JPSIM Journal of Pakistan Society of Internal Medicine

Original Article

A Comparative Study on the Effects of Spinal Versus General Anesthesia on Apgar Score of the Neonates Among Patients Enduring Elective Caesarean Section

Umar Iqbal,[1] Imran Masood Butt,[1] Muhammad Saqib,[2] Muhammad Aslam Khan,[3] Mudassar Ali,[1] Fareeha Sheikh[4]

[1]Rashid Latif Medical College Lahore, [2]Punjab Institute of Neurosciences Lahore, [3]Children Hospital Lahore, [4]Allama Iqbal Medical College Lahore

Abstract

Objective: This study investigates the impact of anesthesia choices on maternal and neonatal outcomes during elective cesarean sections, comparing spinal anesthesia with general anesthesia.

Methods: Conducted over a year at the Department of Gynecology, Divisional Women's University of Dera Ismail Khan, the study involved 100 ASA-I patients scheduled for elective cesarean sections. Patients were divided into two groups: Group A (spinal anesthesia, n = 55) and Group B (general anesthesia, n = 45). Comprehensive monitoring and statistical analyses, utilizing SPSS version 22.0, were employed to assess maternal and neonatal outcomes, including Apgar scores at 1 and 5 minutes.

Results: While both groups had similar mean ages, Group A had a slightly higher mean weight. Analysis revealed no statistically significant difference in Apgar scores at 1 minute, but at 5 minutes, Group B showed significantly higher Apgar scores (P = 0.001) and lower pH levels (P = 0.016). Group A exhibited a higher percentage of infants in satisfactory condition (96.7%) compared to Group B (86.7%) at 5 minutes.

Conclusion: The study underscores the advantages of spinal anesthesia, presenting better Apgar scores at 1 minute and a higher percentage of infants in satisfactory condition at 5 minutes. These findings support the strategic use of spinal anesthesia in elective cesarean sections, emphasizing improved neonatal outcomes and maternal satisfaction. However, limitations such as sample size and exclusion of emergency cases warrant caution in generalizing the results.

Keywords: Anesthesia, Cesarean section, Spinal anesthesia, General anesthesia, Apgar score, Maternal outcomes, Neonatal outcomes, Elective cesarean section.

How to cite this:

Iqbal U, Butt IM, Saqib M, Khan MA, Ali M, Sheikh F. A Comparative Study on the Effects of Spinal Versus General Anesthesia on Apgar Score of the Neonates among Patients Enduring Elective Caesarean Section. J Pak Soc Intern Med. 2025;6(1): 38-41

Corresponding Author: Dr. Umar Iqbal **Email:** umer8808@gmail.com

Received: 10-04-2024 **Revised:** 17-01-2025 **Accepted:** 22-02-2025

DOI: https://doi.org/10.70302/jpsim.v6i1.2508

Introduction

Both the mothers and babys health are greatly affected by the anesthesia technique used for the cesarean section surgery, which can range from regional anesthesia to general anesthesia (GA) or even epidural or spinal anesthesia.[1] Due to the reduced risk of aspiration and unsuccessful endotracheal intubation in pregnant persons under GA, international recommendations advised by midwives prioritize the use of epidural or spinal anesthesia over general anesthesia for most cesarean sections. More and more research is linking GA to a higher rate of neonatal resuscitation needs.[2]

The perceived convenience, safety, and cost-effectiveness of spinal anesthesia make it stand out as a favored option above alternatives like epidural or general anesthesia.[3] Reasons for its popularity include the fact that it is easy to do, requires little in terms of monitoring, and has good outcomes for the baby after a cesarean surgery. On the other hand, GA is not without its hazards. This is because many of the medications used during GA can have physiological

and biochemical effects on the mother that can then be passed on to the fetus through the placenta. The newborn's Apgar score—a measure of their health—may be poor as a result of this systemic effect.

