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Comparative Study of Perioperative Blood Sugar Levels in Non-Diabetic and Diabetic Patients Using General and Spinal Anaesthesia

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ABSTRACT

Background: *Surgical stress and anaesthesia disrupt glucose homeostasis via neuroendocrine activation, causing perioperative hyperglycaemia that is associated with infection, delayed healing, and prolonged hospitalization in patients with and without diabetes.* ***Objective:*** *To compare perioperative blood glucose patterns in diabetic and non-diabetic patients receiving general versus spinal anaesthesia and to examine associations between postoperative hyperglycaemia and early postoperative outcomes.* ***Methods:*** *This comparative observational study included 68 adults undergoing elective surgery at Social Security Teaching Hospital, Lahore over four months. Patients were classified as diabetic (n=34) or non-diabetic (n=34) and received either general anaesthesia (n=34) or spinal anaesthesia (n=34). Blood glucose was measured at standardized perioperative phases (preoperative, intraoperative, postoperative). Two-way ANOVA assessed independent effects of diabetic status and anaesthetic technique on glucose levels; associations between postoperative hyperglycaemia (>200 mg/dL) and outcomes were expressed as odds ratios (OR) with 95% confidence intervals (CI).* ***Results:*** *Mean glucose increased from 128.59±39.94 mg/dL preoperatively to 140.91±41.42 mg/dL intraoperatively (Δ+12.32 mg/dL, 95% CI 8.01–16.63; p<0.001) and remained elevated postoperatively at 140.44±41.53 mg/dL (Δ+11.85 mg/dL, 95% CI 7.47–16.22; p<0.001). Diabetic status had a large effect at all phases (p<0.001; partial η^2 0.870–0.904). Anaesthetic technique had no preoperative effect (p=0.718) but significantly influenced intra- and postoperative glucose (p<0.001 and p=0.005), with higher levels under general anaesthesia. Postoperative hyperglycaemia occurred in 22/68 (32.4%) and was associated with complications (OR 5.75, 95% CI 1.80–18.4; p=0.003), prolonged stay >6 days (OR 3.21, 95% CI 1.12–9.17; p=0.029), and wound infection (OR 4.61, 95% CI 1.39–15.3; p=0.012).* ***Conclusion:*** *Perioperative blood glucose rises significantly during surgery and remains elevated postoperatively; diabetic status is the dominant predictor, while general anaesthesia independently increases intra- and postoperative glucose compared with spinal anaesthesia. Postoperative hyperglycaemia is strongly associated with adverse outcomes, supporting routine perioperative glucose monitoring and targeted glycaemic management.*

Keywords: *Perioperative hyperglycaemia; Blood glucose; Diabetes mellitus; General anaesthesia; Spinal anaesthesia; Postoperative complications; Length of stay*

INTRODUCTION

Perioperative dysglycemia is a common and clinically consequential response to surgery and anaesthesia. Surgical tissue injury triggers neuroendocrine stress activation (catecholamines, cortisol, glucagon, growth hormone) that increases hepatic glucose output via glycogenolysis/gluconeogenesis and reduces peripheral glucose uptake by inducing insulin resistance, producing "stress hyperglycaemia" even in patients without pre-existing diabetes. This metabolic phenotype is not benign: perioperative hyperglycaemia is associated with worse in-hospital outcomes and higher mortality in patients with undiagnosed diabetes or stress hyperglycaemia, and it is increasingly recognized as a risk marker across surgical populations (11). Contemporary perioperative guidance therefore emphasizes structured glycaemic surveillance and proactive management to avoid both uncontrolled

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hyperglycaemia and iatrogenic hypoglycaemia, each of which can worsen recovery trajectories (1).

