

# Diabetes Mellitus And Perioperative Outcomes: The Importance Of Coordinated Nursing And Anesthesia Care

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## Abstract

### Background:

Diabetes mellitus is a common and clinically significant comorbidity among surgical patients and is strongly associated with adverse perioperative outcomes. Metabolic instability, impaired wound healing, and increased susceptibility to infection place patients with diabetes at higher risk during the perioperative period, necessitating coordinated and vigilant clinical management.

### Aim:

This article aims to examine the relationship between diabetes mellitus and perioperative outcomes, with a particular focus on the importance of coordinated nursing and anesthesia care in optimizing surgical safety and patient recovery.

### Methods:

A narrative clinical review approach was adopted, synthesizing current evidence from guidelines and peer-reviewed literature related to perioperative diabetes management, nursing practice, and anesthesia care. The review focuses on perioperative risk factors, clinical outcomes, and interprofessional roles across the preoperative, intraoperative, and postoperative phases.

### Results:

The evidence indicates that poor perioperative glycemic control is associated with increased rates of surgical site infections, delayed wound healing, cardiovascular complications, and prolonged hospital stay. Nursing interventions—including preoperative assessment, glucose monitoring, patient education, and postoperative surveillance—play a critical role in early risk identification and complication prevention. Anesthesia care contributes significantly through pre-anesthetic evaluation, intraoperative glucose and hemodynamic management, and mitigation of anesthesia-related risks. Coordinated nursing–anesthesia collaboration was consistently associated with improved glycemic stability, enhanced patient safety, and better perioperative outcomes.

### **Conclusion:**

Perioperative outcomes in patients with diabetes mellitus are strongly influenced by the quality of coordinated nursing and anesthesia care. Integrating structured, team-based approaches and standardized perioperative diabetes management protocols can significantly reduce complications and improve surgical outcomes. Strengthening collaboration between nursing and anesthesia teams should be considered a core clinical strategy in the perioperative care of patients with diabetes.

**Keywords:** Diabetes Mellitus; Perioperative Outcomes; Nursing Care; Anesthesia Care; Interprofessional Collaboration; Patient Safety.

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### **1. Introduction**

Diabetes mellitus is one of the most prevalent chronic conditions encountered in surgical patients and is widely recognized as a significant determinant of perioperative morbidity and adverse outcomes. The presence of diabetes alters physiological responses to surgery and anesthesia, increasing the risk of perioperative complications such as surgical site infections, delayed wound healing, cardiovascular instability, and glycemic disturbances. As a result, perioperative outcomes in patients with diabetes are closely linked to the quality of clinical management provided throughout the surgical pathway.

Effective perioperative care for patients with diabetes requires meticulous glycemic control, careful anesthetic planning, and continuous clinical monitoring. Evidence indicates that both hyperglycemia and hypoglycemia during the perioperative period are associated with increased rates of postoperative complications, prolonged hospital stay, and higher healthcare costs. These risks highlight the need for coordinated clinical interventions rather than isolated discipline-specific practices.

Nursing and anesthesia professionals play central and complementary roles in the perioperative management of patients with diabetes. Nurses are responsible for preoperative assessment, glucose monitoring, medication management, patient education, and postoperative surveillance, while anesthesia teams oversee anesthetic planning, intraoperative metabolic stability, and hemodynamic control. The effectiveness of perioperative diabetes management is therefore strongly dependent on seamless coordination between nursing and anesthesia care.

Despite the availability of clinical guidelines for perioperative diabetes management, variations in practice and communication gaps between nursing and anesthesia teams continue to be reported. Fragmented care may lead to inconsistent glycemic monitoring, delayed intervention, and suboptimal clinical outcomes. In contrast, coordinated interprofessional practice has been associated with improved patient safety, enhanced glycemic control, and reduced perioperative complications.