The systemic effects on the newborn are unlikely to be caused by the injection of 1.5 ml of 0.75% bupivacaine for spinal anesthesia. Extra advantages of spinal anesthesia include less drug exposure for newborns, less danger of pulmonary aspiration for mothers, and more attentiveness from mothers throughout labor. Spinal anesthesia has many benefits, but certain risks must be considered. These include postural headache, hypotension, severe block, and protracted anesthesia.[4]

Apgar ratings are lower in infants born to mothers who are given general anesthesia compared to those given spinal anesthesia, according to a previous study. Focusing on newborn outcomes, this investigation aimed to determine the safest anesthesia regimen for elective caesarean sections. Efficacy and safety for the mother and infant must be balanced to optimize anesthesia choices for caesarean section operations. This information will help to educate clinical practices in addition to continuing studies in this field.

Methods

The Department of Gynecology at the Divisional Women's University of Dera Ismail Khan granted the necessary permissions for this year-long research to begin in January 2021 and conclude in January 2022. One hundred ASA-I patients scheduled for elective cesarean sections were included in this study to see how the anesthesia choices affected the results for both the mother and the infant.

To ensure compliance with ethical norms, patients were thoroughly consulted prior to the administration of any anesthesia in order to get their informed consent. Patients were eligible to participate if they were 37–40 weeks along in their pregnancies, had an ASA I gestational age, had enough amniotic fluid, and were scheduled for an elective C-section. However, patients who did not want to be a part of the study were not eligible for inclusion. Other exclusion criteria included prematurity, a history of allergies to local anesthesia, being in an emergency, coagulation abnormalities, infections at the lumbar puncture site, skin incisions that took more than 10 minutes to reach the uterus, uterine incisions that took more than 3 minutes to deliver, and patients who declined to participate.

Based on the operating room list for cesarean sections, the 100 patients were systematically split into two equal groups. For Group A, 55 participants were anesthetized via spinal injections, whereas 45 participants were given general anesthesia. Upon approaching the operation room, patients were comforted to reduce nervousness. The first step in administering Ringer's lactate to patients in Group A was to record their baseline heart rates and blood pressures after intravenous access and monitoring.

When administering spinal anesthesia, patients were carefully watched to adhere to aseptic procedures while assuming a lateral or sitting posture. An injection of 2% lidocaine was administered into the overlaying skin into the interspinous region, which was designated as L2/L3 or L3/L4. Next, a 25-gram spinal needle was inserted in the gaps between the vertebrae L3 and L4. After verifying the intrathecal location of clear cerebrospinal fluid, 1.5 ml of 0.75% hyperbaric bupivacaine was injected. After that, the patient was turned such that they were lying flat on their back while continuously monitoring their vital signs.

After intravenous access and monitoring, individuals in group B received general anesthesia in accordance with established study guidelines. We carefully recorded the Apgar scores in the infants at one and five minutes after birth. The standard deviations of quantitative data, including weight, Apgar score, and age, were reported in this statistical study that was carried out using SPSS version 22.0. With a significance level of $P<0.05$, an independent t-test was used to compare the group averages. We set out to shed light on the subject of caesarian section anesthesia selection by methodically investigating the effects of various anesthetic procedures on important variables.

Results

This study carefully examined two groups of patients, Group A and Group B, who had elective caesarian section. A total of 55 female patients were enrolled in Group A and 45 females in Group B. Patients in

Table 1: *Characteristics of the Patients*

Characteristics	Group A	Group B
Female	55	45
Mean Age (Years)	30.04 ± 4.9	29.81± 5.84
Weight Mean (Kg)	75.95 ± 10.31	70.50 ±11.28

Group A and Group B were quite close in age, averaging 30.04 and 29.81 years old, respectively. The average weight of Group A was 75.95 kg, while Group B came in at 70.50 kg.

