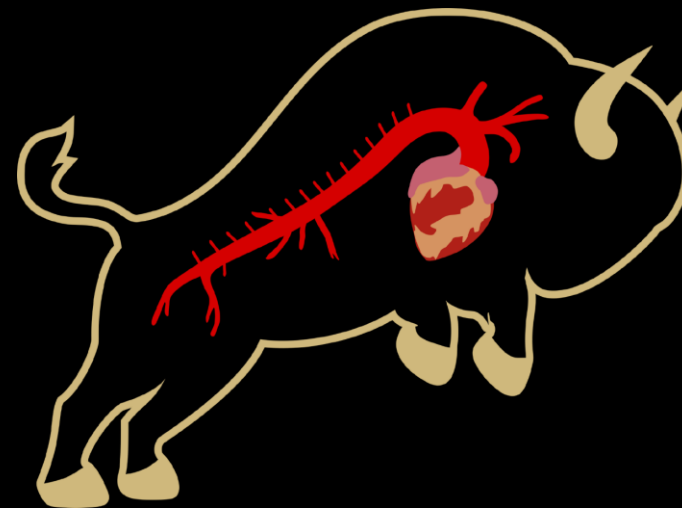
Pulmonary Artery Injury is Inconsequential in Re-do Aortic Arch Surgery

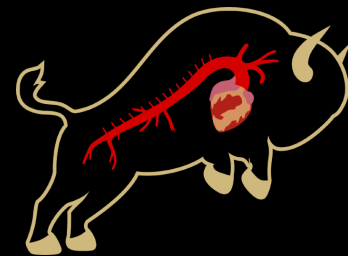
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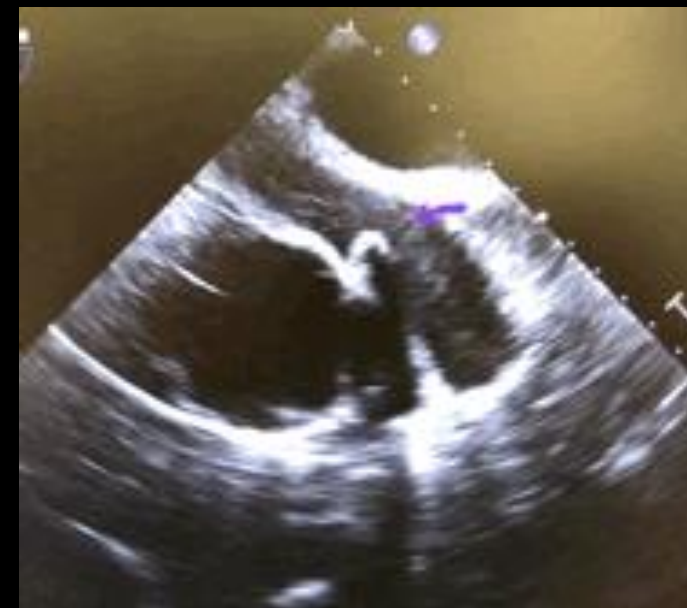
No disclosures





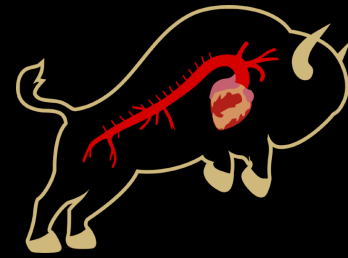
Introduction

- Scar tissue in a re-operative field increases risk for harm to surrounding structures
- In aortic arch surgery, particularly in distal ascending intervention, the pulmonary artery (PA) is at particular risk given its proximity
- Damage to the PA may increase risk for further bleeding complications, or for prolonged ventilation
- However, we believe that when recognized and repaired, PA injury does not increase risk of adverse events

