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Original Research

The Incidence of Maternal Hypoglycaemia Associated with Prolonged Fasting Before Elective Caesarean Section: A Retrospective Study from a Tertiary Care Centre

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Abstract:

Background: Preoperative fasting before elective caesarean section is routinely practiced to reduce the risk of aspiration during anaesthesia. However, prolonged fasting in pregnant women may predispose to maternal hypoglycaemia, which can adversely affect both maternal well-being and fetal outcomes.

Objectives: To determine the incidence of maternal hypoglycaemia associated with prolonged preoperative fasting before elective caesarean section and to assess its association with duration of fasting and maternal clinical characteristics.

Methods: A retrospective observational study was conducted at Patna Medical College and Hospital (PMCH), Patna, over a one-year period (January 2025–December 2025). Records of 100 women who underwent elective caesarean section were reviewed. Fasting duration, preoperative random blood glucose levels, and maternal characteristics were analyzed. Maternal hypoglycaemia was defined as blood glucose <70 mg/dL. Statistical analysis was performed using appropriate tests, with $p < 0.05$ considered significant.

Results: The incidence of maternal hypoglycaemia was 28%. Prolonged fasting duration (>10 hours) was significantly associated with hypoglycaemia ($p < 0.001$). Mean blood glucose levels decreased progressively with increasing fasting duration.

Conclusion: Prolonged preoperative fasting before elective caesarean section is significantly associated with maternal hypoglycaemia. Revisiting fasting protocols in obstetric practice may help reduce preventable metabolic complications.

Introduction

Caesarean section is one of the most commonly performed surgical procedures worldwide, with steadily increasing rates in both developed and developing countries. Standard anaesthetic practice mandates preoperative fasting to minimize the risk of pulmonary aspiration during induction of anaesthesia. Traditionally, pregnant women are advised prolonged fasting for both solids and liquids prior to surgery. [1]

Pregnancy is a metabolically demanding state characterized by increased glucose utilization, insulin resistance, and altered

carbohydrate metabolism. These physiological changes render pregnant women particularly vulnerable to hypoglycaemia during periods of prolonged fasting. [2] Maternal hypoglycaemia may manifest as dizziness, sweating, palpitations, and altered sensorium, and may also contribute to maternal stress and discomfort in the perioperative period. [3]

In addition to maternal effects, hypoglycaemia may influence fetal glucose availability, potentially affecting neonatal outcomes. Several studies have suggested that prolonged fasting may not confer additional safety benefits and may instead predispose to metabolic derangements. [4-6] Enhanced recovery protocols and modern anaesthesia guidelines increasingly support shorter fasting durations and allowance of clear fluids up to two hours before surgery. [7]

Despite evolving guidelines, prolonged fasting remains common in obstetric practice, particularly in resource-limited settings. Data regarding the incidence of maternal hypoglycaemia associated with prolonged fasting before elective caesarean section in Indian settings remain limited. This study was undertaken to evaluate the incidence of maternal hypoglycaemia and its association with fasting duration in women undergoing elective caesarean section at a tertiary care centre.

Materials and Methods

Study Design and Setting

This retrospective observational study was conducted at Patna Medical College and Hospital (PMCH), Patna, Bihar.

Study Duration

January 2025 to December 2025.

Study Population

Medical records of 100 pregnant women who underwent elective caesarean section during the study period were included.

Inclusion Criteria

- Women aged 18–40 years
- Singleton pregnancy
- Elective caesarean section
- Availability of complete medical records

Exclusion Criteria

- Emergency caesarean section
- Known diabetes mellitus or gestational diabetes
- Endocrine disorders
- Incomplete records

Data Collection

Data extracted included maternal age, parity, gestational age, duration of preoperative fasting, and preoperative random blood glucose levels measured on the morning of surgery.

Definition

Maternal hypoglycaemia was defined as blood glucose <70 mg/dL.

Statistical Analysis

Data were analyzed using statistical software. Continuous variables were expressed as mean ± standard deviation. Categorical variables were expressed as frequencies and percentages. Chi-square test and ANOVA were used where appropriate. A p-value <0.05 was considered statistically significant.

Results

Baseline Maternal Characteristics

A total of **100 women** who underwent elective caesarean section were included in the study. The mean maternal age was **26.8 ± 4.2 years**, and the mean gestational age at delivery was **38.1 ± 1.2 weeks**. Multigravida women constituted the majority of the study population (**62%**), while **38%** were primigravida.

