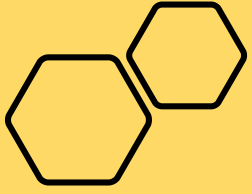




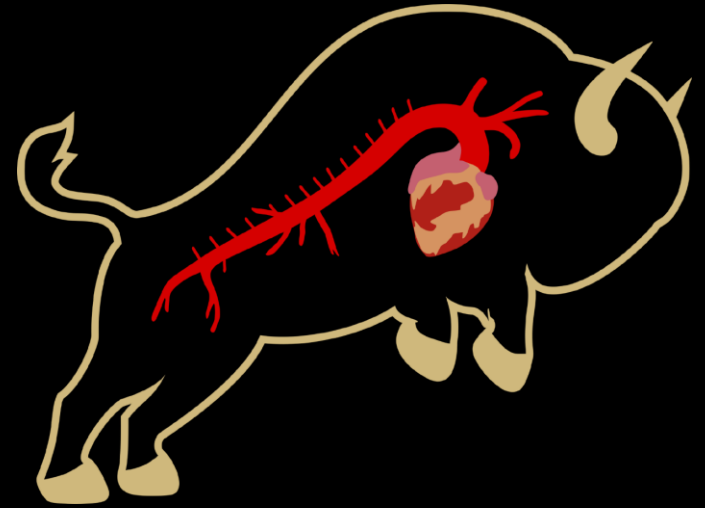
Logistic Regression as a Predictive Tool of Post-Operative Mortality in Hemiarch Surgery

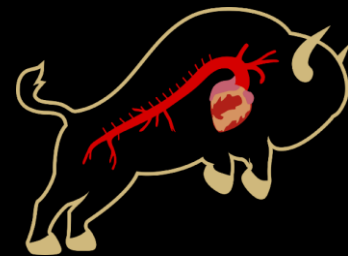
Adam Carroll (1), Nicolas Chanes (1), Muhammad Aftab (1), T. Brett Reece (1)

(1) University of Colorado Anschutz, Denver, CO



No disclosures

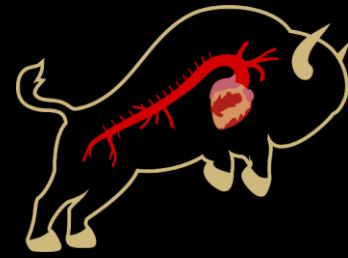




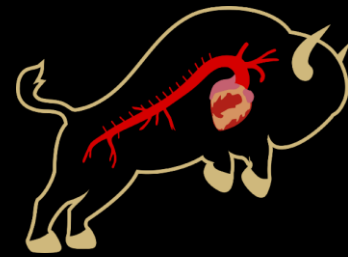
Introduction

- Patient outcomes in hemiarth surgery have improved, with reduced operative mortality
- Improvements in outcomes have led many surgeons to question whether risk of surveillance is appropriate
- Better identifying which patients are at higher risk of operative mortality may help to guide clinical decision-making

Aim

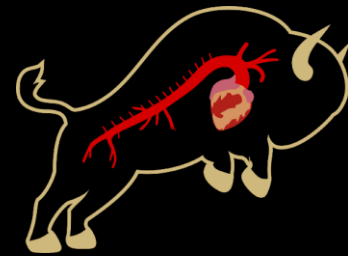


- Develop a model to predict post-operative mortality in hemiarthrosis surgery
- Focus on pre-operative and adjunctive operative procedures performed to better predict how baseline health and operative decision-making affects outcomes