Accordingly, this article aims to examine the relationship between diabetes mellitus and perioperative outcomes, with a particular focus on the importance of coordinated nursing and anesthesia care. By synthesizing current clinical evidence, this review highlights key perioperative risks associated with diabetes and explores how integrated nursing–anesthesia collaboration can contribute to improved surgical outcomes and patient safety.

### **2. Diabetes Mellitus and Perioperative Risk Profile**

Diabetes mellitus alters multiple physiological systems that are directly relevant to perioperative care. Chronic hyperglycemia affects immune function, endothelial integrity, and microvascular circulation, increasing susceptibility to infection and impairing tissue healing. In addition, diabetic patients often present with comorbidities such as cardiovascular disease, renal impairment, and autonomic neuropathy, all of which complicate anesthetic management and surgical recovery (Joshi et al., 2012; Umpierrez et al., 2012).

Perioperative stress responses further exacerbate metabolic instability by increasing counter-regulatory hormones, leading to hyperglycemia even in patients with previously controlled diabetes. Conversely, fasting, insulin administration, and anesthetic agents may precipitate hypoglycemia, which can be

difficult to detect intraoperatively due to masked clinical symptoms under anesthesia (American Diabetes Association [ADA], 2024).

**Table 1 Key Perioperative Risk Factors Associated with Diabetes Mellitus**

Risk Factor	Clinical Mechanism	Perioperative Implication
Hyperglycemia	Stress hormone release and insulin resistance	Increased infection risk and delayed wound healing
Hypoglycemia	Fasting and insulin/medication effects	Neurological injury, cardiovascular events
Autonomic neuropathy	Impaired cardiovascular reflexes	Hemodynamic instability during anesthesia
Microvascular disease	Reduced tissue perfusion	Poor surgical healing and ischemic complications
Cardiovascular comorbidities	Accelerated atherosclerosis	Increased perioperative cardiac events

Sources: Joshi et al. (2012); ADA (2024); Umpierrez et al. (2012).

### 3. Perioperative Outcomes in Patients with Diabetes Mellitus

Clinical evidence consistently demonstrates that diabetes mellitus is associated with adverse perioperative outcomes. Poor glycemic control has been independently linked to higher rates of surgical site infections, prolonged hospitalization, increased postoperative morbidity, and higher mortality rates across various surgical specialties (Gustafsson et al., 2009; Halkos et al., 2008).

Intraoperative glycemic variability has emerged as a critical predictor of postoperative complications. Studies indicate that both sustained hyperglycemia and wide glucose fluctuations are associated with unfavorable outcomes, emphasizing the importance of continuous monitoring and timely intervention (Umpierrez et al., 2012). Postoperatively, inadequate glucose control contributes to delayed recovery, increased readmissions, and reduced patient satisfaction.

**Table 2 Common Perioperative Outcomes in Patients with Diabetes Mellitus**

Outcome	Clinical Association	Impact on Patient Care
Surgical site infection	Hyperglycemia and impaired immunity	Prolonged healing and antibiotic use
Delayed wound healing	Microvascular dysfunction	Extended hospital stay
Glycemic instability	Stress response and medication mismatch	Increased complication rates
Cardiovascular events	Autonomic and vascular disease	Increased perioperative mortality
Length of stay	Combined metabolic and surgical factors	Higher healthcare costs

Sources: Halkos et al. (2008); Gustafsson et al. (2009); Umpierrez et al. (2012).

### 4. Nursing Roles in Perioperative Diabetes Management

Nursing care is central to the prevention and early detection of diabetes-related perioperative complications. Preoperatively, nurses perform comprehensive assessments, identify high-risk patients, review antidiabetic medications, and ensure appropriate preoperative fasting and glucose monitoring protocols. Patient education regarding medication adjustments and perioperative expectations is also a critical nursing responsibility (Association of periOperative Registered Nurses [AORN], 2023).

During the intraoperative and postoperative phases, nurses are responsible for frequent blood glucose monitoring, timely reporting of abnormal values, administration of insulin or glucose as prescribed, and close observation for signs of infection or metabolic instability. Nursing surveillance has been shown to significantly reduce adverse events by enabling early intervention and coordination with anesthesia teams (ADA, 2024).

