

Original Research

Comparison of the effect of general and spinal anaesthesia for elective caesarean section on maternal and foetal outcomes: A retrospective cohort study

¹Akamjot Kaur, ²Parmvir Singh Dhillon

^{1,2}MBBS, Punjab, India

ABSTRACT:

Background: This study was conducted to evaluate the Comparison between general and spinal anaesthesia for elective caesarean section on maternal and foetal outcomes. **Material and methods:** A retrospective analysis of data from 100 individual births was conducted. The data focused on the outcomes of both the mother and the foetus after the use of general or spinal anaesthetic for elective caesarean section. We then compared these results. Two anaesthesiologists were responsible for administering anaesthesia during the obstetric operations. Both anaesthesiologists administered anaesthesia using identical anaesthetic drugs. Patient monitoring, extubation criteria, and the spinal method were all carried out in accordance with our institutional practice. The exclusion criteria encompassed the requirement for urgent or epidural anaesthesia, the transition from spinal to general anaesthesia, and deliveries when bleeding was expected, such as placenta previa or coagulopathy. The subjects were divided into 2 groups of 50 subjects each. Group 1 was for general anaesthesia and Group 2 was for spinal anaesthesia. Statistical analysis was performed using SPSS software. **Results:** Maternal outcomes: It was observed that the pre-operative SBP and postoperative SBP were higher in the general anaesthesia group as compared to spinal anaesthesia group. The pre-operative HR was higher in the 2nd group (90.6 beats/min) as compared to 1st group (83.4 beats/min). the postoperative HR in 1st and 2nd group was 95.8 beats/min and 73.4 beats/min, respectively. The estimated blood loss in 1st group was higher (762.3 ml) as compared to the 2nd group (691.9 ml). Foetal outcomes: The foetal weight of the group 1 newborns was slightly lesser (2861.3 g) than those of the 2nd group (2867.5 g). 10 out of 50 newborns from 1st group showed 1- min Apgar score < 7 whereas 7 newborns from 2nd group showed the same. 2 out of 50 newborns from the 1st group showed 5-min Apgar score < 7. **Conclusion:** The general group was characterized by higher levels of maternal blood loss and a greater percentage of newborns with 5-minute Apgar scores below 7 compared to the spinal group in caesarean procedures.

Keywords: GA, spinal anaesthesia, maternal, foetal, outcomes, blood loss, delivery.

Received: 14 October, 2021

Accepted: 18 November, 2021

Corresponding author: Parmvir Singh Dhillon, MBBS, Punjab, India

This article may be cited as: Kaur A, Dhillon PS. Comparison of the effect of general and spinal anaesthesia for elective caesarean section on maternal and foetal outcomes: A retrospective cohort study. Int J Res Health Allied Sci 2021; 7(6): 103-106.

INTRODUCTION

Caesarean section (CS) is a surgical procedure where a neonate is delivered through an incision on the abdominal wall and uterus of the mother. It is used in situations where vaginal delivery is not possible and often refers to as a lifesaving procedure. Regional and general anaesthesia are commonly used for CS and both have their advantages and disadvantages. Regional anaesthesia is generally preferred as a type of anaesthesia for CS but also general anaesthesia is still frequently used in some countries, largely due to greater familiarity with it.¹ The type of anaesthesia and anaesthesia management for CS largely affects pregnant patient satisfaction. Many studies compared

differences between these two types of anaesthesia for CS but mainly for neonatal and maternal outcomes.^{2,3} Not many of them compared patient satisfaction.⁴

The proportion of women giving birth by caesarean delivery has increased in both developed and developing countries.⁵ One frequently proposed explanation is caesarean delivery on maternal request (CDMR). CDMR refers to a primary caesarean delivery performed because the mother requests this method of delivery in the absence of standard medical/obstetrical indications. The prevalence rate of CDMR in all caesarean deliveries is 1-18% globally and less than 3% in the United States.^{6,7}

For CDMR, both general and neuraxial are two anaesthesia modalities, which have shown equivocal findings with respect to 1 and 5 minutes Apgar scores, umbilical artery pH values and total time in operating room.⁸ Although anaesthesia guidelines recommend regional anaesthesia for caesarean delivery because of the higher risk of failed intubation, aspiration, intraoperative blood loss and awareness with general anaesthesia,^{8,9} it is still high rate of using general anaesthesia on maternal request for this procedure in both developed and developing countries.

Hence, this study was conducted to evaluate the Comparison between general and spinal anaesthesia for elective caesarean section on maternal and foetal outcomes.

MATERIAL AND METHODS

A retrospective analysis of data from 100 individual births was conducted. The data focused on the

outcomes of both the mother and the foetus after the use of general or spinal anaesthetic for elective caesarean section. We then compared these results. Two anaesthesiologists were responsible for administering anaesthesia during the obstetric operations. Both anaesthesiologists administered anaesthesia using identical anaesthetic drugs. Patient monitoring, extubation criteria, and the spinal method were all carried out in accordance with our institutional practice. The exclusion criteria encompassed the requirement for urgent or epidural anaesthesia, the transition from spinal to general anaesthesia, and deliveries when bleeding was expected, such as placenta previa or coagulopathy. The subjects were divided into 2 groups of 50 subjects each. Group 1 was for general anaesthesia and Group 2 was for spinal anaesthesia. Statistical analysis was performed using SPSS software.

