

The Association of Perioperative Glycemic Control with Postoperative Surgical Site Infection Following Elective Foot Surgery in Patients with Diabetes

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Introduction/Purpose: Diabetes mellitus has been associated with an increased risk for postoperative surgical site infection (SSI) following foot and ankle surgery; however, among patients with diabetes, the level of perioperative glycemic control may affect the risk of postoperative SSI. There remains little evidence to support a perioperative hemoglobin A1c (HbA1c) level that could serve as a threshold for a significantly increased risk of postoperative SSI following foot surgery. The primary goal of the present study was to evaluate the association of perioperative glycemic control as demonstrated by hemoglobin a1c (HbA1c) in patients with diabetes with the incidence of postoperative SSI following elective foot surgery. Our secondary objective was to calculate a threshold level of HbA1c above which the risk of postoperative SSI after foot surgery increases significantly in patients with diabetes.

Methods: A national administrative database was queried for patients who underwent common elective foot surgeries, including hallux valgus corrections, hallux rigidus correction and hammertoe corrections among others. Patients who underwent more complex procedures and patients with concomitant hindfoot procedures were excluded. Patients with diabetes mellitus who had a perioperative HbA1c level recorded within 3 months of surgery were identified; and were then stratified into thirteen mutually exclusive groups based on their hemoglobin a1c in 0.5 mg/dl increments from < 5.49 mg/dl to > 11.5 mg/dl. The incidence of SSI was determined by either a diagnosis or procedure for SSI within 1 year postoperatively using CPT and ICD-9 codes, and was calculated for each HbA1c patient group. A receiver operating characteristic (ROC) analysis was performed to determine an optimal threshold value of the HbA1c above which the risk of postoperative SSI was significantly increased.

Results: 4,744 patients who underwent forefoot surgery with diabetes and a perioperative HbA1c recorded within 3 months of surgery in the database were included in the study. The rate of deep SSI requiring irrigation and debridement within one year postoperatively stratified by HbA1c is pictured in Figure 1, which ranged from a low of 2.5% to a high of 11.8% and was significantly correlated with increasing HbA1c levels ($P < 0.0001$). The results of ROC analysis determined that the inflection point of the ROC curve corresponded to an HbA1c level above 7.5 mg/dL ($P < 0.0001$, AUC = 0.622, spec. = 75%, sens. = 44%).

Conclusion: The risk of postoperative SSI following elective foot surgery in patients with diabetes mellitus increases significantly as the perioperative HbA1c increases. ROC analysis determined that a perioperative HbA1c above 7.5 mg/dL could serve as a threshold for a significantly increased risk of postoperative SSI following elective foot surgery.