The clinical relevance is amplified by the rising global burden of diabetes and prediabetes, increasing the proportion of surgical candidates with chronic dysglycaemia. Population-level estimates and projections have documented substantial prevalence and anticipated growth in diabetes burden in diverse settings, underscoring that perioperative teams will encounter diabetes and stress hyperglycaemia with increasing frequency (8–10,12). Diabetes further compounds perioperative risk through baseline insulin resistance, microvascular and macrovascular disease, and altered immune function, all of which predispose to postoperative complications when glycaemic control is suboptimal (5). Hyperglycaemia impairs innate immune function and collagen synthesis, providing a plausible biological pathway linking elevated perioperative glucose with surgical site infection and delayed wound healing; observational and comparative evidence in elective abdominal surgery has similarly shown higher wound infection rates among diabetic patients with poorer glycaemic profiles compared with non-diabetic counterparts (3). Beyond infection, cardiometabolic multimorbidity is strongly associated with mortality and adverse outcomes, situating perioperative dysglycaemia within a broader risk cluster that is increasingly prevalent in surgical cohorts (13).

Anaesthetic technique is a potentially modifiable determinant of perioperative glycaemic excursions because it modulates the magnitude of the stress response. General anaesthesia may amplify glycaemic variability through laryngoscopy/intubation, deeper sympathetic activation, perioperative pain, and broader systemic neuroendocrine activation; conversely, neuraxial (spinal) anaesthesia can attenuate afferent nociceptive transmission and sympathetic outflow, potentially reducing stress-mediated glucose surges. Prior work in non-diabetic patients suggests that postoperative glucose rises occur under both general and spinal techniques, but patterns may differ by modality and timing (4). In addition, the pharmacologic maintenance strategy within general anaesthesia may matter inhalational agents can impair insulin secretion and glucose tolerance, while propofol-based total intravenous anaesthesia may provide comparatively greater glycaemic stability and fewer postoperative complications in patients with type 2 diabetes mellitus (7). Perioperative fluids can also influence glycaemic profiles; evidence evaluating crystalloid choice in non-diabetic patients undergoing major elective surgery supports that perioperative management decisions beyond "diabetes status" can measurably affect glucose dynamics (2). Importantly, large surgical datasets indicate that perioperative hyperglycaemia is associated with adverse events among patients both with and without diabetes, reinforcing the need to treat dysglycaemia as a perioperative risk signal rather than a diabetes-only concern (14). Diabetes itself is also associated with worse outcomes after non-cardiac surgery at the population level, highlighting the need for context-specific perioperative optimization strategies (15).

Despite this evolving evidence base, practical knowledge gaps remain in many institutions: real-world perioperative pathways often vary in anaesthetic selection, glucose monitoring intensity, and diabetes medication handling, and locally generated comparative data are limited. In particular, there is a need for institution-level evidence that jointly evaluates (i) baseline diabetic status, (ii) anaesthetic technique selection—specifically general versus spinal anaesthesia as commonly used approaches—and (iii) perioperative glucose trajectories at prespecified timepoints, while also linking glycaemic patterns to clinically relevant postoperative outcomes such as hyperglycaemia above a defined threshold, wound complications, and length of hospital stay. Such evidence can strengthen perioperative standard operating procedures by clarifying which components exert independent effects and where monitoring and mitigation should be concentrated, consistent with contemporary diabetes perioperative guidance (1).

Accordingly, this study focuses on adult patients undergoing elective surgery, comparing perioperative blood glucose changes and clinically meaningful dysglycaemia between diabetic and non-diabetic patients receiving general anaesthesia versus spinal anaesthesia, and examining whether observed glycaemic instability is associated with postoperative complications and prolonged hospitalization. The primary objective is to quantify differences in perioperative blood glucose levels and/or change-from-baseline across anaesthetic techniques and diabetic status, with secondary objectives to evaluate the incidence of postoperative hyperglycaemia and its relationship with postoperative complications and length of stay. We hypothesize that, independent of baseline diabetic status, general anaesthesia is associated with greater perioperative glycaemic excursions compared with spinal anaesthesia, and that poorer perioperative glycaemic control is associated with higher postoperative morbidity and longer hospitalization (1,4,7,14).

METHODS

This comparative observational study with a cross-sectional analytical framework was conducted to evaluate perioperative blood glucose variations in adult surgical patients stratified by diabetic status and anaesthetic technique. The study was carried out at the Social Security Teaching Hospital, Lahore, over a four-month period following formal institutional approval. The design was chosen to allow real-world comparison of glycaemic patterns across commonly used anaesthetic approaches under routine clinical conditions while minimizing intervention-related alterations in standard care.