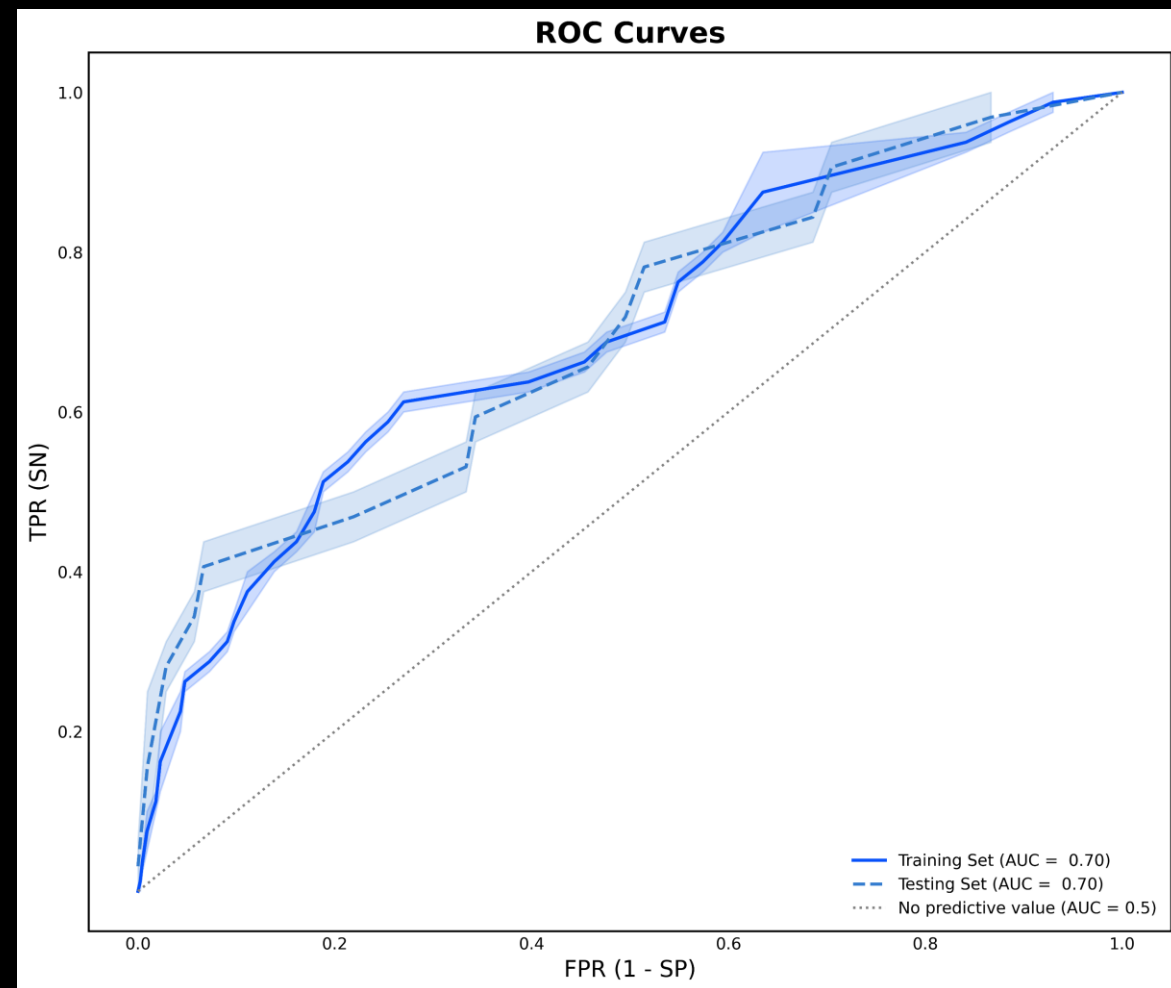
Methods

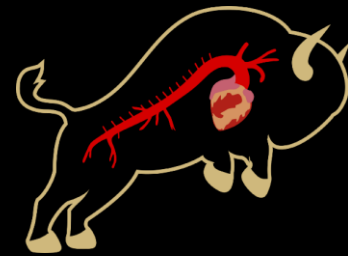
- Retrospective review of aortic database for all patients who underwent hemiarch surgery from 2009 to 2022
- Patients divided into training (80%) and testing (20%) sets of different logistic regression models
- Included 17 input parameters from pre-operative characteristics and operative procedures performed
- Assess model performance and accuracy with area under receiver operating curve (AUC-ROC)
- Calculate individual variable odds ratio, confidence intervals to determine specific impact



Results

- In total, 602 hemiarth patients included in analysis
- Mortality occurred in 56 patients (9.30%)
- Logistic regression model demonstrated cross-validation accuracy of 91%, well calibrated with Brier score of 0.09
- Best performing model with AUC-ROC of 0.70 on training and testing sets



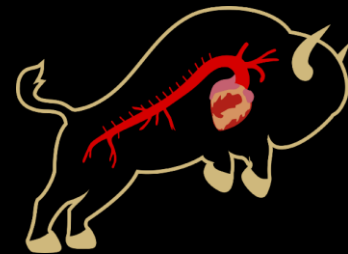


Results: Variable Odds Ratio

- Increased mortality (in order of impact):
 - Adjunctive Root
 - Adjunctive CABG
 - Urgent/Emergent Procedure
 - Dissection with malperfusion
- Decreased mortality
 - Dissection without malperfusion
 - Elective procedure
 - No adjunctive structural procedure

Aortic Presentation		
Aneurysm	486 (80.7%)	0.98 (0.95, 1.02)
Dissection – No Malperfusion	135 (22.4%)	0.82 (0.79, 0.85)
Dissection – Malperfusion	53 (8.8%)	1.05 (1.02, 1.07)
Procedure Type		
Hemiarch	602 (100%)	0.98 (0.98, 0.98)
Root + Hemiarch	242 (40.2%)	1.37 (1.31, 1.43)
Operative Urgency		
Elective	414 (68.8%)	0.89 (0.86, 0.93)
Urgent/Emergent	188 (31.2%)	1.09 (1.05, 1.14)
Adjunctive Procedure		
No Adjunctive Structural Procedure	98 (16.3%)	0.92 (0.89, 0.95)
Aortic Valve Repair	48 (8.0%)	1.09 (1.07, 1.12)
Aortic Valve Replacement	153 (25.4%)	0.81 (0.78, 0.84)
Mitral Valve Repair	7 (1.2%)	0.98 (0.97, 0.99)
Mitral Valve Replacement	9 (1.5%)	1.05 (1.04, 1.06)
Tricuspid Valve Repair	4 (0.7%)	1.05 (1.04, 1.06)
Tricuspid Valve Replacement	1 (0.2%)	1.05 (1.04, 1.06)
PFO Closure	15 (2.5%)	1.00 (0.99, 1.02)
Afib Procedure	23 (3.8%)	0.95 (0.94, 0.97)
CABG	53 (8.8%)	1.20 (1.17, 1.23)

Figure: Patient Characteristics including odds ratios and confidence intervals from the logistic regression model. Values are n (%).



Conclusions

- Predicting risk factors for peri-operative mortality may help to guide patient-clinician decision making
 - Able to assess degree of impact of specific patient risk factors
- Hemiarch peri-operative mortality is increased by:
 - Adjunctive root or CABG
 - Increased procedural urgency
 - Dissection with malperfusion
- Given absence of risk models available for aortic surgery, may help to guide patient risk stratification

Questions???

