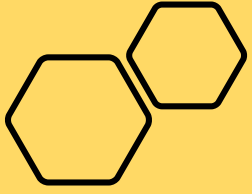




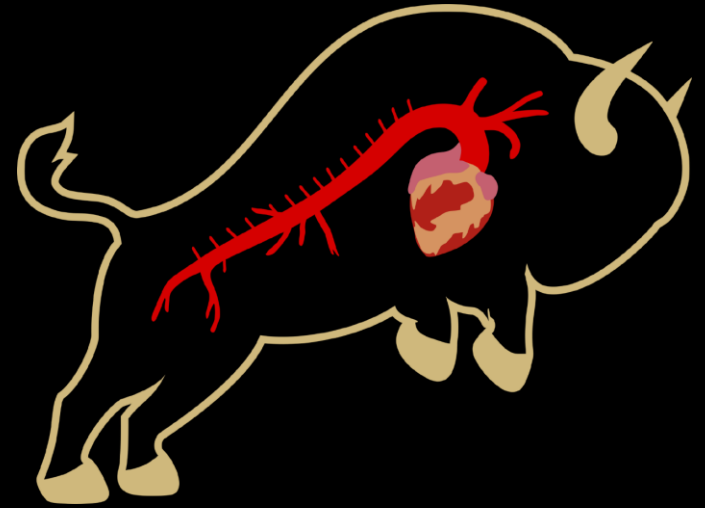
# Increased Risk of Major Adverse Cardiovascular Events in Elective Aortic Arch Replacement Patients undergoing Concomitant Coronary Artery Bypass Grafting

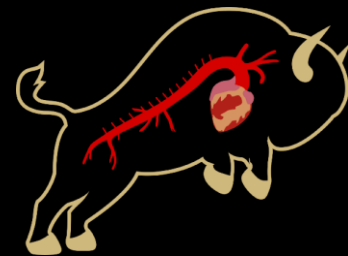
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No disclosures

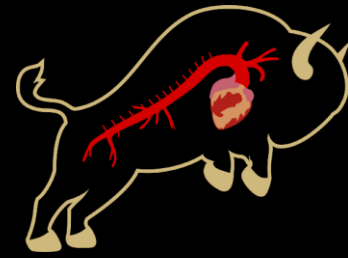




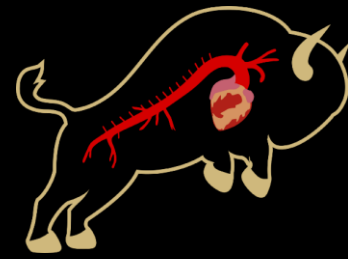
# Introduction

- With an aging population and improvement in morbidity and mortality after aortic arch replacements, older patients are able to undergo arch surgery
- As a result, more patients require adjunctive coronary revascularization with CABG at time of arch surgery
- Unclear how concomitant CABG affects outcomes in aortic arch surgery patients

# Aim

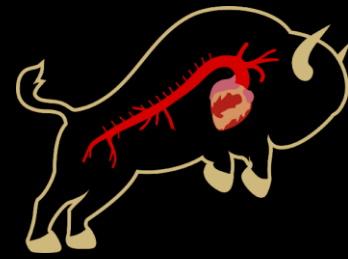


- Investigate whether adjunctive CABG increases risk of morbidity, mortality and MACE (stroke, MI or death) in elective aortic arch patients



# Methods

- Retrospective review of a single institution prospective database for patients who underwent elective aortic arch replacement from April 2009 to May 2023
- Stratify patients into two cohorts
  - Elective arch surgery with CABG
  - Elective arch surgery without CABG
- Between groups comparison between above cohorts, with additional investigation of primary endpoint of MACE (stroke, MI, death) with multivariable logistic regression

