The Impact of Healthcare Disparities on Surgical Timing for Acromioclavicular and Clavicular Injuries

Liam Wong[1], Nesa Milan[1], Sachin Umrao[1,2], Thomas A. Peterson[1,2], Brian Feeley[1]
[1]Department of Orthopaedic Surgery, University of California, San Francisco
[2]Bakar Computational Health Sciences Institute

Liam.Wong@ucsf.edu

Disclosures: Authors have nothing to disclose.

INTRODUCTION: Timely operative management of acromioclavicular separations (ACS) and clavicle fractures (CF) is important for pain control, return to function, and avoidance of downstream resource use. Access to prompt surgery and early follow-up may vary across patient subgroups due to structural and clinical factors, including neighborhood socioeconomic status, sex, obesity, language, and race/ethnicity. The Area Deprivation Index (ADI) is increasingly used to quantify socioeconomic disadvantage, but its relationship to timely treatment in common shoulder girdle injuries remains unclear. We leveraged a multi-center, deidentified EHR dataset to elucidate disparities in (1) surgery within 30 days of diagnosis and (2) clinic follow-up within 30 days among patients with operatively treated ACS or CF. We hypothesized that greater socioeconomic deprivation (higher ADI), female sex, and obesity would be associated with delays, while the independent effects of race/ethnicity and primary language would attenuate after adjustment for socioeconomic context and clinical covariates. We hypothesized that greater neighborhood deprivation (higher ADI), sex-based differences, and patient comorbidity burden would be associated with delays, whereas the independent effects of race/ethnicity and primary language would diminish after adjustment for socioeconomic and clinical variables.

METHODS: This large, retrospective cohort study utilized the University of California (UC) Health Data Warehouse, which contains deidentified electronic health records (EHRs) from six UC academic health systems (Davis, Irvine, Los Angeles, Riverside, San Diego, and San Francisco). Patients with operatively treated ACS or CF were identified using Current Procedural Terminology (CPT) codes. Multivariable logisitc regression analyses were used to identify characteristics independently associated with delayed surgery over 30 days and delayed clinic follow-up over 30 days. The multivariable model included age, sex, ADI, race, Hispanic ethnicity, language, and BMI. Complications including wound healing delay, revision or reoperation, emergency department visit within 30 days, or postoperative medical compoications were also analyzed.

RESULTS: We identified 964 patients (723 male, 75.0%) with a median age of 38 years (IQR 27-51). Median time to surgery was 28 days (IQR 8-187), and 52.1% underwent surgery within 30 days. Median ADI was 3 (IQR 1-6). On multivariable analysis, younger age (<50 years) (OR 1.94; 95% CI 1.42-2.65), male sex (OR 2.54; 95% CI 1.83-3.55), and lower neighborhood deprivation (ADI low median) (OR 2.45; 95% CI 1.83-3.30) were independently associated with higher odds of surgery within 30 days (all $P<0.001$), while obesity was associated with lower odds (OR 0.43, 95% CI 0.29-0.63, $p<0.001$). For clinic follow-up, male sex (OR 2.01; 95% CI 1.43-2.81; $P<0.001$) and lower neighborhood deprivation (ADI low median) (OR 1.70; 95% CI 1.22-2.36; $P=0.002$) were independently associated with higher odds of a visit within 30 days, while obesity was associated with lower odds (OR 0.58; 95% CI 0.39-0.86; $P=0.007$). Overall complication rates were low (6.1%), with no significant differences across demographic or socioeconomic characteristics.

DISCUSSION: In this multi-center cohort of patients with operatively treated acromioclavicular separations and clavicle fractures, we found that socioeconomic disadvantage, sex, and health status were the primary drivers of disparities in timely surgical care and follow-up. Patients from less deprived neighborhoods and male patients were significantly more likely to undergo surgery and complete follow-up within appropriate timeframes, while obesity independently reduced the odds of timely care. Importantly, after adjustment for socioeconomic and clinical factors, race, ethnicity, and primary language were not associated with surgical delay or follow-up. These findings suggest disparities are driven more by structural barriers and patient health status than by race or language, underscoring the need for interventions targeting socioeconomic disadvantage and comorbidity management to improve equitable care delivery.

SIGNIFICANCE/CLINICAL RELEVANCE: Disparities in timely surgical care and follow-up for operative ACS/CF are driven primarily by socioeconomic disadvantage, sex, and patient health status, not race or language, identifying modifiable, system-level targets for equitable access. Recognizing and addressing these structural and clinical barriers is critical to designing equitable pathways that ensure all patients receive timely surgical care.
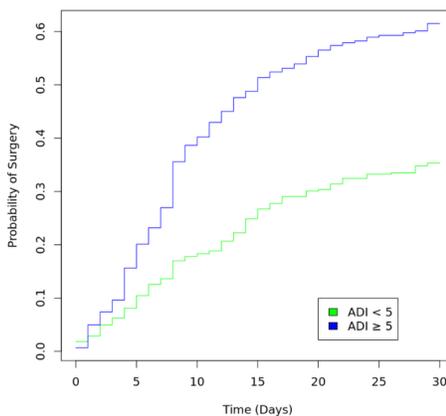
IMAGES AND TABLES:

Figure 1. Kaplan–Meier curves demonstrating probability of surgery within 30 days of diagnosis, stratified by Area Deprivation Index (ADI). Patients from less deprived neighborhoods (ADI <5, green) had significantly lower probability of timely surgery compared to those from more deprived neighborhoods (ADI ≥5, blue).
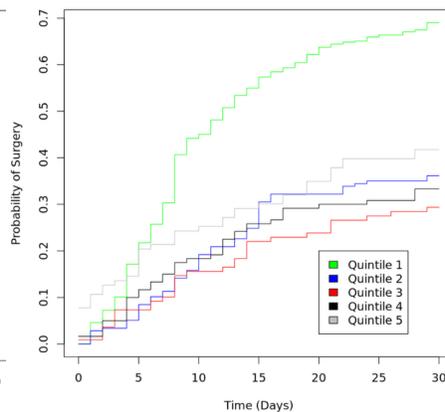

Figure 2. Kaplan–Meier curves showing probability of surgery within 30 days of diagnosis, stratified by Area Deprivation Index (ADI) quintile. Patients in the least deprived neighborhoods (Quintile 1, green) had the highest probability of timely surgery, while those in more deprived quintiles (Quintiles 2–5) had progressively lower probabilities.

Characteristic	OR	95% CI	P value
Age <50 years	1.94	1.42-2.65	<0.001**
Male sex	2.54	1.83-3.55	<0.001**
ADI low median	2.45	1.83-3.30	<0.001**
Obesity (BMI ≥30)	0.43	0.29-0.63	<0.001**
Hispanic ethnicity	0.97	0.64-1.48	0.89
White race	1.01	0.74-1.39	0.94
English language	0.87	0.40-1.90	0.72

Table 1. Predictors of surgery within 30 days