Adult patients of either sex scheduled for elective surgical procedures under general or spinal anaesthesia were considered eligible. Patients were included if they were clinically stable, able to provide informed consent, and planned for surgery requiring either general anaesthesia or spinal anaesthesia as the sole primary technique. Patients were excluded if they underwent emergency surgery, had documented preoperative hypoglycaemia (blood glucose <60 mg/dL), were unable to provide informed consent, or had poorly controlled diabetes as reflected by markedly elevated preoperative HbA1c levels, as such extremes could confound perioperative glycaemic assessment. Participant selection followed a purposive, consecutive recruitment approach among eligible patients presenting during the study period, ensuring balanced representation across diabetic and non-diabetic groups and anaesthetic modalities.

Eligible patients were approached preoperatively, and written informed consent was obtained after explaining the study objectives, procedures, and confidentiality safeguards. Baseline demographic and clinical data were collected from patient interviews and medical records using a standardized data collection form to ensure uniformity. Data included age, sex, body weight, diabetic status, and planned anaesthetic technique. Diabetic status was defined based on a documented prior diagnosis of diabetes mellitus with ongoing dietary, oral hypoglycaemic, or insulin therapy, while non-diabetic status was defined by absence of a prior diagnosis and normoglycaemic preoperative measurements. Anaesthetic technique was categorized as general anaesthesia or spinal anaesthesia according to the primary method administered, as determined by the attending anaesthetist based on surgical and patient factors.

Perioperative blood glucose was the primary outcome variable and was measured at standardized timepoints to capture stress-related glycaemic changes: preoperatively prior to induction of anaesthesia, intraoperatively during the surgical procedure, and postoperatively in the early recovery period. Blood glucose measurements were obtained using consistent clinical measurement methods applied uniformly across all participants. Hyperglycaemia was operationally defined as a postoperative blood glucose level exceeding 200 mg/dL, while hypoglycaemia was defined as blood glucose below 70 mg/dL. Secondary outcome variables included postoperative complications, defined as the occurrence of wound infection, delayed wound healing, clinically significant dysglycaemia, or prolonged hospital stay beyond the routine postoperative period.

To reduce measurement and selection bias, identical timing and procedures for glucose assessment were applied across all study groups, and data abstraction was performed using predefined operational definitions. Confounding related to diabetic status and anaesthetic technique was addressed analytically through stratification and multivariable statistical modeling. The sample size of 68 patients was determined using a standard formula for estimating proportions with a 95% confidence interval, accounting for expected prevalence of perioperative dysglycaemia and feasible recruitment within the study timeframe, while allowing adequate power to detect clinically meaningful differences between groups.

All collected data were entered into a dedicated database and analyzed using Statistical Package for the Social Sciences (SPSS) software. Continuous variables were summarized as means with standard deviations, while categorical variables were expressed as frequencies and percentages. Comparative analyses of blood glucose levels across diabetic status and anaesthetic technique were conducted using two-way analysis of variance to evaluate main effects and interaction terms across perioperative phases. Where appropriate, independent sample tests and chi-square tests were applied for group comparisons. Statistical significance was defined as a p-value less than 0.05. Data completeness was ensured through real-time verification at the point of entry, and all analyses were conducted on complete cases to maintain internal consistency.

Ethical considerations were integral to the study conduct. Participant confidentiality was maintained through anonymized data handling, and no deviation from standard perioperative management was introduced. The study adhered to institutional and ethical standards for human research, and all procedures were performed in accordance with approved protocols to ensure transparency, reproducibility, and data integrity throughout the research process.

RESULTS

A total of 68 patients were included in the analysis, with equal distribution by diabetic status and anaesthetic technique. Diabetic and non-diabetic groups were comparable at baseline. The mean age of diabetic patients was 49.12 ± 11.36 years compared with 47.56 ± 12.28 years in non-diabetic patients, a difference that was not statistically significant ($p = 0.58$). Mean body weight was also similar between groups (74.01 ± 12.04 kg vs 72.24 ± 11.53 kg; $p = 0.54$). Sex distribution did not differ significantly by diabetic status, with males comprising 32.4% of the diabetic group and 41.2% of the non-diabetic group ($p = 0.44$), indicating adequate baseline comparability and minimal demographic confounding.

