

Impact of Social Vulnerability on Aortic Arch Surgery

Ananya Shah¹, Adam Carroll², Alejandro Suarez-Pierre², Jessica Rove³, Catherine Velopulos⁴, Muhamed Aftab³, T. Brett Reece³

¹University of Colorado School of Medicine

²Department of Surgery, University of Colorado School of Medicine

³Division of Cardiothoracic Surgery, University of Colorado Anschutz Medical Campus

⁴Division of GI, Trauma, and Endocrine Surgery, University of Colorado Anschutz Medical Campus

Objective:

Socioeconomic status is a known factor influencing morbidity and mortality. The CDC's social vulnerability index (SVI) quantifies neighborhood-level vulnerability. Although high SVI has been associated with adverse outcomes in trauma, CABG, and AAA repair, its impact on aortic arch surgery remains unknown.

Hypothesis:

In total aortic arch (TAR) and hemiarch (HAR) replacement, higher SVI will correlate with increased comorbidities, surgical acuity, and post-operative morbidity and mortality.

Methods:

This single-center retrospective study examined adult patients undergoing HAR and TAR performed for aortic aneurysm and/or dissection between 2010 and 2022. SVI was calculated by the patients' residential ZIP codes. The cohort was stratified into three groups: SVI<0.33, SVI 0.33-0.66, and SVI≥0.66. The primary endpoint was postoperative mortality, with control for confounding bias through multivariable logistic regression.

Results:

For 753 patients, higher SVI correlated with more baseline comorbidities and minority status. SVI was associated with dissection pathology (p=0.04) and urgent/emergent procedures (p=0.02). High SVI was associated with TAR (p=0.01), reflected by lower nadir bladder temperatures (p=0.01), longer cardiopulmonary bypass (p=0.02), longer circulatory arrest times (p=0.01), and more coagulation product usage.

High SVI patients had longer length of stay, higher rates of infection (p=0.01) and a trend towards increased stroke risk. SVI did not correlate with in-hospital or late mortality, confirmed by multivariable regression.

Conclusion:

In socially vulnerable communities, patients who require aortic arch surgery have more comorbidities and present urgently or emergently with dissection pathology, requiring more extensive arch repair. Post-procedure, they have a higher risk of infection and a trend towards more stroke risk, but not higher rates of other adverse outcomes or increased mortality during or after hospital stay.