RESULTS

Table 1: Maternal and foetal parameters.

Measures	Group 1 (general anaesthesia)	Group 2 (spinal anaesthesia)
Maternal:		
✓ Preoperative SBP	133.5	128.1
✓ Postoperative SBP	140.3	115.7
✓ Preoperative HR (beats/min)	83.4	90.6
✓ Postoperative HR (beats/min)		
✓ Estimated Blood Loss (ml)	95.8	73.4
	762.3	691.9
Foetal:		
✓ Foetal weight (g)	2861.3	2867.5
✓ Apgar score (1 min) < 7 (%)	10 (20%)	07 (14%)
✓ Apgar score (5 min) < 7 (%)		
	2 (4%)	0
SBP: systolic blood pressure, HR: heart rate		

Maternal outcomes: It was observed that the pre-operative SBP and postoperative SBP were higher in the general anaesthesia group as compared to spinal anaesthesia group. The pre-operative HR was higher in the 2nd group (90.6 beats/min) as compared to 1st group (83.4 beats/min). the postoperative HR in 1st and 2nd group was 95.8 beats/min and 73.4 beats/min, respectively. The estimated blood loss in 1st group was higher (762.3 ml) as compared to the 2nd group (691.9 ml).

Foetal outcomes: The foetal weight of the group 1 newborns was slightly lesser (2861.3 g) than those of the 2nd group (2867.5 g). 10 out of 50 newborns from 1st group showed 1- min Apgar score < 7 whereas 7 newborns from 2nd group showed the same. 2 out of 50 newborns from the 1st group showed 5-min Apgar score <7.

DISCUSSION

Caesarean delivery rates have increased over time, considering the health of both the mother and the foetus. Although GA as an anaesthetic technique provides rapid induction and better cardiovascular and respiratory stability, anaesthetic drugs that cross the placental barrier may cause foetal depression. In addition, while the risk of aspiration is increased in a pregnant woman who is considered to have a full stomach, intubation may be difficult due to the changing anatomy of the pregnant woman.¹⁰ It has been suggested that GA may be more appropriate to apply to the patient to shorten the time between the onset of anaesthesia and the delivery of the foetus in caesarean deliveries.¹¹

Sympathetic blockade and hypotension developing during SA may adversely affect the newborn by decreasing uteroplacental perfusion. Furthermore, cerebrospinal fluid leakage from lumbar puncture causes complications such as headache and

nausea.^{12,13} An ideal anaesthesia method has been determined for caesarean delivery, and the decision is made according to the mother's request, obstetric reasons, and the experience of the anaesthesiologist. The prevalence of caesarean section (C-section) has dramatically increased globally. In 150 countries 18.6% of total births are through a C-section. Iran is among the countries with the highest rate of C-section (47.9%).¹⁴

From 1985 to 1990, the mortality rate of C-sections under general anaesthesia was reported to be 16.7 times higher than that under spinal anaesthesia in the United States. However, in a study in 2002, the mortality rate was reduced significantly, and it was suggested that anaesthesia the two types of anaesthesia might not influence mortality, indicating that procedures and drugs for general anaesthesia have improved in the past two decades.¹⁵

Hence, this study was conducted to evaluate the Comparison between general and spinal anaesthesia for elective caesarean section on maternal and foetal outcomes.

In this study, 100 women underwent 100 singleton deliveries and were divided into 2 groups of 50 each based on anaesthesia received. Both maternal and foetal outcomes were measured. In maternal outcomes, it was found that the pre-operative SBP and postoperative SBP were higher in the general anaesthesia group as compared to spinal anaesthesia group. The pre-operative HR was higher in the 2nd group (90.6 beats/min) as compared to 1st group (83.4 beats/min). the postoperative HR in 1st and 2nd group was 95.8 beats/min and 73.4 beats/min, respectively. The estimated blood loss in 1st group was higher (762.3 ml) as compared to the 2nd group (691.9 ml). The foetal weight of the group 1 newborns was slightly lesser (2861.3 g) than those of the 2nd group (2867.5 g). 10 out of 50 newborns from 1st group showed 1- min Apgar score < 7 whereas 7 newborns from 2nd group showed the same. 2 out of 50 newborns from the 1st group showed 5-min Apgar score < 7.