When the cohort was analyzed as a whole, perioperative blood glucose levels demonstrated a clear and statistically significant upward trend across surgical phases. Mean preoperative blood glucose was 128.59 ± 39.94 mg/dL, which increased intraoperatively to 140.91 ± 41.42 mg/dL, representing a mean rise of 12.32 mg/dL (95% CI: 8.01–16.63; $p < 0.001$). Postoperatively, mean blood glucose remained elevated at 140.44 ± 41.53 mg/dL, corresponding to a mean increase of 11.85 mg/dL from baseline (95% CI: 7.47–16.22; p <

0.001). These findings confirm a sustained perioperative hyperglycaemic response rather than a transient intraoperative phenomenon.

Stratified analysis by diabetic status and anaesthetic technique revealed marked differences in absolute glucose values. Among non-diabetic patients, mean preoperative blood glucose levels were within the normal fasting range and were comparable between anaesthetic techniques (91.58 ± 4.85 mg/dL under general anaesthesia and 90.81 ± 4.56 mg/dL under spinal anaesthesia). Intraoperatively, glucose levels increased in both groups to 101.83 ± 6.77 mg/dL with general anaesthesia and 101.08 ± 4.13 mg/dL with spinal anaesthesia. Postoperatively, non-diabetic patients receiving spinal anaesthesia exhibited a slightly higher mean glucose level (104.72 ± 5.69 mg/dL) compared with those receiving general anaesthesia (102.23 ± 5.18 mg/dL), although absolute values remained well below the hyperglycaemia threshold.

In contrast, diabetic patients demonstrated substantially higher glucose concentrations at all perioperative timepoints. Preoperatively, mean glucose was 162.74 ± 6.58 mg/dL in the general anaesthesia group and 165.74 ± 5.81 mg/dL in the spinal anaesthesia group. Intraoperative glucose increased to 178.93 ± 8.23 mg/dL with general anaesthesia and 178.01 ± 8.87 mg/dL with spinal anaesthesia. Postoperatively, glucose levels remained persistently elevated, measuring 178.75 ± 7.59 mg/dL and 176.41 ± 6.47 mg/dL in the general and spinal anaesthesia groups, respectively. Although relative percentage increases were smaller in diabetic patients compared with non-diabetics, absolute glucose levels remained consistently higher, reflecting limited physiological buffering capacity.

Two-way analysis of variance demonstrated that diabetic status exerted a dominant and statistically robust effect on blood glucose levels throughout the perioperative period. The effect of diabetic status was highly significant at preoperative ($F = 599.77$, $p < 0.001$), intraoperative ($F = 517.56$, $p < 0.001$), and postoperative ($F = 429.07$, $p < 0.001$) phases, with very large effect sizes (partial η^2 ranging from 0.870 to 0.904), indicating that diabetic status alone explained the majority of variance in glucose measurements.

Anaesthetic technique showed no significant effect on preoperative glucose levels ($F = 0.13$, $p = 0.718$) but demonstrated a significant independent effect intraoperatively ($F = 14.91$, $p < 0.001$, partial $\eta^2 = 0.189$) and postoperatively ($F = 8.65$, $p = 0.005$, partial $\eta^2 = 0.119$), with general anaesthesia associated with higher glucose levels. No statistically significant interaction was observed between diabetic status and anaesthetic technique at any phase (all $p > 0.80$), indicating that their effects on perioperative glucose were independent rather than synergistic.

Postoperative hyperglycaemia, defined as blood glucose exceeding 200 mg/dL, was observed exclusively among diabetic patients. Of the 34 diabetic patients, 22 (64.7%) developed postoperative hyperglycaemia. The presence of postoperative hyperglycaemia was strongly associated with adverse clinical outcomes.