The baseline demographic and obstetric characteristics of the study participants are summarized in **Table 1**.

Table 1. Baseline maternal characteristics of study participants (n = 100)

Variable	Value
Age (years), mean ± SD	26.8 ± 4.2
Gestational age (weeks), mean ± SD	38.1 ± 1.2
Primigravida, n (%)	38 (38%)
Multigravida, n (%)	62 (62%)

Preoperative Fasting Duration

The mean duration of preoperative fasting was **11.2 ± 2.4 hours**. Nearly half of the participants (**48%**) experienced fasting durations exceeding 10 hours. Only **18%** of women fasted for 8 hours or less.

The distribution of fasting duration among the study population is presented in **Table 2**.

Table 2. Distribution of preoperative fasting duration

Fasting duration	Number of patients (%)
≤ 8 hours	18 (18%)
9–10 hours	34 (34%)
> 10 hours	48 (48%)

Incidence of Maternal Hypoglycaemia

Maternal hypoglycaemia (blood glucose <70 mg/dL) was observed in **28 patients**, giving an overall incidence of **28%**. The remaining **72%** of patients maintained normoglycaemic blood glucose levels prior to surgery.

The incidence of maternal hypoglycaemia is shown in **Table 3**.

Table 3. Incidence of maternal hypoglycaemia

Blood glucose status	Number of patients (%)
Normoglycaemia (≥70 mg/dL)	72 (72%)
Hypoglycaemia (<70 mg/dL)	28 (28%)

Association Between Fasting Duration and Hypoglycaemia

A significant association was observed between prolonged fasting duration and the occurrence of maternal hypoglycaemia. Among women who fasted for more than 10 hours, **41.7%** developed hypoglycaemia, compared to **17.6%** in those fasting for 9–10 hours and **11.1%** in those fasting for 8 hours or less.

This association was statistically significant (**χ^2 test, $p < 0.001$**). The relationship between fasting duration and hypoglycaemia is detailed in **Table 4**.

Table 4. Association between fasting duration and maternal hypoglycaemia

Fasting duration	Hypoglycaemia n (%)	Normoglycaemia n (%)	p-value
≤ 8 hours	2 (11.1%)	16 (88.9%)	
9–10 hours	6 (17.6%)	28 (82.4%)	
> 10 hours	20 (41.7%)	28 (58.3%)	**<0.001**

Mean Blood Glucose Levels According to Fasting Duration

Mean preoperative blood glucose levels showed a progressive decline with increasing duration of fasting. Women who fasted for ≤8 hours had a mean blood glucose level of **86.4 ± 9.2 mg/dL**, while those fasting for 9–10 hours had a mean

level of **78.6 ± 8.5 mg/dL**. The lowest mean blood glucose levels were observed in women fasting for more than 10 hours (**68.9 ± 7.8 mg/dL**).

The difference in mean blood glucose levels across fasting duration groups was statistically significant (**ANOVA, $p < 0.001$**). This trend is illustrated in **Figure 1**.

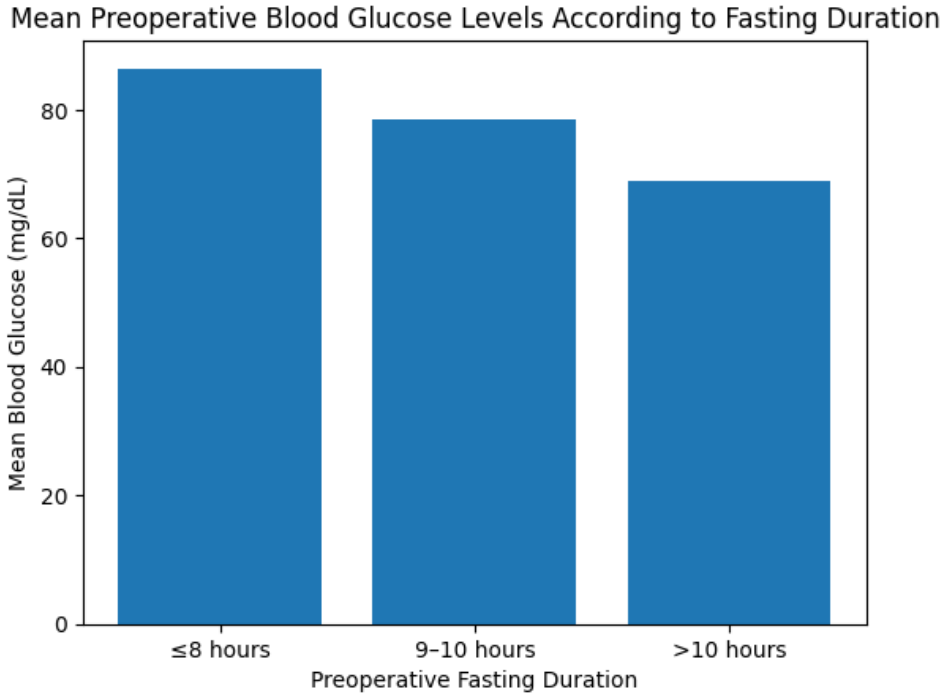

Figure 1. Mean preoperative blood glucose levels according to fasting duration

Summary of Key Results

Overall, the study demonstrated a **high incidence of maternal hypoglycaemia (28%)** among women undergoing elective caesarean section. Prolonged fasting duration was significantly associated with both **lower mean blood glucose levels** and **higher incidence of hypoglycaemia**, with the strongest effect observed in women fasting for more than 10 hours.

Discussion

The present study identifies a considerable burden of maternal hypoglycaemia (28%) among women undergoing elective caesarean section, particularly in those exposed to prolonged preoperative fasting. A clear inverse relationship was observed between fasting duration and preoperative blood glucose values, suggesting that extended fasting significantly increases the likelihood of metabolic compromise in term pregnant women. These findings support earlier observations that pregnancy-associated metabolic demands make women more vulnerable to glucose depletion when oral intake is withheld for long durations. [9]

Comparable trends have been reported in obstetric anaesthesia literature, where prolonged fasting before caesarean delivery was associated with significant reductions in maternal glucose levels and an increased occurrence of hypoglycaemia. [10,11] These outcomes may be explained by the continuous maternal-to-fetal glucose transfer, along with altered hormonal regulation of carbohydrate metabolism during late pregnancy, which predisposes women to faster depletion of circulating glucose stores. In such settings, maternal hypoglycaemia may develop even in the absence of pre-existing endocrine disorders. [12]

In recent years, perioperative fasting recommendations have undergone major revisions, emphasizing that unnecessarily long fasting offers limited additional protection against aspiration while increasing maternal discomfort and metabolic instability. [13] Several updated anaesthesia guidelines recommend allowing clear fluids up to two hours prior to elective surgery and restricting solid food for an appropriate duration, supporting safer metabolic conditions without compromising perioperative safety. [14] Despite these well-established recommendations, prolonged fasting continues to be practiced in many institutions due to logistical delays, routine scheduling patterns, and lack of strict implementation protocols.

Although often considered mild, maternal hypoglycaemia may lead to clinically relevant perioperative symptoms such as weakness, dizziness, anxiety, and autonomic disturbances, potentially worsening maternal stress responses during surgery. [15] In addition, pregnancy is associated with physiological changes in glucose and lipid metabolism, and maternal glucose instability may affect fetal substrate availability, raising concerns regarding maternal–fetal metabolic balance. [16]

Evidence from similar clinical environments has demonstrated that hypoglycaemia is not uncommon in term women undergoing elective caesarean section after prolonged fasting, further supporting the validity of the present results.[17,18] In addition, perioperative complications in anaesthesia are known to increase when metabolic and hemodynamic stability is compromised, particularly in high-risk obstetric settings.[19,20] Therefore, minimizing avoidable metabolic disturbances may contribute to improved perioperative outcomes.

Special consideration is also required in patients with pregnancy-related complications such as hypertensive disorders, where physiological stress is higher and perioperative management is more complex. [21] National-level guidance emphasizes the importance of standardized obstetric surgical preparation, including better perioperative planning and improved institutional practices. [22] Moreover, maintaining optimal perioperative glucose balance is increasingly recognized as an important supportive strategy in obstetric anaesthesia practice, especially in preventing avoidable adverse events. [23]

Recent studies have reinforced that prolonged fasting significantly lowers maternal blood glucose prior to elective caesarean section, supporting the need for institutional revision of traditional fasting protocols. [24,25] Hence, strict adherence to evidence-based fasting recommendations, improved coordination between obstetric and anaesthesia teams, and better patient counselling may reduce the incidence of maternal hypoglycaemia and improve overall perioperative maternal care.

Conclusion

Prolonged preoperative fasting before elective caesarean section is significantly associated with maternal hypoglycaemia. Adoption of shorter fasting protocols and adherence to updated guidelines may reduce preventable metabolic complications and improve maternal care.

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