Evaluation of Post-Operative Hyperglycemia in Patients Undergoing Total Hip and Total Knee Arthroplasty

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Introduction: Postoperative hyperglycemia (PHG) is a common physiological response to surgical stress and has been linked to periprosthetic joint infections (PJI), venous thromboembolism, prolonged hospital stays, increased costs, readmissions, and worse functional outcomes. Although this response is expected in patients with diabetes (DM), emerging evidence shows that non-diabetic patients (NDM) experiencing PHG may face even higher morbidity and mortality. This may be due to the inability of NDM patients to physiologically adapt to glycemic fluctuations, unlike those with chronic diabetes.

Identification of the Problem: This study expands on a quality improvement initiative focused on glycemic monitoring in NDM patients undergoing total hip (THA) or total knee arthroplasty (TKA) who experienced elevated postoperative glucose levels. The Joint Commission (TJC) mandates this monitoring for Advanced Certification, defining PHG as glucose ≥126 mg/dL. Due to the elective nature, preoperative optimization, and short hospital stays associated with THA/TKA, leadership questioned whether this requirement was appropriate for this population.

Purpose of the Study:

1. Determine PHG incidence
2. Identify contributing factors
3. Monitor adverse events
4. Track interventions related to PHG
5. Analyze correlation between glucose levels and surgical site infections (SSI)

Methodology: A retrospective chart review was conducted for 394 adult NDM patients (49.6% of total THA/TKA procedures) between 10/1/2024 and 11/22/2024. Data included point-of-care glucose levels measured ≥30 minutes after arrival in the PACU. Patients with a history of diabetes were excluded.

Results: Of 394 patients, 364 (92.4%) were not hyperglycemic postoperatively. Significant univariate associations were found with BMI ($p = 0.030$), preoperative glucose ($p< 0.001$), procedure duration ($p< 0.001$), and estimated blood loss (EBL) ($p< 0.001$). No adverse events were reported. Three SSIs occurred within 90 days, none associated with elevated postoperative glucose.

Discussion: This study supports investigating alignment, based on evidence, with industry recommendations to practice within individual institutions.

Conclusion: Contributing factors to PHG in NDM patients included elevated pre-op glucose, higher BMI, longer surgeries, and greater EBL. These findings informed

discussions with TJC, resulting in a waiver of the glycemic monitoring requirement for this patient group.

Implications for perianesthesia nurses and future research:

- Implications: Evaluation of new requirements based on evidence is necessary to ensure positive patient outcomes.
- Future Work: Prospective studies measuring additional POC testing times are needed.