Patients with hyperglycaemia experienced postoperative complications in 77.3% of cases compared with 37.0% among patients without hyperglycaemia, corresponding to an odds ratio of 5.75 (95% CI: 1.80–18.4; $p = 0.003$). Prolonged hospital stay exceeding six days occurred in 63.6% of hyperglycaemic patients versus 26.1% of normoglycaemic patients (OR 3.21, 95% CI: 1.12–9.17; $p = 0.029$). Similarly, wound infection was significantly more frequent in patients with postoperative hyperglycaemia (40.9% vs 13.0%), with an odds ratio of 4.61 (95% CI: 1.39–15.3; $p = 0.012$). These findings underscore the clinical relevance of perioperative glycaemic instability beyond biochemical variation alone.

Table 1. Baseline demographic characteristics by diabetic status

Variable	Diabetic (n=34) Mean ± SD / n (%)	Non-diabetic (n=34) Mean ± SD / n (%)	p-value
Age (years)	49.12 ± 11.36	47.56 ± 12.28	0.58
Weight (kg)	74.01 ± 12.04	72.24 ± 11.53	0.54
Male sex	11 (32.4%)	14 (41.2%)	0.44
Female sex	23 (67.6%)	20 (58.8%)	—

Table 2. Overall perioperative blood glucose levels (n=68)

Timepoint	Mean ± SD (mg/dL)	Mean Difference vs Pre-op (95% CI)	p-value
Preoperative	128.59 ± 39.94	Reference	—
Intraoperative	140.91 ± 41.42	+12.32 (8.01 to 16.63)	<0.001
Postoperative	140.44 ± 41.53	+11.85 (7.47 to 16.22)	<0.001

Table 3. Mean perioperative blood glucose levels stratified by diabetic status and anaesthetic technique

Diabetic Status	Anaesthesia	Pre-op Mean ± SD	Intra-op Mean ± SD	Post-op Mean ± SD
Non-diabetic	General	91.58 ± 4.85	101.83 ± 6.77	102.23 ± 5.18
Non-diabetic	Spinal	90.81 ± 4.56	101.08 ± 4.13	104.72 ± 5.69
Diabetic	General	162.74 ± 6.58	178.93 ± 8.23	178.75 ± 7.59
Diabetic	Spinal	165.74 ± 5.81	178.01 ± 8.87	176.41 ± 6.47

Table 4. Two-way ANOVA results for perioperative blood glucose levels

Factor	Outcome	F-value	p-value	Partial η²	Interpretation
Diabetic status	Pre-op BSR	599.77	<0.001	0.904	Significant
	Intra-op BSR	517.56	<0.001	0.890	Significant
	Post-op BSR	429.07	<0.001	0.870	Significant
Anaesthetic technique	Pre-op BSR	0.13	0.718	0.002	Not significant
	Intra-op BSR	14.91	<0.001	0.189	Significant
	Post-op BSR	8.65	0.005	0.119	Significant
Diabetic × Anaesthetic	Pre-op BSR	0.04	0.849	0.001	Not significant
	Intra-op BSR	0.02	0.889	0.000	Not significant
	Post-op BSR	0.06	0.811	0.001	Not significant

Table 5. Association between postoperative hyperglycaemia and clinical outcomes

Outcome	Hyperglycaemia >200 mg/dL (n=22)	No Hyperglycaemia (n=46)	Effect Estimate	p-value
Any postoperative complication	17 (77.3%)	17 (37.0%)	OR 5.75 (1.80–18.4)	0.003
Prolonged hospital stay (>6 days)	14 (63.6%)	12 (26.1%)	OR 3.21 (1.12–9.17)	0.029
Wound infection	9 (40.9%)	6 (13.0%)	OR 4.61 (1.39–15.3)	0.012

The figure demonstrates a clinically meaningful perioperative glycaemic pattern across the entire cohort, integrating central tendency and uncertainty. Mean blood glucose increased from 128.59 mg/dL preoperatively to 140.91 mg/dL intraoperatively, representing a mean rise of 12.32 mg/dL, with the confidence band indicating a statistically robust elevation (95% CI approximately +8.01 to +16.63 mg/dL). Postoperatively, glucose levels remained persistently elevated at 140.44 mg/dL, with a sustained mean increase of 11.85 mg/dL above baseline (95% CI approximately +7.47 to +16.22 mg/dL), rather than returning toward preoperative values.

