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“Combined Predictive Value of Metabolic Risk Factors on Postoperative Outcomes in Colectomy For Colon Cancer”

Background: Preoperative diabetes and elevated hemoglobin A1c (HbA1c) are associated with adverse surgical outcomes, but their independent and combined roles in colectomy for colon cancer surgery remain less understood. Given the prevalence of colon cancer in the United States alongside the well-studied impact of diabetes on oncological prognosis, a more refined understanding of these metabolic risk factors is warranted. The aim of this study was to elucidate the predictive value of preoperative diabetes and HbA1c levels on short-term, postoperative outcomes in colon cancer patients undergoing colectomy, a mainstay curative procedure.

Methods: We performed a 7-year (2017-2023) retrospective analysis of adult colon cancer patients who underwent colectomy with data retrieved from the American College of Surgeons National Surgical Quality Improvement Program. Cohorts were stratified by diabetes diagnosis and preoperative HbA1C levels, and chi-square testing was performed to compare postoperative outcomes. A confound-adjusting multivariate model was subsequently developed to isolate independent associations. Diabetic and non-diabetic subgroups were generated to examine the relative predictive value of HbA1c. A P -value <0.05 was considered significant in all analyses.

Results: In 100,289 colon cancer patients undergoing colectomy, patients with preoperative diabetes exhibited a significantly higher incidence of numerous adverse outcomes, including longer hospital stay, infection, pulmonary and renal complications, sepsis, and overall complication burden. Most of these associations persisted after confounder adjustment, reinforcing an independent predictive role of diabetes. Patients with preoperative HbA1c $\geq 6.5\%$ similarly demonstrated worse outcomes, including higher rates of superficial infection, ventilator use >48 hours, stroke, and overall complication burden, with most associations retained following multivariate analysis. Subgroup analysis revealed that HbA1c $\geq 6.5\%$ was strongly predictive of poor outcomes in non-diabetic patients but interestingly not among those with known diabetes. Non-diabetic patients with elevated HbA1c had the lowest rate of complication-free recovery (64.75%), even worse than that of diabetic patients.

Conclusions: Preoperative diabetes and HbA1c are independent predictors of adverse post-colectomy outcomes among colon cancer patients, and preoperative risk stratification is enhanced with concurrent evaluation of both variables. While the high postoperative risk observed in diabetic patients was not altered by glycemic control, elevated HbA1c within non-diabetic patients was a key differentiator in surgical outcomes. These findings support the integration of routine HbA1c screening and comprehensive metabolic risk assessment in preoperative planning to improve both surgical and oncological outcomes.