**Table 3 Nursing Interventions in Perioperative Diabetes Care**

Phase	Nursing Responsibility	Clinical Benefit
Preoperative	Risk assessment and medication review	Prevention of metabolic complications
Intraoperative	Glucose monitoring and documentation	Early detection of instability
Postoperative	Wound assessment and glycemic control	Reduced infection and delayed healing
Patient education	Instruction on diabetes management	Improved adherence and recovery
Coordination of care	Communication with anesthesia team	Enhanced patient safety

Sources: AORN (2023); ADA (2024); Joshi et al. (2012).

### 5. Anesthesia Care in Patients with Diabetes Mellitus

Anesthetic management of patients with diabetes mellitus requires careful consideration of metabolic stability, cardiovascular status, and autonomic function. Diabetes-related complications such as autonomic neuropathy, ischemic heart disease, and renal impairment may alter physiological responses to anesthetic agents and increase perioperative risk (Joshi et al., 2012). Pre-anesthetic evaluation therefore plays a critical role in identifying risk factors and planning individualized anesthesia strategies.

During anesthesia, maintaining stable blood glucose levels is essential. Both hyperglycemia and hypoglycemia are associated with adverse intraoperative and postoperative outcomes. Hyperglycemia increases the risk of infection and impairs wound healing, while hypoglycemia may lead to neurological injury and cardiovascular instability, particularly when masked by anesthetic-induced unconsciousness (Umpierrez et al., 2012). Continuous or frequent glucose monitoring is therefore recommended for patients with diabetes undergoing surgery.

Anesthesia professionals are also responsible for managing the hemodynamic effects of anesthetic agents in patients with diabetic autonomic neuropathy, who may exhibit exaggerated hypotension or impaired heart rate responses. Close coordination with nursing staff allows for timely detection of metabolic and hemodynamic disturbances and supports safer intraoperative management.

**Table 4 Anesthesia Considerations in Patients with Diabetes Mellitus**

Anesthesia Aspect	Diabetes-Related Concern	Clinical Implication
Pre-anesthetic assessment	Cardiovascular and autonomic neuropathy	Increased risk of intraoperative instability
Anesthetic drug selection	Altered pharmacodynamics	Risk of prolonged recovery or hypotension
Intraoperative glucose control	Stress-induced hyperglycemia or fasting-related hypoglycemia	Increased perioperative complications
Hemodynamic monitoring	Impaired autonomic response	Need for vigilant blood pressure control

Post-anesthesia care	Delayed metabolic recovery	Higher risk of postoperative complications
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Sources: Joshi et al. (2012); Umpierrez et al. (2012); ADA (2024).

## 6. Coordination between Nursing and Anesthesia in Perioperative Diabetes Care

Effective perioperative management of patients with diabetes mellitus depends heavily on coordinated practice between nursing and anesthesia teams. Fragmented care may result in inconsistent glucose monitoring, delayed intervention, and increased risk of complications. In contrast, structured interprofessional collaboration has been associated with improved glycemic control, enhanced patient safety, and better perioperative outcomes (Reeves et al., 2017).

Preoperatively, coordination ensures consistent medication adjustment, appropriate fasting protocols, and shared understanding of glycemic targets. During surgery, real-time communication between nurses and anesthesia professionals supports prompt response to glucose fluctuations and hemodynamic changes. Postoperatively, coordinated handover processes are essential for maintaining continuity of care and preventing adverse events.

Clinical guidelines increasingly emphasize team-based approaches to perioperative diabetes management. Shared protocols, standardized communication tools, and clearly defined roles enhance collaborative effectiveness and reduce variability in care delivery (AORN, 2023; ADA, 2024).