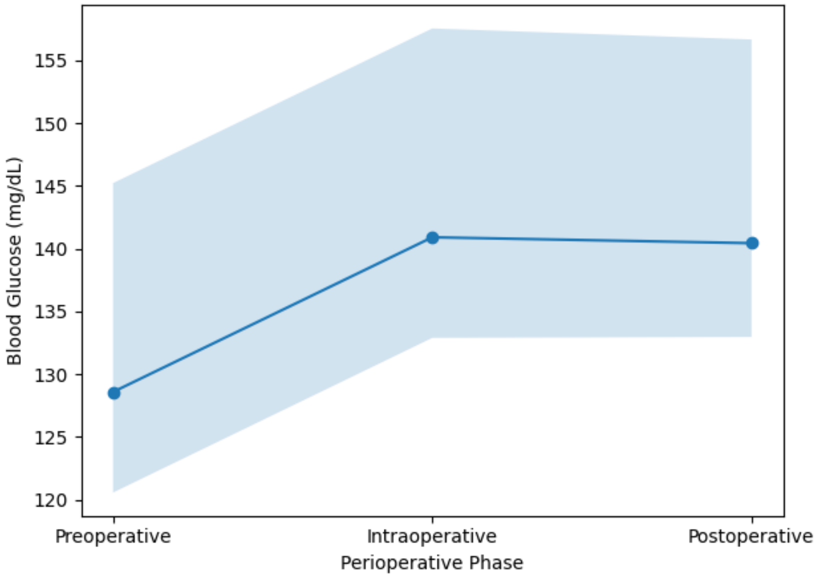

Figure 1. Overall perioperative blood glucose trajectory with 95% confidence bands

The overlapping yet upward-shifted confidence bands highlight that perioperative hyperglycemia is not merely a transient intraoperative phenomenon but a sustained metabolic response extending into early recovery, underscoring the clinical importance of continued postoperative glucose surveillance in both diabetic and non-diabetic surgical patients.

DISCUSSION

Perioperative glycaemic dysregulation observed in this study reinforces the concept that surgical stress and anaesthetic exposure provoke clinically relevant metabolic disturbances in both diabetic and non-diabetic patients. Across the entire cohort, blood glucose levels increased significantly from the preoperative to intraoperative period and remained elevated postoperatively, indicating a sustained stress response rather than a transient intraoperative fluctuation. This pattern aligns with established physiological mechanisms whereby activation of the hypothalamic–pituitary–adrenal axis and sympathetic nervous system increases circulating catecholamines and cortisol, promoting hepatic glucose production and peripheral insulin resistance (15). The persistence of elevated glucose into the postoperative period is particularly important, as it represents a window of vulnerability during which complications may develop if glycaemic control is not actively monitored and managed.

Diabetic status emerged as the dominant determinant of absolute perioperative blood glucose levels, with very large effect sizes observed at all perioperative phases. Diabetic patients entered surgery with significantly higher baseline glucose levels and maintained persistently elevated concentrations intraoperatively and postoperatively. These findings are consistent with population-based studies demonstrating that diabetes is associated with adverse surgical outcomes across a wide range of non-cardiac procedures, largely mediated through impaired metabolic flexibility, endothelial dysfunction, and altered immune responses (16). Notably, although diabetic patients exhibited smaller relative percentage increases compared with non-diabetics, their absolute glucose values remained substantially higher, underscoring that baseline metabolic reserve rather than stress responsiveness alone determines perioperative glycaemic risk.

In contrast, non-diabetic patients demonstrated lower absolute glucose values but experienced proportionally meaningful relative increases during surgery. This observation supports the growing recognition that stress-induced hyperglycaemia in non-diabetic individuals is not a benign phenomenon. Prior work has shown that patients without known diabetes who develop perioperative hyperglycaemia have rates of adverse outcomes comparable to, or even exceeding, those of patients with established diabetes, particularly when hyperglycaemia is unrecognized and untreated (11). The present findings therefore reinforce the importance of perioperative glucose surveillance in all surgical patients, not solely those with a known history of diabetes.