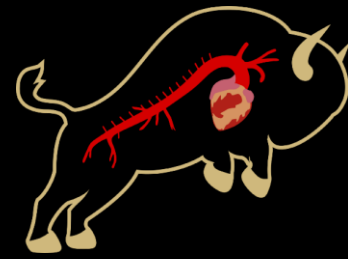


# Results

- In total, 564 patients identified
  - 41 with adjunctive CABG, 523 without
- Patients undergoing adjunctive CABG were significantly older, more likely to be male
- Adjunctive CABG with significantly more baseline comorbidities (outside of coronary artery disease) including:
  - Hyperlipidemia (HLD)
  - Hypertension (HTN)
  - Diabetes (DM)
  - Pulmonary disease
  - Atrial fibrillation

|                                  | With CABG<br>(N=41) | Without CABG<br>(N=523) | p value |
|----------------------------------|---------------------|-------------------------|---------|
| <b>Preoperative Demographics</b> |                     |                         |         |
| Age                              | 68.0±7.2            | 58.0±15.3               | <0.001  |
| Male                             | 38 (92.7%)          | 379 (72.5%)             | 0.003   |
| BMI                              | 30.5±7.1            | 29.4±6.3                | 0.049   |
| HLD                              | 27 (68.9%)          | 185 (35.4%)             | <0.001  |
| HTN                              | 39 (95.1%)          | 333 (63.7%)             | <0.001  |
| Smoking                          | 8 (19.5%)           | 127 (24.3%)             | 0.571   |
| DM2                              | 14 (34.1%)          | 43 (8.22%)              | <0.001  |
| CKD                              | 4 (9.8%)            | 50 (9.6%)               | 0.999   |
| Prior Stroke                     | 1 (2.4%)            | 37 (7.1%)               | 0.237   |
| Pulmonary Disease                | 15 (36.6%)          | 115 (22.0%)             | 0.050   |
| Atrial Fibrillation              | 8 (19.5%)           | 37 (7.1%)               | 0.009   |
| PAD                              | 2 (4.9%)            | 16 (3.1%)               | 0.376   |
| Prior Sternotomy                 | 6 (14.6%)           | 112 (21.4%)             | 0.425   |

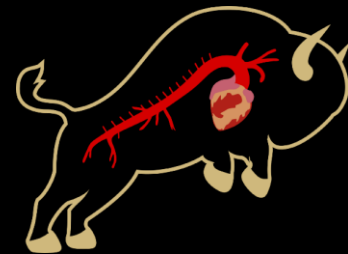
*Values ± standard deviation or (%)*



# Intraoperative Results

- CABG patients significantly more likely to undergo hemiarch replacement, have an adjunctive atrial fibrillation procedure
- Despite less total arches, significantly higher cardiopulmonary bypass and aortic cross-clamp times
- Higher administration of platelets when CABG performed

| <u>Intraoperative Variables</u>         | <u>With CABG (N=41)</u> | <u>Without CABG (N=523)</u> | <u>P value</u> |
|---|-------------------------|-----------------------------|----------------|
| <u>Aortic Procedure</u>                 |                         |                             |                |
| Ascending Replacement                   | 0                       | 15 (2.9%)                   | 0.611          |
| Hemiarch Replacement                    | 37 (90.2%)              | 383 (73.2%)                 | 0.015          |
| Total Arch Replacement                  | 4 (9.8%)                | 125 (23.9%)                 | 0.050          |
| <u>Adjunctive Procedures</u>            |                         |                             |                |
| Aortic Root Replacement                 | 11 (26.8%)              | 193 (36.9%)                 | 0.238          |
| Aortic Valve Intervention               | 17 (41.5%)              | 190 (36.3%)                 | 0.506          |
| Mitral Valve Intervention               | 2 (4.9%)                | 13 (2.5%)                   | 0.299          |
| Atrial Fibrillation Procedure           | 6 (14.6%)               | 20 (3.8%)                   | 0.008          |
| <u>Intraoperative Temperature/Times</u> |                         |                             |                |
| Nadir Bladder Temp                      | 27.1±1.3                | 26.9±2.2                    | 0.561          |
| Cardiopulmonary Bypass Time             | 183.3±79.2              | 153.3±54.5                  | 0.001          |
| Aortic Cross Clamp Time                 | 125.6±53.8              | 98.8±46.5                   | 0.005          |
| Circulatory Arrest Time                 | 12.1±8.9                | 13.3±10.7                   | 0.472          |
| <u>Intraoperative Product (units)</u>   |                         |                             |                |
| Packed Red Blood Cells                  | 1.9±2.3                 | 2.0±3.2                     | 0.841          |
| Fresh Frozen Plasma                     | 3.7±2.5                 | 3.2±4.1                     | 0.442          |
| Platelets                               | 2.0±1.1                 | 1.4±1.4                     | 0.008          |