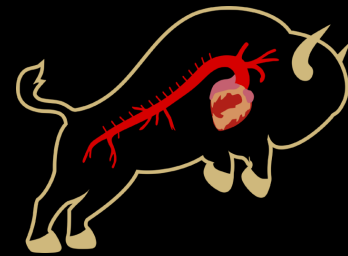


TEE of PA injury

Aim

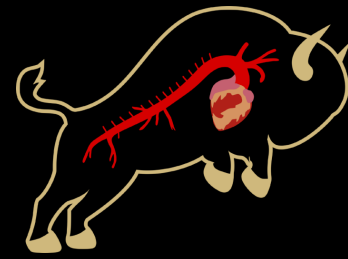


Investigate the impact of pulmonary artery injury on operative and post-operative outcomes for aortic arch patients with a prior history of sternotomy



Methods

- Reviewed prospectively maintained single institutional database all patients who underwent re-do sternotomy for TAR and hemiarch repair between February 2010 and May 2023
- In total, 238 patients undergoing arch surgery with prior sternotomy were identified
- Patients were split into two cohorts based on whether a PA injury occurred
 - 34 (14.3%) had an iatrogenic PA injury
 - 204 (85.7%) did not have a PA injury
- Pre-operative and operative characteristics, and post-operative outcomes were compared between the two cohorts

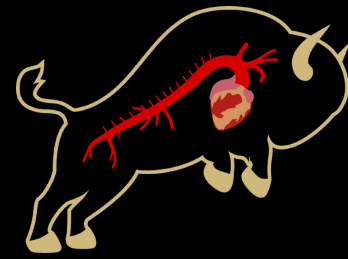


Preoperative Characteristics

- Increased BMI in PA injury patients, although borderline significance in Obesity (BMI>30)
- Increased baseline renal disease in PA injury patients
- No difference in procedural urgency or aortic pathology

	No Injury (n = 204)	PA Injury (n = 34)	P-value
Gender			0.413
Male	147 (72.1%)	27 (79.4%)	
Female	57 (27.9%)	7 (20.6%)	
Age	59.4 (49.8-67.0)	59.9 (55.3-64.1)	0.514
Comorbidities			
HLD	64 (31.4%)	14 (41.1%)	0.324
HTN	148 (72.5%)	29 (85.3%)	0.139
Obesity	67 (32.8%)	17 (50.0%)	0.079
Smoking	56 (27.5%)	6 (17.6%)	0.293
Diabetes	15 (7.4%)	3 (8.8%)	0.728
Renal Disease	24 (11.8%)	9 (26.4%)	0.031
CAD	37 (18.1%)	9 (26.4%)	0.248
Stroke	25 (12.3%)	4 (11.8%)	0.999
Pulmonary Disease	54 (26.5%)	7 (20.6%)	0.531
BMI	27.6 (24.0-31.5)	29.5 (25.4-35.0)	0.039
Operative Urgency			0.079
Elective	129 (63.2%)	27 (79.4%)	
Urgent/Emergent	75 (36.8%)	7 (20.6%)	
Aortic Pathology			0.715
Aneurysm	153 (75.0%)	27 (79.4%)	
Dissection	79 (38.7%)	12 (35.3%)	
Aneurysm and Dissection	45 (22.1%)	10 (29.4%)	

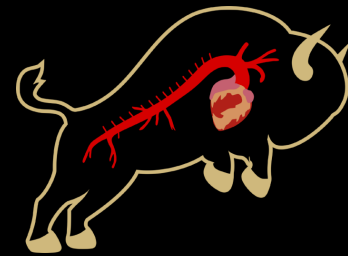
Values are presented as N (%) or Median (IQR).
P-values are from Kruskal-Wallis or Fisher's exact test.