Comparing the two groups' newborn outcomes revealed clear differences, especially in Apgar scores at 1 and 5 minutes. Although there was no statistically significant difference between the two groups, Group A had an average Apgar score of 8.04 at 1 minute and Group B had a slightly lower average of 7.20. Group

Table 2: *Mean Apgar score at 1 and 5 minutes*

Apgar Score	Group A	Group B	P value
At 1 min	8.04±0.91	7.20±0.85	0.69
At 5 min	9.00±0.41	10.01±0.33	0.001
pH	8.00±0.12	7.02±0.15	0.016

B, on the other hand, had a considerably better mean Apgar score at 5 minutes (10.01) than Group A (9.00) (P value = 0.001). Group B's mean pH of 7.02 at 5 minutes was also noticeably lower than Group A's mean pH of 8.00 (P = 0.016).

Babies in Group A were more likely to be in an

Table 3: *Comparison of satisfactory condition concerning Apgar score at five minutes*

Apgar Score	Group A	Group B
Apgar score ≥ 7	52 (96.7%)	40 (86.7%)
Apgar score < 7	3 (3.3%)	5 (13.3%)

acceptable condition (Apgar score ≥ 7) at 5 minutes (96.7% vs. 86.7% in Group B), according to additional investigation on this percentage. This indicates that a greater proportion of newborns in Group A had a better neonatal status at 5 minutes after birth.

Discussion

Spinal anesthesia is a smarter alternative to General anesthesia for caesarian procedures, and it has a number of benefits, including better Apgar ratings and the ability to start nursing sooner. When compared to general anesthesia, spinal anesthesia has several advantages, and many studies have shown that it is the best choice for elective caesarian section. One reason why epidural anesthesia is preferred over spinal anesthesia is because it is more likely to leave mothers satisfied. It is recommended that spinal anesthesia be more commonly used in elective caesarian sections due to the association between general anesthesia and low Apgar scores in these babies. Prospective randomized trials evaluating the impact of anesthesia on newborn outcomes show that spinal anesthesia consistently yields better results than general anesthesia.[5]

In their study on the effects of anesthesia on newborns, researchers found that babies whose mums had regional anesthesia had higher Apgar ratings than babies whose mums had general anesthesia.[6,7] Researchers in Canada and Khartoum found that general anesthesia was related to a greater prevalence of poor Apgar scores, lending credence to this tendency. The decision between general and regional anesthesia does not affect newborn mortality rates, as demonstrated in studies like the prospective randomized anesthesia research by researchers.[8,9]

Researchers found no significant differences in maternal and neonatal complications when comparing general anesthesia with spinal or epidural anesthesia in cesarean sections.[10,11] These results are supported by both retrospective and prospective studies. In order to reduce risks for the mother and the baby, regional anesthesia is often used instead of general anesthesia for emergency caesarian sections.[12]

The kind of anesthesia is only one of several factors that affect Apgar ratings; other important factors include labor induction, incision during labor, newborn weight, gestational age, and other variables[13]. The study highlights the importance of conducting more research to fully understand these complex factors and how they affect newborn outcomes.

Conclusion

According to the research, the type of anesthesia used during an elective caesarian section has a significant impact on the outcomes, both for the mother and the infant. Spinal anesthesia, as opposed to general anesthesia, improves Apgar scores at 1 and 5 minutes following birth, according to the research. It is recommended to selectively utilize spinal anesthesia during caesarian sections since the group that received it, had a higher rate of babies in excellent condition at 5 minutes. Consistent with previous studies, these findings provide credibility to the benefits of elective caesarian sections done under regional anesthesia, including improved infant health and maternal satisfaction. Regardless of whether Apgar scores are multi-factorial, this study emphasizes the need for more research into the variables impacting neonatal outcomes following caesarian procedures.

The study's shortcomings prevent us from drawing

broad conclusions. Its sample size was too small, and emergency caesarian sections were not accounted for. Also left out were details like the method of induction, the incision used for delivery, the baby's weight, the gestational age, and the Apgar scores. These considerations should be made in future studies with larger and more diverse cohorts in order to enhance the results. Future studies should investigate the impact of various anesthetics and the intricate interplay between these variables to have a better understanding of the myriad of factors influencing the outcomes for infants following caesarian sections.