**Table 5 Elements of Effective Nursing–Anesthesia Coordination in Perioperative Diabetes Care**

Care Phase	Coordinated Action	Clinical Benefit
Preoperative	Shared assessment and medication planning	Reduced metabolic instability
Intraoperative	Joint glucose monitoring and intervention	Improved patient safety
Postoperative	Structured handover and surveillance	Prevention of complications
Communication	Clear reporting of glucose trends	Timely clinical decision-making
Protocol use	Standardized perioperative guidelines	Reduced practice variation

Sources: Reeves et al. (2017); AORN (2023); ADA (2024).

## 7. Discussion

This review highlights the clinically significant relationship between diabetes mellitus and perioperative outcomes, emphasizing the pivotal role of coordinated nursing and anesthesia care in mitigating diabetes-related surgical risks. The evidence synthesized across perioperative phases demonstrates that glycemic instability—manifesting as hyperglycemia, hypoglycemia, or wide glucose variability—remains a central mechanism linking diabetes to adverse outcomes such as surgical site infections, delayed wound healing, cardiovascular events, and prolonged hospitalization (Halkos et al., 2008; Umpierrez et al., 2012).

Consistent with existing literature, the findings underscore that perioperative outcomes in patients with diabetes are not solely determined by disease severity but are strongly influenced by the quality and coordination of clinical care. Nursing surveillance, including glucose monitoring, medication management, and early complication detection, has been shown to play a critical role in preventing adverse events, particularly when integrated with anesthesia-led intraoperative metabolic and hemodynamic control (AORN, 2023; ADA, 2024).

The role of anesthesia care emerges as equally central, especially in managing stress-induced hyperglycemia, autonomic neuropathy, and anesthetic-related hemodynamic instability. Prior studies indicate that inadequate intraoperative glucose control is independently associated with increased postoperative morbidity, reinforcing the importance of anesthetic strategies tailored to diabetic

physiology (Joshi et al., 2012). However, the effectiveness of these strategies is significantly enhanced when supported by continuous nursing–anesthesia communication and shared decision-making.

Importantly, this review aligns with broader interprofessional evidence demonstrating that coordinated team-based care improves clinical outcomes in complex patient populations. Reeves et al. (2017) reported that structured interprofessional collaboration contributes to improved safety and quality of care, particularly in high-risk clinical environments. In the perioperative context, this collaboration translates into consistent glycemic targets, timely intervention, and continuity of care across transitions from preoperative assessment to postoperative recovery.

From a clinical practice perspective, the findings support the adoption of standardized perioperative diabetes management protocols that explicitly define nursing and anesthesia responsibilities while promoting collaborative workflows. Variability in practice and fragmented communication remain significant barriers to optimal outcomes and should be addressed through institutional policies, shared protocols, and ongoing interprofessional training (ADA, 2024).

Overall, this discussion reinforces that coordinated nursing and anesthesia care is not an adjunct but a core clinical determinant of perioperative outcomes in patients with diabetes mellitus.

## 8. Conclusion

Diabetes mellitus represents a major clinical challenge in perioperative care, with a well-established association with adverse surgical outcomes. This review demonstrates that effective perioperative management of patients with diabetes is fundamentally dependent on coordinated nursing and anesthesia care across all surgical phases.

Nursing contributions—including comprehensive assessment, glucose monitoring, patient education, and postoperative surveillance—combined with anesthesia-led metabolic and hemodynamic management, form an integrated clinical framework that directly influences patient safety and recovery. When care is coordinated, perioperative risks associated with diabetes can be significantly reduced, leading to improved outcomes and more efficient use of healthcare resources.

The findings support the implementation of structured, team-based perioperative diabetes management models that prioritize communication, role clarity, and shared clinical responsibility. Strengthening nursing–anesthesia collaboration through standardized protocols and interprofessional education is essential for improving perioperative outcomes in this high-risk patient population.

Future clinical initiatives should focus on embedding coordinated care pathways into routine perioperative practice, ensuring that patients with diabetes receive consistent, evidence-based, and collaborative care throughout the surgical journey.

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