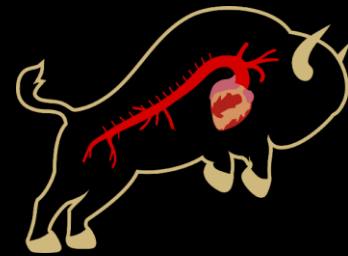


# Postoperative Results

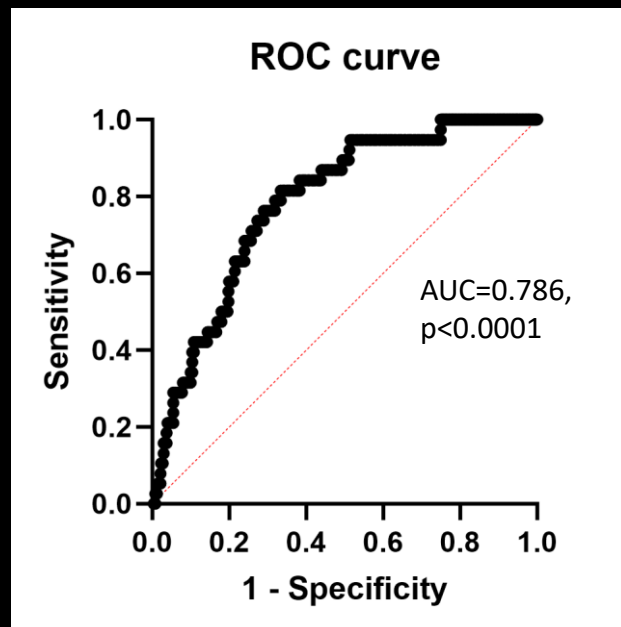
- CABG patients more likely to have:
  - Prolonged ventilation >48 hours
  - Need for mechanical circulatory support
  - ICU infection
  - Arrhythmia
  - In-hospital MACE

| Postoperative Outcomes             | With CABG (N=41) | Without CABG (N=523) | P value |
|------------------------------------|------------------|----------------------|---------|
| New Hemodialysis                   | 2 (4.88%)        | 12 (2.29%)           | 0.270   |
| DVT                                | 2 (4.88%)        | 7 (1.33%)            | 0.131   |
| CVA                                | 3 (7.31%)        | 21 (4.02%)           | 0.406   |
| Delirium                           | 6 (14.53%)       | 49 (9.37%)           | 0.266   |
| Prolonged Ventilation (>48 hr)     | 6 (14.53%)       | 29 (5.54%)           | 0.033   |
| Infection                          | 6 (14.53%)       | 28 (5.35%)           | 0.026   |
| Mechanical Circulatory Support     | 4 (9.76%)        | 16 (3.06%)           | 0.050   |
| Arrhythmia                         | 16 (39%)         | 106 (20.27%)         | <0.001  |
| Myocardial Infarction              | 1 (2.44%)        | 1 (0.19%)            | 0.136   |
| Acute Kidney Injury (STS Criteria) | 2 (4.88%)        | 12 (2.29%)           | 0.262   |
| MACE                               | 7 (17.0%)        | 34 (6.50%)           | 0.022   |
| Mortality                          | 3 (7.31%)        | 14 (2.67%)           | 0.114   |

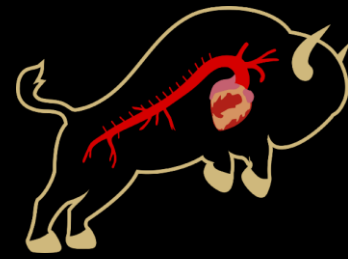




# Multivariable logistic regression



- Significant pre-operative and operative variables accurately predicted occurrence of MACE
- Multivariable analysis revealed CABG performance, number of vessels revascularized, or other operative variables not predictor of MACE
- Primary contributor: increased patient baseline comorbidities including age



# Conclusions

- Despite undergoing less extensive aortic arch intervention, elective arch patients undergoing adjunctive CABG have increased operative times and morbidity and mortality
- Performance of CABG or number of vessels bypassed not primary driver of risk; rather the summation of increased patient risk factors and comorbidities
- Adjunctive CABG should be performed when clinically indicated, but with caution given a more comorbid population

Questions???