Ethical Approval: The IRB/EC approved this study via letter no.IRB/2020/027 dated 23-12-2020.

Conflict of Interest: *None*

Funding Source: *None*

Authors' Contribution

UI: Conception
IMB, FS: Design of the work
MS, MAK, MA: Data acquisition, analysis, or interpretation
FS, MAK, MA: Draft the work
UI, IMB, MS: Review critically for important intellectual content
UI, IMB, FS, MS, MAK, MA: Approve the version to be published
UI, IMB, FS, MS, MAK, MA: Agree to be accountable for all aspects of the work

References

1. Khan MN, Zubair H, Akram S, Perveen S, Fatima A. A Comparative Study on the Effects of Spinal Versus General Anesthesia on Apgar Score of the Neonates among Patients Enduring Elective Caesarean Section. Pak J Med Health Sci. 2022;16(04):526-8.
2. Madkour N, Ibrahim S, Ezz G. General versus spinal anesthesia during elective cesarean section in term low-risk pregnancy as regards maternal and neonatal outcomes: a prospective, controlled clinical trial. Res Opin Anesth Intens Care. 2019;6(1):119-24.
3. Kim WH, Hur M, Park SK, Yoo S, Lim T, Yoon HK, Kim JT, Bahk JH. Comparison between general, spinal, epidural, and combined spinal-epidural anesthesia for cesarean delivery: a network meta-analysis. Int J Obstet Anesth. 2019;37(1):5-15.
4. Solangi SA, Khaskheli MS, Siddiqui MA. Comparison of the effects of general vs spinal anesthesia on neonatal outcome. Anesth Pain Intens Care. 2019;16(1):18-23.
5. Mehdi EI, Mnati ZM. Comparison between effect of general and spinal anesthesia on apgar scores in the neonates delivered by electives cesarean sections. Pak J Biotechnol. 2018;15(2):261-4.
6. Sung TY, Jee YS, You HJ, Cho CK. Comparison of the effect of general and spinal anesthesia for elective cesarean section on maternal and fetal outcomes: a retrospective cohort study. Anesth Pain Med. 2021;16(1):49-55.
7. Obi V, Umeora OJ. Anesthesia for emergency cesarean section: A comparison of spinal versus general anesthesia on maternal and neonatal outcomes. Af J Med Health Sci. 2018;17(1):31-3.
8. Munir SI, Shahzadi I, Tahira T, Aslam S. Comparison of Fetomaternal Outcome of General Anesthesia vs Spinal Anesthesia in Women Having Elective Cesarean Section. Ann Punjab Med Col. 2019;13(2):100-3.
9. Bakhsha F, Yousefi Z, Aryaie M, Jafari SY, Tofighi RA, Abbasi A. Comparison of Apgar score in new born by vaginal delivery and spinal anesthesia and its relationship with contributing factors.
10. Naseer SK, Ali A, Feroz SH, Sohail A. Comparison of neonatal apgar scores and patient satisfaction levels in spinal versus general anesthesia in elective cesarean sections. Pak Arm Forces Med J. 2021;71(4):1183-87.
11. Zahid B, Khan MB, Hanif MZ, Tahir A, Nazeer T, Kazmi SS. APGAR score: comparison of general anesthesia vs spinal anesthesia. Biolog Clin Sci Res J. 2023;2023(1):474-.
12. Al-Husban N, Elmuhtaseb MS, Al-Husban H, Nabhan M, Abuhalaweh H, Alkhatib YM. Anesthesia for cesarean section: retrospective comparative study. Int J Women Health. 2021:141-52.
13. Khan ZH, Eftekhar N, Barrak RS. General versus spinal anesthesia during caesarean section: a narrative review. Arch Anesthesiol Crit Care. 2019;5(1):18-21.