Comparison of Glycemic Control Prior to Total Joint Arthroplasty: The Novelty of a Multi-Marker Approach

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INTRODUCTION:
The best methods of predicting glycemic control prior to total joint arthroplasty (TJA) continue to be a matter of debate. Several cutoffs have been proposed in an effort to guide preoperative optimization goals and limit postoperative complications. This study sought to correlate postoperative glucose control in patients undergoing TJA to the measurement of two established glycemic indices.
METHODS:
We conducted a retrospective review of all patients who underwent TJA from March 2012 to February 2021. All patients included had a preoperative hemoglobin A1c (HbA1c) collected within 90 days of surgery as well as a glucose level recorded within 72 hours postoperatively. Patients were stratified based on a postoperative glucose cutoff of 200 mg/dL. A subanalysis of patients with fructosamine collected within 28 days preoperatively, in addition to HbA1c, was also conducted. Receiver operating characteristic (ROC) curve analysis was used to determine what values of HbA1c and fructosamine yielded a higher likelihood of postoperative glucose levels >200 mg/dL.
RESULTS:
Of the 2,613 patients who had preoperative HbA1c values, 135 also had preoperative fructosamine levels. Our analysis demonstrated a significantly increased likelihood of postoperative glucose levels >200 mg/dL in patients with preoperative HbA1c >6.6% ($p<0.001$) or fructosamine >285 ($p=0.035$). Patients whose preoperative markers exceeded one or both cutoffs were considered to be non-optimized and were 3.5 times more likely to have a postoperative glucose >200 mg/dL compared to optimized patients (odds ratio: 3.514, 95% confidence interval: 1.334 to 9.257; $p=0.011$).
DISCUSSION AND CONCLUSION:
Previous studies examining preoperative glucose management have recommended various guidelines to limit complications following TJA. Our data suggest that current HbA1c parameters alone may not be predictive of optimal postoperative glucose and that other glycemic markers are necessary to ensure appropriate preoperative glycemic control.