Malnourishment Alone and in Conjunction with High Injury Severity Score Increases Hospital Length of Stay in Orthopaedic Trauma Patients

Timothy Niedzielak, DO*; Anna Maria Jacques, DO; Samuel Eaddy, MS; Andrew Ardeljan, BS; Joel L. Rush, DO; Emily Keener, DO; Edward Perez, MD; Bradley Ian Roth, DO; Brian Cross, DO*
Broward Health Medical Center, Fort Lauderdale, Florida, UNITED STATES

Purpose: Polytrauma patients spend, on average, 46 days as a hospital inpatient; nearly half of that time may be spent in the ICU. The intensive treatment needed to care for these patients may alter metabolic pathways and release inflammatory mediators, forcing the metabolism into a catabolic state, which may lead to malnourishment, decreased immune function, and lengthened hospital stay. Historically, albumin levels have been monitored to assess nutritional status. However, with an average half-life of 20 days, albumin may be an ideal marker for preexisting malnutrition, while prealbumin (PAB), with a half-life of approximately 2 days, is an appealing marker to monitor baseline and acute changes in nutritional status. The aim of this study was to compare hospital length of stay (LOS) in orthopaedic trauma patients presenting with initial malnourished state versus those appropriately nourished evidenced by PAB levels.

Methods: This is a diagnostic retrospective comparative study in which the primary outcome was hospital LOS. These were compared between cohorts that initially presented to our trauma center as malnourished evidenced by a serum PAB below 19 mg/dL. A 2-sample t test was calculated for all independent variables to compare the mean LOS in patients with abnormal values versus normal values. Several other lab markers and demographics were secondarily examined as predictors of LOS using univariate linear regression analysis and Fisher's exact tests. The significance was set at $P<0.05$.

Results: A total of 135 orthopaedic trauma patients were included in this retrospective cohort study. 32 patients (24%) presented to our institution with a PAB less than 19 mg/dL and were given a diagnosis of malnourishment. There was a significant difference in hospital LOS in patients presenting with acute malnourishment to our trauma center. Furthermore, patients with a higher ISS alone and those with a higher ISS:PAB ratio had increasing hospital LOS, suggesting a synergistic relationship between these 2 independent variables and as a result, a useful predictor of inpatient outcome on polytraumatized patients.

Conclusion: The optimization of trauma patients with and without orthopaedic injuries remains a challenge. This study demonstrates that malnourishment in polytraumatized orthopaedic patients leads to longer hospital LOS. With a shorter half-life than traditionally monitored albumin, PAB appears to be a more suitable marker to monitor nutritional status and daily deviations in patients presenting acutely with trauma. Lastly, there is a correlation between both increased ISS and malnourished state and higher hospital LOS.

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