

# Preoperative Hypoalbuminemia increases 30-day Risk of Major Complications, Mortality and Readmission in Operative Fixation of Pelvis and Acetabulum Fractures

Jonathan Lans, Arvind Gabriel Von Keudell, Malcolm DeBaun, Mark Fleming, Upender Martin Singh, Christian Alexander Pean

## INTRODUCTION:

Albumin levels have been increasingly studied in orthopedic surgery as a predictor of postoperative complications. However, the role of albumin levels has not been specifically evaluated in patients undergoing surgical fixation of pelvic or acetabular fractures. The purpose of this study was to assess and compare short-term ( $\leq 30$  days) outcomes of pelvis and acetabulum fractures in patients with hypoalbuminemia compared to those without.

## METHODS:

Patients undergoing open reduction internal fixation (ORIF) of pelvis and acetabulum fractures were identified from the American College of Surgeons National Surgical Quality Improvement Program database between 2012 to 2019. Hypoalbuminemia was defined as a pre-operative albumin level less than 3.5 g/dL. The outcomes of interest included 30-day major complication, venous thromboembolism, need for blood transfusion and mortality along with length of stay and discharge location. A multivariable analysis was performed to identify independent associations with these outcomes.

**RESULTS:** A total of 1,449 patients underwent pelvis and acetabulum ORIF during the study period assessed and 26.7% had preoperative albumin  $< 3.5$  mg/dL. In a multivariable regression analysis controlling for numerous patient comorbidities and demographics, patients with hypoalbuminemia were at higher risk for major complications (OR 1.92 (1.20-3.07)), and mortality (OR 3.78 (1.52-9.47)). Patients with hypoalbuminemia also had a longer LOS  $8.3 \pm 8.6$  days vs.  $6.5 \pm 4.9$  days ( $p < 0.01$ ).

**DISCUSSION AND CONCLUSION:** Patients with hypoalbuminemia undergoing ORIF for pelvis and acetabular fractures have a higher rate of major complication and mortality in the 30-day postoperative period. Orthopedic trauma surgeons can use this information to guide patient expectations and postoperative surveillance for complications in this patient population.

Table 1: Adverse Events and Outcomes Comparisons

Patients (% total)	Normal Albumin n=365 (49.3)	Hypoalbuminemia n=399(50.7)	Multivariate Analysis Results Odds Ratio, hypoalbuminemia (95% Confidence Interval)	P-Value
Mortality**	30 (7.5)	6 (1.6)	3.78 (1.52-9.47)	<b>&lt;0.01</b>
Major Adverse Event**	32 (8.8)	73 (18.3)	1.92 (1.20-3.07)	<b>&lt;0.01</b>
Blood Transfusion	146(36.6)	87 (23.8)	1.84 (1.35-2.53)	<b>&lt;0.01</b>
Infectious Complications	24 (6.6)	35 (8.8)	1.37 (0.80-2.34)	0.16
Pulmonary Embolism	5 (1.4)	3 (0.8)	0.545 (0.13-2.30)	0.315
DVT Requiring Therapy	7 (1.9)	12 (3.0)	1.59 (0.62-4.07)	0.23
Readmission	28 (7.7)	35 (3.7)	1.16 (0.69-1.94)	0.46
Length of Stay*	<b><math>8.3 \pm 8.6</math></b>	$6.5 \pm 4.9$		<b>&lt;0.01</b>
Operative Time	$126.8 \pm 95.9$ minutes	$126.7 \pm 92.3$ minutes		0.42

All values are presented as n (%).

\*Statistically significant difference in comparison of continuous variables

\*\*Multivariate analysis values are demonstrated for values statistically significant in univariate analyses and subsequently tested adjusted for BMI, sex, age, smoking status, modified frailty index, dyspnea, diabetes, CHF, hypertension, and COPD. The values are reported as RR, with the 95% CI in parentheses.

P=0.05 considered significant. Odds Ratios reference hypoalbuminemia patients compared to patients with normal albumin levels