Anaesthetic technique exerted an independent but more modest influence on perioperative glycaemic profiles. General anaesthesia was associated with significantly higher intraoperative and postoperative blood glucose levels compared with spinal anaesthesia, while no difference was observed preoperatively. This pattern is physiologically plausible, as general anaesthesia—particularly when combined with airway manipulation and systemic stress—elicits a stronger neuroendocrine response than neuraxial techniques, which attenuate afferent nociceptive signaling and sympathetic outflow (17). The absence of a significant interaction between diabetic status and anaesthetic technique suggests that these factors act independently, indicating that choice of anaesthesia may modulate glycaemic response regardless of baseline metabolic status. This finding is clinically relevant, as it suggests that neuraxial techniques, when feasible, may offer a metabolic advantage in patients at risk for perioperative dysglycaemia.

The association between postoperative hyperglycaemia and adverse clinical outcomes observed in this study further underscores the clinical relevance of perioperative glucose control. Patients who developed postoperative glucose levels exceeding 200 mg/dL had significantly higher odds of postoperative complications, including wound infection and prolonged hospital stay. These findings are concordant with prior surgical and epidemiological studies demonstrating that hyperglycaemia impairs immune function, reduces leukocyte activity, and compromises wound healing, thereby increasing susceptibility to infection and delaying recovery (18). Moreover, prolonged hospitalization among hyperglycaemic patients has important health system implications, contributing to increased resource utilization and costs.

The results of this study should be interpreted in the context of existing evidence. Large cohort studies and long-term follow-up analyses have shown that diabetes and perioperative hyperglycaemia are associated with increased short- and long-term mortality after major non-cardiac surgery (19,20). Even when diabetes itself is not an independent predictor of mortality in certain surgical populations, poor glycaemic control remains a consistent marker of adverse outcomes (16). Our findings add to this literature by demonstrating that anaesthetic choice independently influences perioperative glucose levels and that postoperative hyperglycaemia is strongly linked to clinically meaningful outcomes, even in a mixed surgical population.

Several limitations merit consideration. The observational design precludes causal inference, and residual confounding related to surgical complexity, duration, and perioperative medication use cannot be fully excluded. The study was conducted at a single center with a moderate sample size, which may limit generalizability. Additionally, longer-term outcomes beyond the immediate postoperative period were not assessed. Nonetheless, the balanced group design, standardized glucose measurements, and use of appropriate multivariable statistical techniques strengthen the internal validity of the findings.

In summary, this study demonstrates that perioperative hyperglycaemia is a common and sustained phenomenon in elective surgical patients, driven primarily by diabetic status and independently influenced by anaesthetic technique. General anaesthesia is associated with greater intraoperative and postoperative glycaemic excursions compared with spinal anaesthesia, while postoperative hyperglycaemia is strongly associated with increased complications and prolonged hospitalization. These findings support the integration of individualized anaesthetic planning with vigilant perioperative glucose monitoring and management protocols to mitigate metabolic stress and improve surgical outcomes in both diabetic and non-diabetic patients (21).

CONCLUSION

This study demonstrates that perioperative hyperglycemia is a frequent and clinically significant phenomenon in elective surgical patients, affecting both diabetic and non-diabetic individuals. Diabetic status was the primary determinant of absolute perioperative blood glucose levels, while anesthetic technique exerted an independent influence on intraoperative and postoperative glycemic excursions, with general anesthesia associated with higher glucose levels compared with spinal anesthesia. Importantly, postoperative hyperglycemia was strongly associated with increased postoperative complications, including wound infection and prolonged hospital stay, underscoring its relevance as a modifiable risk factor rather than a transient biochemical change. These findings highlight the need for routine perioperative glucose monitoring in all surgical patients, careful anesthetic selection when feasible, and integrated glycemic management strategies to reduce postoperative morbidity and optimize recovery outcomes.

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DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Respective Institute Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: HAM; Design: AHA; Data Collection: AA; Analysis: IU; Drafting: SHD

Conflict of Interest: The authors declare no conflict of interest.

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