Glycated Albumin as a Predictor of Adverse Outcomes in Patients Undergoing Primary Total Joint Arthroplasty: A Multicenter Prospective Study

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INTRODUCTION:
HbA1c has long been the standard test for measuring glycemic control, however, it may not be the ideal test to predict complications following primary total joint arthroplasty (TJA). While HbA1c measures glycemic control over 2-3 months, other markers such as fructoasmine (7-21 days) and glycated albumin (GA) (14-21 days) may be more accurate. The purpose of this multicenter study was to assess the utility of these novel glycemic indices at predicting short-term complications.
METHODS:
This prospective study enrolled 1,020 patients (633 knees, 387 hips) undergoing primary TJA at two institutions. HbA1c, fructosamine, and GA were measured preoperatively using standardized assays. Using the American Diabetes Association guidelines of poor glycemic control (HbA1c >=7%, fructosamine >=262 mmol/L, GA of >=15.8%), 90-day complications in patients above the threshold for each marker were identified and compared with those below it. Multivariate regression was utilized to assess the predictive value of each test.
RESULTS:
HbA1c and GA were found to have the strongest correlation with one another (r=0.626), followed by fructosamine and GA (r=0.406), and fructosamine and HbA1c (r=0.301). Patients with GA >=15.8% had higher rates of medical complications (10.3% vs. 1.6%, p<0.001), while there was no difference in patients with elevated fructosamine or HbA1c. Upon regression analysis, GA >=15.8% (OR, 5.8 [95% CI, 2.3 to 15.1]; p<0.001) was identified as an independent risk factor for 90-day complications, while fructosamine and HbA1c were not. We found no association between any of the indices and the development of periprosthetic joint infection (PJI) (p>0.05).
DISCUSSION AND CONCLUSION:
The results of our prospective study suggest that GA may more accurately predict short-term complications in patients undergoing TJA, when compared to fructoasmine and HbA1c. Longer follow-up time is necessary in order to identify the optimal GA cutoff for use in this setting and determine whether any correlation exists elevated GA levels and PJI.