Intraoperative Characteristics

- Trend towards more total arch replacement in PA injury patients
- Higher cardiopulmonary bypass, circulatory arrest time in PA injury patients
 - When stratified by procedure, difference only seen in total arches, also seen in aortic cross-clamp time
- Increased transfusion of FFP in PA injury patients

	No Injury (n = 204)	PA Injury (n = 34)	P-value
Aortic Intervention			0.086
Total Arch	93 (45.6%)	24 (70.6%)	
Hemiarch	83 (40.7%)	7 (20.6%)	
Zone 1 Replacement	5 (2.5%)	1 (2.9%)	
Ascending Arch	5 (2.5%)	1 (2.9%)	
Root +/- aortic valve only	18 (8.8%)	1 (3.8%)	
CPB Time (min)			0.011
Total Arch CPB	176 (150-215)	221.5 (186.5-255)	0.005
Hemiarch CPB	162.5 (129.5-226)	182 (150.5-187.5)	0.913
Cross-Clamp (XC) Time (min)			0.101
Total Arch XC	78 (51-119)	119 (78-159)	0.005
Hemiarch XC	107 (79-138)	91 (76.5-99)	0.258
Circulatory Arrest Time (min)			0.047
Total Arch Circ Arrest	23 (17-32)	27 (19-35)	0.307
Hemiarch Circ Arrest	10 (8-16)	8 (6-16)	0.347
Intra-OP Products			
# RBC transfusions	2 (0 - 6)	2 (1 - 5)	0.447
# FFP transfusions	5 (2 - 8)	7 (3 - 11)	0.023
# Platelet transfusions	2 (1 - 3)	2 (2 - 4)	0.262

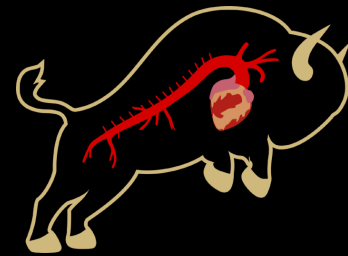


Postoperative Outcomes

- No difference in post-operative outcomes:
 - ICU/Hospital Length of Stay
 - Perioperative open chest or re-operation for bleeding
 - Post-Operative transfusion
 - Mortality

	No Injury (n = 204)	PA Injury (n = 34)	P-value
Post-Op Products			
No Post Operative Transfusion	49 (24.0%)	9 (26.5%)	0.829
# RBC transfusions	1 (0 – 4)	1 (0 – 4)	0.183
# FFP transfusions	0 (0 – 4)	0 (0 – 1)	0.589
# Platelet transfusions	0 (0 – 2)	0 (0 – 2)	0.361
Hospital Length of Stay (days)	10 (7 - 17)	10 (8 - 14)	0.459
ICU Length of Stay (days)	4 (2 - 7)	4 (3 - 7)	0.771
Stroke	21 (10.3%)	0 (0.0%)	0.058
New RRT	11 (5.4%)	3 (8.8%)	0.429
Mechanical Ventilation	20 (9.8%)	2 (5.9%)	0.748
Infection	22 (10.8%)	4 (11.8%)	0.773
Arrhythmia	30 (14.7%)	8 (23.5%)	0.208
Mechanical Circulatory Support	15 (7.4%)	2 (5.9%)	0.999
Open Chest	27 (13.2%)	5 (14.7%)	0.788
Unplanned reop for bleeding	26 (12.7%)	2 (5.9%)	0.388
Mortality	19 (9.31%)	1 (2.94%)	0.323

Data reported as median with corresponding IQR or as a number of categorical subjects with % ratio. Two group comparison is Mann-Whitney-Wilcoxon test (significant reported as $p > 0.05$). Categorical analysis is Fisher's exact test. (CPB=cardiopulmonary bypass, RBC= Red Blood Cell, FFP= fresh frozen plasma, ICU= intensive care unit, RRT=renal replacement therapy).



Conclusion

- In re-do aortic arch surgery, pulmonary artery injury is relatively common
 - Patients with higher BMI, baseline renal disease may be at more risk for PA injury
- Although PA injury prolongs intraoperative times in total arch replacement and increases need for transfusion of fresh frozen plasma for all arch cases, no difference is seen in post-operative outcomes
- PA injury is inconsequential when promptly recognized and repaired

Questions???