The study conducted by Emadi SA et al¹⁶ aimed to determine the choice of general and spinal anaesthesia among women undergoing elective caesarean sections and the factors affecting their choice. In this descriptive study, pregnant women who had the ability to undergo both spinal and general anaesthesia were referred to public and private hospitals in (Sari Imam Khomeini Hospital, Mazandaran University of Medical Sciences). A questionnaire recorded the patient's demographic data, education and occupation, history of anaesthesia, choice of anaesthetic method, and reason for selection. A total of 384 women were included in the study, of whom 60% selected general anaesthesia and 40% selected spinal anaesthesia. Among the reasons for not choosing spinal anaesthesia, most common were fear of injury to the spinal cord (64.3%) and fear of seeing and hearing during the surgery (53.3%), and among the reasons

for not choosing general anaesthesia, most common were fear of not waking (54.3%) and a desire to be alert at the time of infant birth (40.7%). Most of the women with a history of spinal anaesthesia selected spinal anaesthesia (53%), and 62% of those without a history of spinal anaesthesia selected general anaesthesia. Factors such as age, nonmedical staff advice, and being employed were significantly correlated with the choice of anaesthesia (P<0.005). The rate of general anaesthesia selection was higher than spinal anaesthesia.

Saygi et al¹⁷ performed a prospective randomized study comparing maternal and foetal outcomes between general and spinal anaesthesia groups undergoing caesarean section. The postoperative hct levels (29.9 ± 3.2% vs. 32.2 ± 4.1%, P = 0.004) were significantly lower in the general anaesthesia group than in the spinal anaesthesia group.

CONCLUSION

The general group was characterized by higher levels of maternal blood loss and a greater percentage of newborns with 5-minute Apgar scores below 7 compared to the spinal group in caesarean procedures.

REFERENCES

1. Regional versus general anaesthesia for caesarean section. Afolabi BB, Lesi FE. *Cochrane Database Syst Rev.* 2012;10:4350.
2. General versus spinal anaesthesia during elective caesarean section in term low-risk pregnancy as regards maternal and neonatal outcomes: a prospective, controlled clinical trial. Madkour N, Ibrahim S, Ezz G. *Res Opin Anesth Intensive Care.* 2019;6:119.
3. Anaesthesia for caesarean delivery: general or regional anaesthesia—a systematic review. Iddrisu Iddrisu, M. M., Khan Khan, Z.H Z.H. *Ain-Shams J Anesthesiol.* 2021;13:1.
4. The effect of spinal versus general anaesthesia on quality of life in women undergoing caesarean delivery on maternal request. Ghaffari S, Dehghanpisheh L, Tavakkoli F, Mahmoudi H. *Cureus.* 2018;10:0.
5. WHO statement on caesarean section rates. Betran AP, Torloni MR, Zhang JJ, Gülmezoglu AM. *BJOG.* 2016;123:667–670.
6. Elective caesarean delivery on maternal request. Ecker J. *JAMA.* 2013;309:1930–1936.
7. ACOG committee opinion no. 559: caesarean delivery on maternal request. American College of Obstetricians and Gynecologists. *Obstet Gynecol.* 2013;121:904–907.
8. The role of psychological factors in persistent pain after caesarean delivery. Richez B, Ouchchane L, Guttman A, et al. *J Pain.* 2015;16:1136–1146.
9. Clinical update: obstetric anaesthesia. Cyna AM, Dodd J. *The Lancet.* 2007;370:640–642.
10. Ngan Kee WD. Confidential enquiries into maternal deaths: 50 years of closing the loop. *Br J Anaesth.* 2005;94:413–6.
11. Chen Y, Liu W, Gong X, Cheng Q. Comparison of effects of general anaesthesia and combined spinal/epidural anaesthesia for caesarean delivery on umbilical cord blood gas values: a double-blind,

- randomized, controlled study. *Med Sci Monit.* 2019;25:5272–9.
12. Laudenbach V, Mercier FJ, Rozé JC, Larroque B, Ancel PY, Kaminski M, et al. Epipage Study Group. Anaesthesia mode for caesarean section and mortality in very preterm infants: an epidemiologic study in the EPIPAGE cohort. *Int J Obstet Anesth.* 2009;18:142–9.
 13. Van de Velde M, Schepers R, Berends N, Vandermeersch E, De Buck F. Ten years of experience with accidental dural puncture and post-dural puncture headache in a tertiary obstetric anaesthesia department. *Int J Obstet Anesth.* 2008;17:329–35.
 14. Shirzad M, Shakibazadeh E, Hajimiri K, et al. Prevalence of and reasons for women's, family members', and health professionals' preferences for caesarean section in Iran: a mixed-methods systematic review. *Reprod Health* 2021;18:3.
 15. Sumikura H, Niwa H, Sato M, et al. Rethinking general anaesthesia for caesarean section. *J Anesth* 2016;30:268–73.
 16. Emadi SA, Gholipour Baradari A, Khademloo M, Abotorabi M, Hassanzadeh Kiabi F. Evaluating patients' choice of general and spinal anaesthesia for elective caesarean section and associated factors: a descriptive study. *Ann Med Surg (Lond).* 2023 Jan 12;85(1):6-12.
 17. Saygı Aİ, Özdamar Ö, Gün İ, Emirkadı H, Müngen E, