Clinical Outcomes and Economic Burden of Zone 2 Aortic Arch Reconstruction in DeBakey Type 1 and 2 Aortic Dissections

Lauren M. Pixley, BS, Omar M. Sharaf, BS, Dan Neal, MS, Kevin D. Reilly, PA-C, Aidan Charles, MD, Zaid Abu-Mowis, BS, John R. Spratt, MD, Thomas M. Beaver, MD, Tomas D. Martin, MD, Eric I. Jeng, MD

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Background & Aim:

- Aortic dissection is a life-threatening pathology associated with significant morbidity and mortality
- Aortic dissection repair is resource-intensive and associated with extensive health-related cost
- The literature is limited:
  - Published data coalesces acute and chronic dissections, making it challenging to discern differences in clinical and health-related outcomes
  - Economic literature focuses primarily on the direct cost of acute aortic dissections

- **Aim: Evaluate our single-center experience with Zone 2 arch reconstruction in acute and chronic DeBakey Type 1 and 2 aortic dissection**

Methods:

Patient Demographics:

- N = 140 patients
- 79% Male
- Subdivided by dissection timing
  - Acute: *n*= 83, 59.3% Chronic: *n*= 57, 40.7%
- Mean age:
  - Acute: 54.5 $\pm$ 13.0 yrs.
  - Chronic: 59.3 $\pm$ 11.1 yrs.

Dissection Timing:

- Hyperacute: <24 hrs.
- Acute: ≥24 hrs. – <2 weeks
- Acute on Chronic
- Subacute: ≥2 weeks – <90 days
- Chronic: ≥90 days

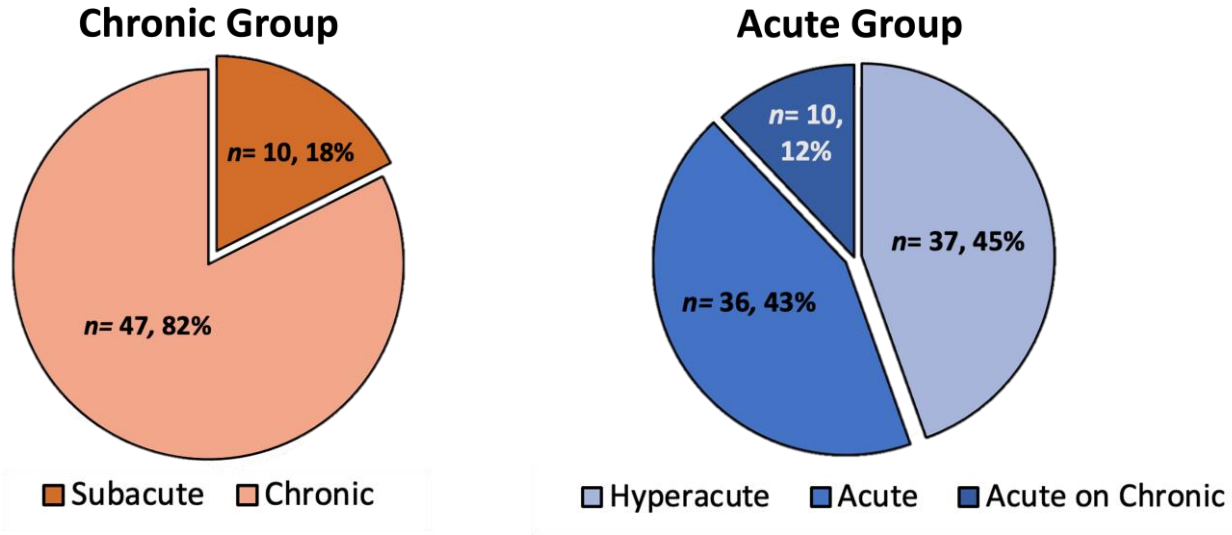


Fig. 1. Acute vs. Chronic Grouping Subcategories.

Methods:

Finances:

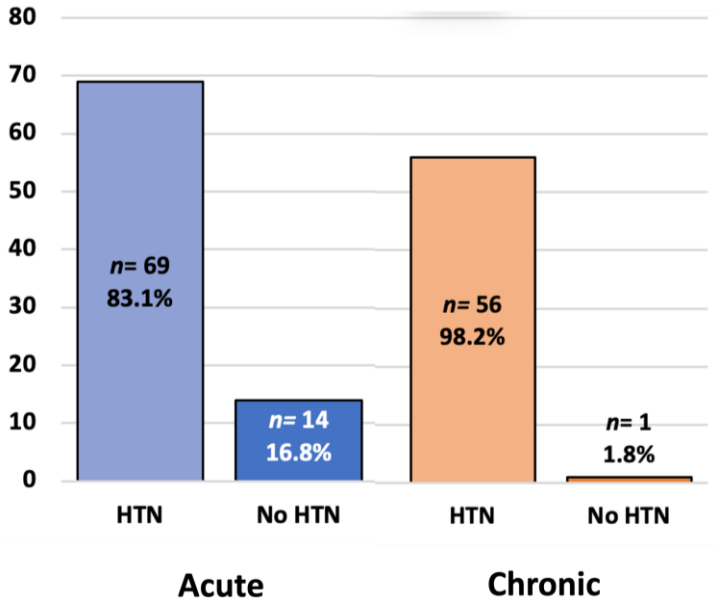
- Cost and charge were evaluated
  - **Cost:** Expense incurred by the hospital to provide health care services to the patient
  - **Charge:** Dollar amount set by the hospital for goods and services rendered before negotiating discounts
- Cost and charge information spans from the index of hospitalization to discharge per patient
- Inflation adjustment was not considered due to the study's short time frame
- All cost and charge information reflects the direct cost of care

Statistical Analysis:

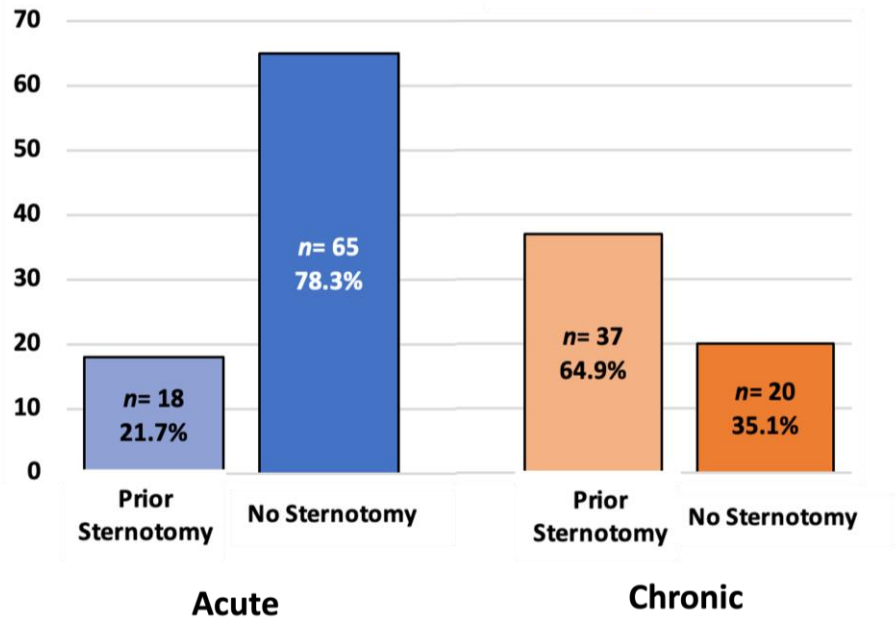
- Fisher's exact & Mann-Whitney tests were performed in R statistical software
- The Kaplan-Meier (KM) method was used to evaluate longitudinal survival

Results: Baseline Characteristics

Hypertension (HTN):



Prior Sternotomy:



Cerebrovascular Disease (CVD):

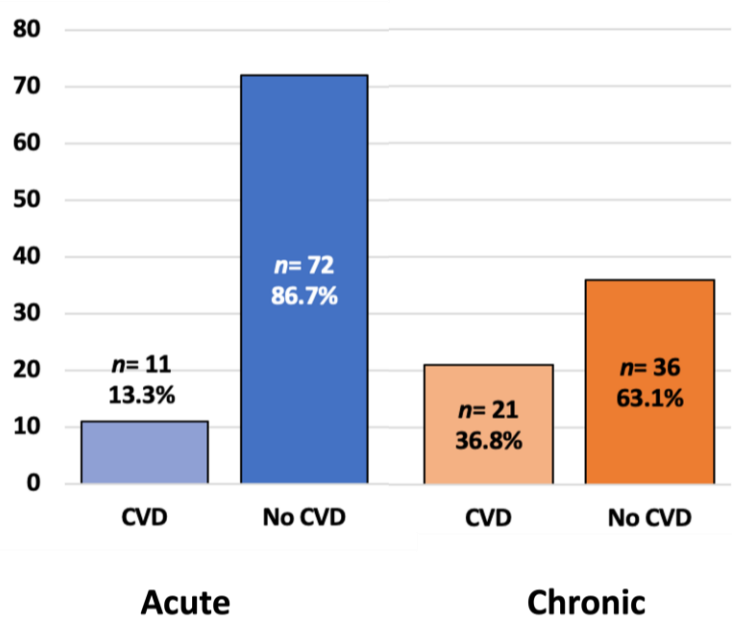


Fig. 2-4. Acute vs. Chronic Baseline Characteristics; *p*-values: HTN, 0.004; Prior Sternotomy, <0.0001; CVD, 0.002.

Results: Intraoperative Data

Deep Hypothermic Circulatory Arrest (DHCA) Temperature:

Acute Group	Chronic Group
16.3 ± 3.7 ℃	18.3 ± 2.8 ℃

Fig. 5. DHCA Temperature Acute vs. Chronic; *p*-value = 0.0003.

Intraoperative Times:

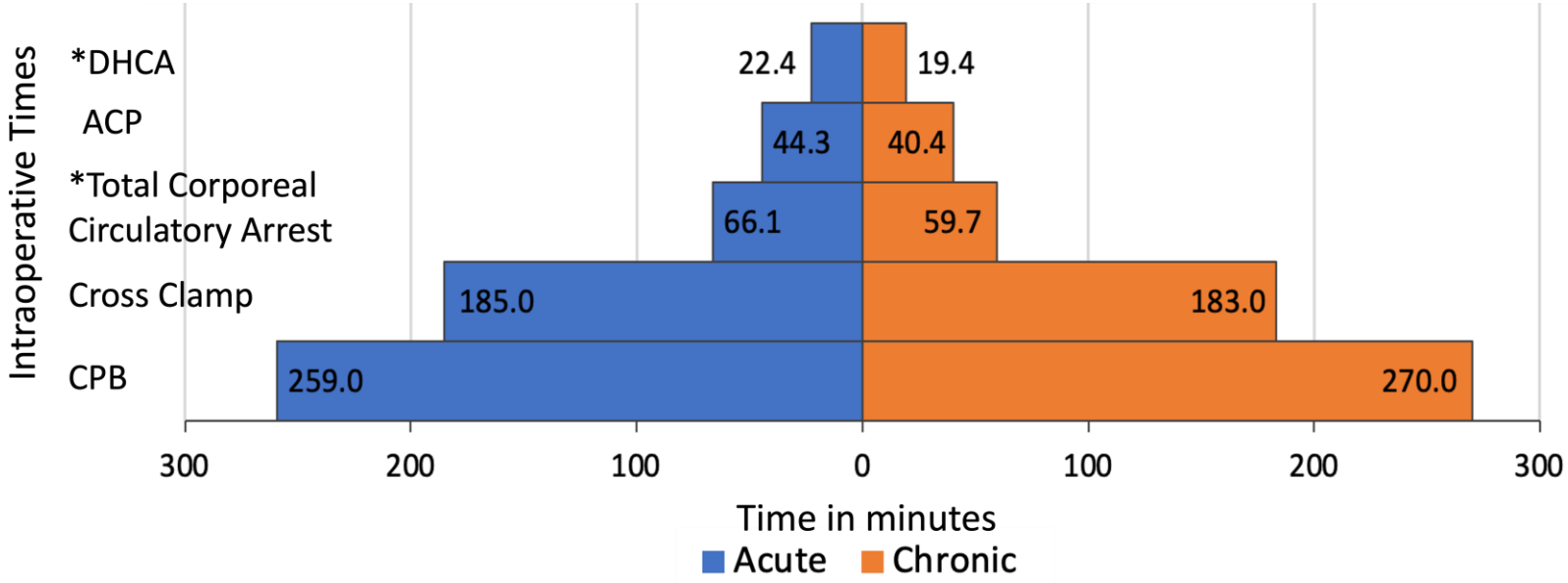


Fig. 6. Acute vs. Chronic Baseline Characteristics; * signifies significance (*p*-value <0.05.)

Results: Postoperative Outcomes

Acute Kidney Injury (AKI) :

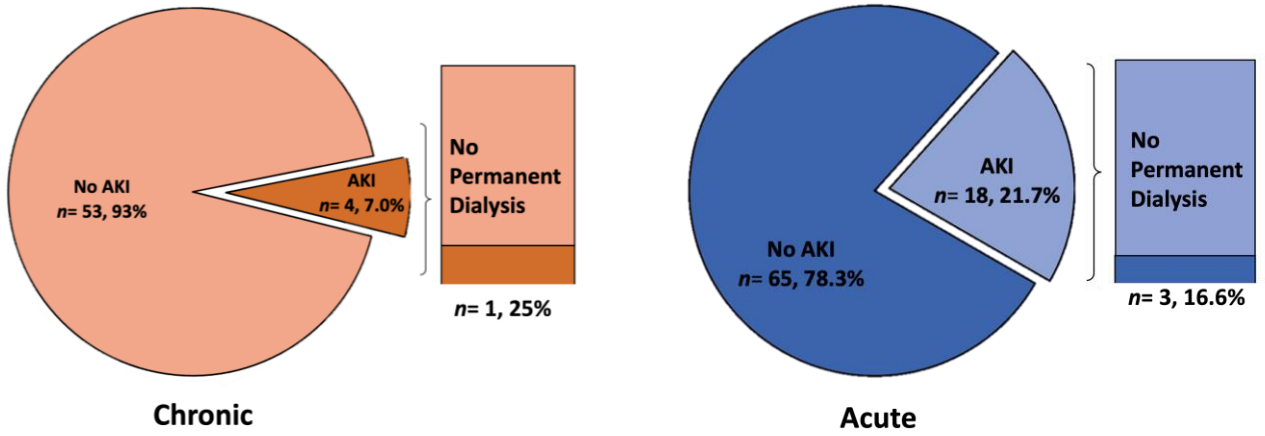


Fig. 7. AKI in Acute vs. Chronic Dissection; *p*-value= 0.020 for AKI; no new requirement for permanent dialysis, *p*-value= 0.646.

Morbidity :

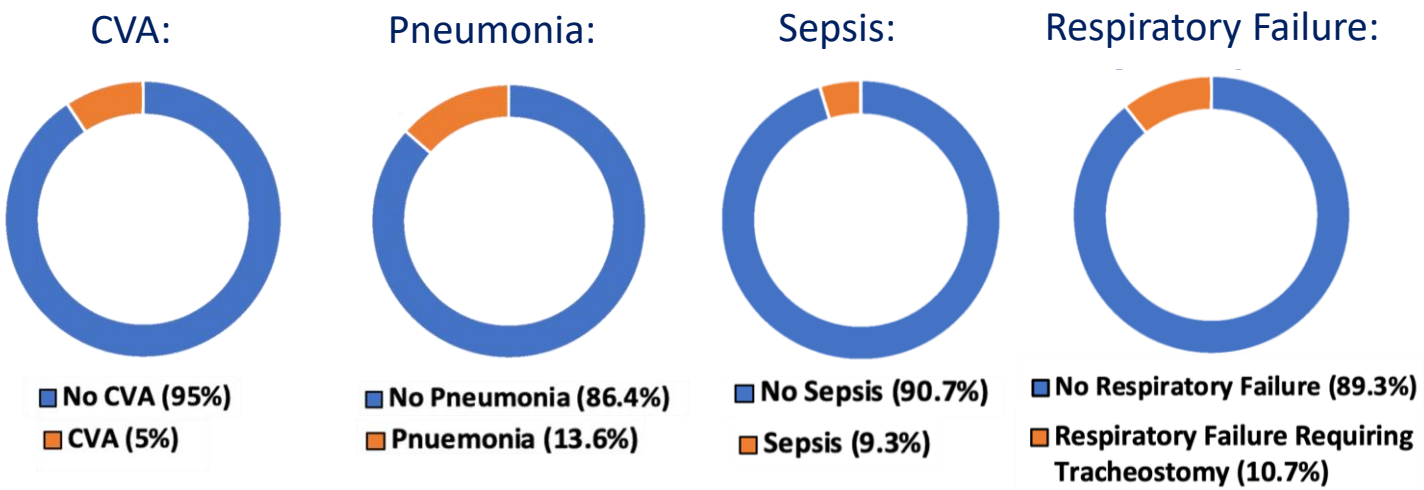


Fig. 8. Acute vs. Chronic Postoperative Morbidity; all outcomes were insignificant (*p*-value >0.05.)

Results: Postoperative Outcomes

Mortality:

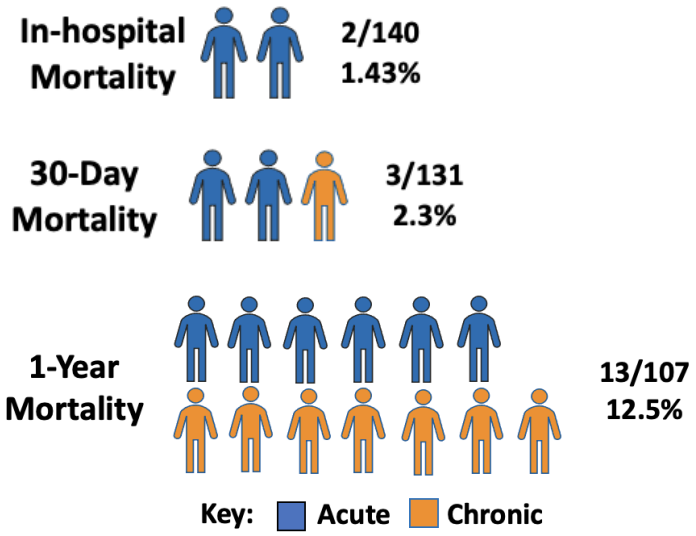


Fig. 9. Acute vs. Chronic Mortality; all outcomes were insignificant (*p*-value >0.05.)

Long-Term Survival Estimate :

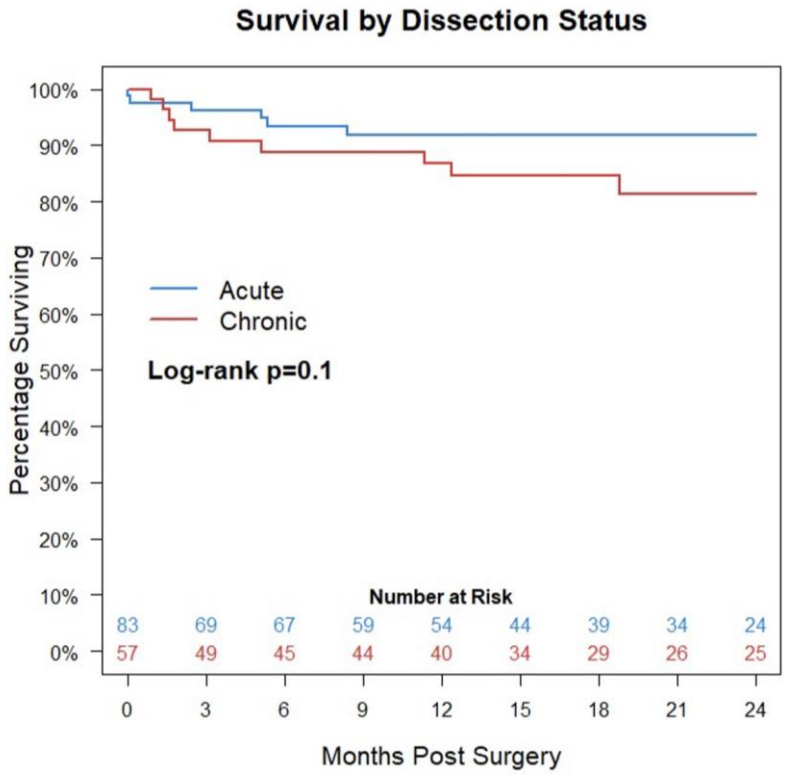


Fig. 10. KM-Survival Curve; no significant difference in longitudinal KM-estimated survival when evaluated by dissection timing.

Length of Stay (LOS) :

	Acute:	Chronic:
Hospital LOS:	16.5 ± 8.6	17.4 ± 9.9
Postoperative LOS:	15.5 ± 8.0	15.4 ± 7.5

Fig. 11. Acute vs. Chronic LOS; all outcomes were insignificant (*p*-value >0.05.)

Results: Economics

Acute vs. Chronic Cost Comparison:

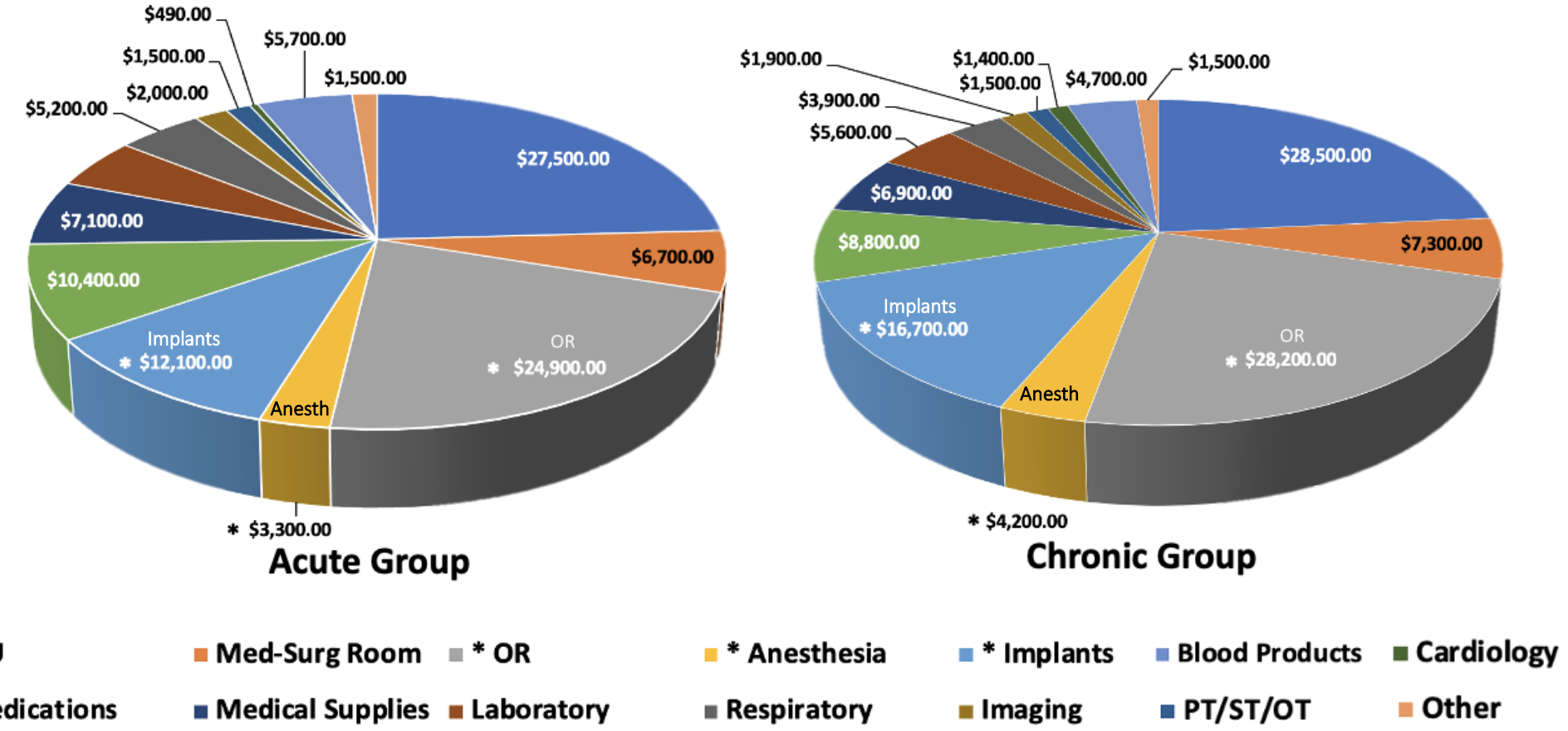


Fig. 11. Acute vs. Chronic Cost and Charge Comparison; * signifies significance (*p*-value <0.05.)

