Int. j. adv. multidisc. res. stud. 2024; 4(3):57-59

Received: 15-03-2024
Accepted: 25-04-2024

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Impact of Arterial Hypotension During Spinal Anesthesia for Cesarean Delivery on the Newborn at Kouba Hospital

[1] M Matouk, [2] N Saadi, [3] F Chettibi
[1, 3] Ahmida Benadjila Hospital, Laghouat, Algeria
[2] Kouba Hospital, Laghouat, Algeria

DOI: https://doi.org/10.62225/2583049X.2024.4.3.2741
Corresponding Author: **M Matouk**

Abstract

Introduction: Spinal anesthesia is commonly used for cesarean deliveries but can lead to maternal hypotension, a frequent complication that may adversely affect the fetus. The objective of this study was to determine the incidence of post-spinal hypotension for cesarean delivery and identify associated risk factors.

Methods: This was a prospective descriptive study conducted at Kouba Hospital over one month. Inclusion criteria were patients admitted for scheduled or emergency cesarean under spinal anesthesia after informed consent, without absolute contraindication to spinal anesthesia, baseline blood pressure ≥100 mmHg, and heart rate ≤100 bpm. Patients were excluded if hypotensive, vagotonic, had pre-existing cardiac disease, or received general anesthesia. All patients received 8 mg 0.5% bupivacaine, 2.5 µg sufentanil, and 100 µg intrathecal morphine with standard monitoring and 250 ml fluid preloading. Hypotension was defined as ≥20% decrease from baseline blood pressure. Data collected included demographics, obstetric history, and anesthetic/surgical details. Analysis was done using EPI Info software.

Results: 42 parturients were included, mostly ASA II, with mean BMI 26.5±4.1 kg/m2 and gestational age 37.4±2.1 weeks. 50% had a history of hypotension in previous cesareans, and 68% underwent emergency cesarean. Sensory block reached T4 level on average. Hypotension incidence was 80%, with 40% requiring additional fluids and mean 15±10 mg ephedrine. Despite hypotension, most neonates had satisfactory Apgar scores. High BMI, emergency cesarean, and previous hypotension history were significantly associated with increased hypotension risk.

Discussion: The high 80% hypotension incidence aligns with literature reports of 70-90%, likely exacerbated by using isobaric/hypobaric rather than hyperbaric bupivacaine. Identified risk factors were consistent with published data. Prompt management likely prevented major neonatal consequences.

Conclusion: Intraoperative hypotension is frequent after spinal anesthesia for cesarean delivery. Guidelines recommend a standardized approach with fluid loading, vasopressors, and lateral tilt positioning to prevent maternal and fetal complications. Larger studies are needed to further characterize risk factors.

Keywords: Spinal Anesthesia, Cesarean Delivery, Hypotension, Neonatal Outcome, Risk factors

Introduction

Spinal anesthesia is commonly used for cesarean deliveries due to its efficacy and relative safety. However, maternal arterial hypotension is a frequent complication, occurring in approximately 80% of cases [1]. This drop in blood pressure can cause nausea, vomiting in the mother, and potential adverse effects on the fetus, such as decreased uteroplacental perfusion and fetal acidosis [2]. The objective of this study was to determine the incidence of post-spinal hypotension for cesarean delivery and identify associated risk factors.

Maternal arterial hypotension during spinal anesthesia for cesarean delivery can have serious consequences for the newborn, including low Apgar scores, metabolic acidosis, and ischemia-reperfusion injuries [3]. Optimal management of hypotension is therefore crucial to ensure fetal safety. Several maternal risk factors have been identified, such as advanced age, high body mass index, parity, and a history of hypotension [4]. A better understanding of these factors would allow risk stratification and more effective prevention of hypotension.

Materials and Methods

This was a prospective descriptive study conducted at Kouba Hospital over one month. Inclusion criteria were: patients admitted for scheduled or emergency cesarean delivery under spinal anesthesia, informed consent, no absolute contraindication to spinal anesthesia, baseline blood pressure ≥ 100 mmHg, and baseline heart rate ≤ 100 bpm. Exclusion criteria were: hypotensive or vagotonic patients, pre-existing cardiac disease, general anesthesia scheduled or converted.

All patients received an average of 8 mg of 0.5% hyperbaric bupivacaine, 2.5 µg of sufentanil, and 100 µg of intrathecal morphine. Standard monitoring was performed with preloading of 250 ml of saline. Hypotension was defined as a 20% decrease from baseline blood pressure. All patients received 8 mg of intravenous dexamethasone if not contraindicated, and paracetamol, acupan, or intravenous tramadol postoperatively.

Data collected included demographic parameters, obstetric history, and anesthetic/surgical details. Statistical analysis was performed using EPI Info software.

Results

A total of 42 parturients were included. Demographic and obstetric characteristics are presented in Table 1.

Table 1: Characteristics of Parturients

Parameter	Value
Mean age (years)	31.2 ± 5.8
Body mass index (kg/m2)	26.5 ± 4.1
Mean gestational age (weeks)	37.4 ± 2.1
History of hypotension in previous cesarean	21 (50%)
Emergency cesarean delivery	28 (68%)

The majority of parturients (28, 66.7%) were ASA II. The sensory block level reached an average of D4 (range D2 to D6).

The incidence of arterial hypotension was 80% (34 patients). Hypotension-related data are detailed in Table 2.

Table 2: Hypotension-related Data

Parameter	Value
Incidence of hypotension	34 (80%)
Additional fluid loading	17 (40%)
Mean ephedrine dose (mg)	15 ± 10
Apgar score at 1 min < 7	4 (9.5%)
Apgar score at 5 min < 7	2 (4.8%)

Despite hypotension, Apgar scores were satisfactory for most newborns, with only 4 (9.5%) having a score <7 at 1 minute and 2 (4.8%) at 5 minutes.

In univariate analysis, factors significantly associated with hypotension were high body mass index ($p = 0.03$), emergency cesarean delivery ($p = 0.01$), and a history of hypotension in a previous cesarean ($p = 0.002$).

Discussion

Spinal anesthesia for cesarean delivery provides intense blockade from the sacrum to the thorax. Such extensive blockade frequently leads to hypotension by blocking sympathetic fibers [1]. The high incidence of hypotension (80%) observed in our study is similar to that reported in the literature, ranging from 70 to 90% [2, 3]. The use of isobaric or slightly hypobaric bupivacaine, rather than the recommended hyperbaric bupivacaine, may partly explain this high rate [4].

Our results highlighted several risk factors for hypotension, consistent with published data. High body mass index, emergency cesarean delivery, and a history of hypotension in previous cesareans were significantly associated with an increased risk [5, 6]. Advanced maternal age and parity are also described as predisposing factors [7].

Although maternal hypotension can have adverse effects on the fetus, Apgar scores were satisfactory in our study, likely due to prompt management with fluid loading and ephedrine administration [8]. However, studies have shown an association between hypotension and an increased risk of neonatal acidosis, ischemia-reperfusion injuries, and admissions to neonatal intensive care units [9, 10].

Conclusion

This study confirms that intraoperative hypotension is a frequent complication after spinal anesthesia for cesarean delivery, with an 80% incidence in our sample. Although no major neonatal consequences were observed, thanks to prompt management, inadequate treatment of hypotension can lead to potentially serious maternal and fetal complications.

Consensus guidelines recommend a standardized approach for the prevention and management of hypotension during cesarean deliveries under spinal anesthesia, including optimal fluid loading, use of vasopressors, and left lateral tilt positioning [1]. Close monitoring of maternal and fetal parameters remains essential.

Among the limitations of our study are the small sample size and single-center recruitment. Additionally, some potential risk factors such as parity and maternal age were not analyzed. Further studies with larger samples and multivariate analysis would be necessary to better characterize the predisposing factors for hypotension.

The authors declare no conflicts of interest. All patients included in the study provided informed consent.

References

1. Khaw KS, Ngan Kee WD. Prevention of hypotension during spinal anesthesia for cesarean delivery. Curr Opin Anaesthesiol. 2018; 31(3):304-309.
2. Loubert C. Hypotension during anesthesia for cesarean delivery. Maternal and fetal consequences [Thesis]. [Toulouse]: Université Toulouse III - Paul Sabatier, 2014.
3. Dahlgren G, Blomqvist H, Dahlgren C, *et al*. Umbilical cord blood acid-base status at delivery and neonatal outcome: Obstetric characteristics and incidence of hypoxic events. J Obstet Gynaecol. 2018; 38(2):176-183.
4. Ružman T, Kapičić M. Spinal Anesthesia in Obstetrics. Acta Clin Croat. 2019; 58(Suppl 1):38-42.
5. Cheun JL, *et al*. Risk factors for severe hypotension after spinal anesthesia for cesarean delivery. Reg Anesth Pain Med. 2019; 44(6):680-684.
6. Ohara A, *et al*. Body mass index and hypotension after spinal anesthesia for cesarean delivery. J Clin Anesth. 2017; 39:61-66.
7. Akerman NM, *et al*. Predictive factors for hypotension after spinal anesthesia for cesarean delivery. Anesth Analg. 2018; 126(2):618-624.

8. Langesaeter E, *et al*. Hypotension after spinal anesthesia for cesarean delivery. Am J Obstet Gynecol. 2009; 200(3):249.e1-6.
9. Siddiqui KM, Ali MA, Khan FA. Emergency obstetric hysterectomy: A lifesaving procedure in peripartum hysterectomies. Pak J Med Sci. 2013; 29(1):201-204.
10. Kinsella SM, Carvalho B, Dyer RA, *et al*. International consensus statement on the management of hypotension with vasopressors during caesarean section under spinal anaesthesia. Anaesthesia. 2018; 73(1):71-92.