Results: Economics

Acute vs. Chronic Charge Comparison:

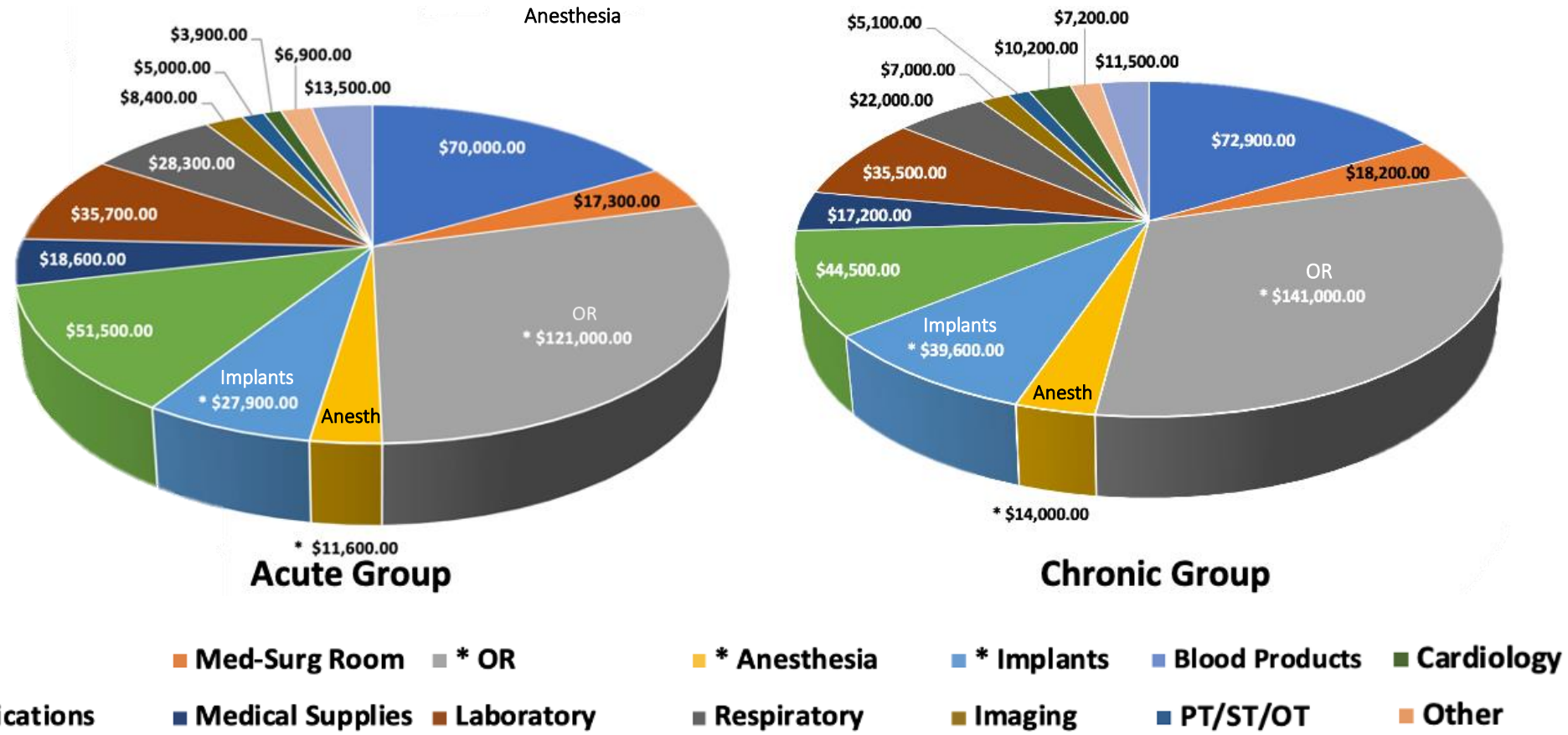


Fig. 12. Acute vs. Chronic Cost and Charge Comparison; * signifies significance (*p*-value <0.05.)

Results: Economics

Grand Total Cost & Charge Acute vs. Chronic:

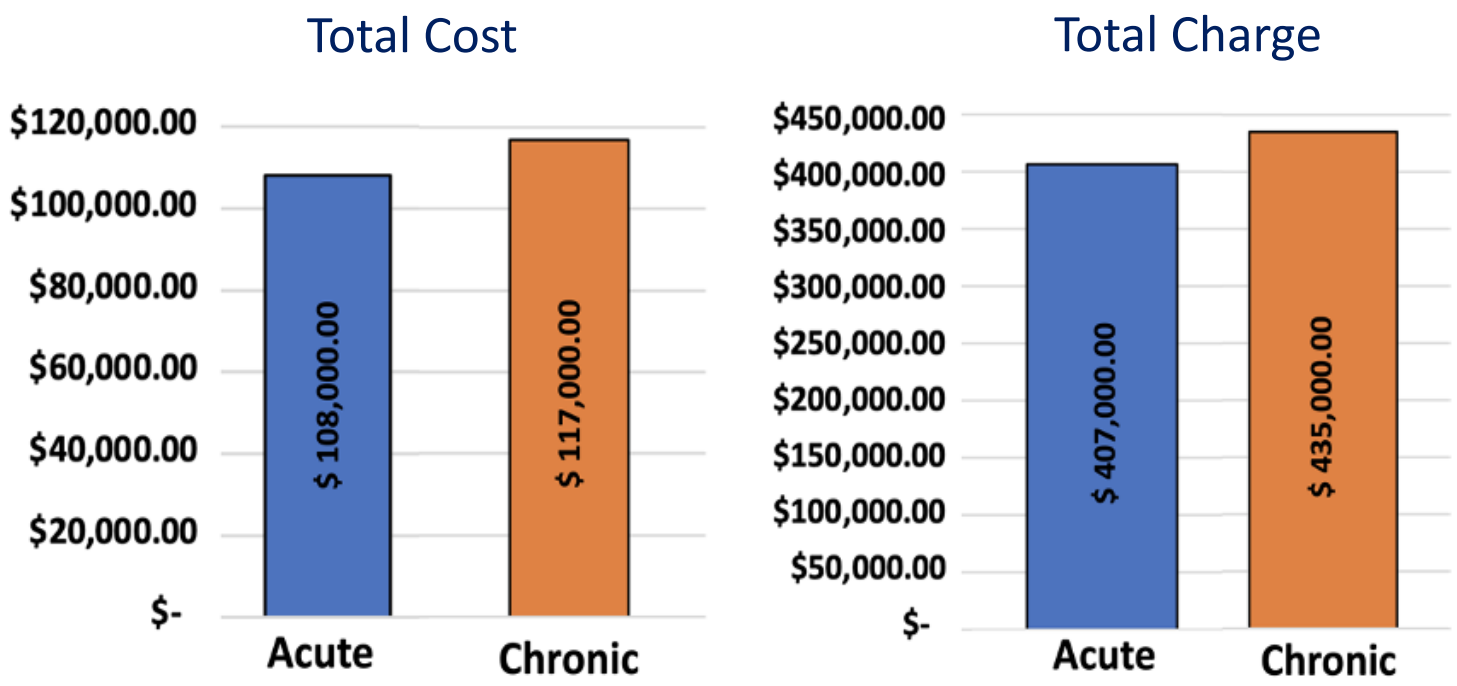


Fig. 13. Acute vs. Chronic Total Cost and Charge; all values were insignificant (*p*-value >0.05.)

Conclusion:

- Patients with subacute or chronic dissections were older with a higher comorbidity burden, and yet there were no differences in most major postoperative outcomes and mortality
- Zone 2 arch reconstruction for acute and chronic DeBakey Type 1 and 2 aortic dissections was associated with a high cost of care at our center
- Patients in the chronic group incurred greater OR, anesthesia service, and implant device costs and charges
- Despite higher subcategories of cost and charge associated with chronic dissection repair, the cumulative cost and charge did not significantly differ when evaluated by dissection timing
- Zone 2 arch reconstruction for aortic dissections in our center is associated with a low postoperative complication rate and excellent long-term survival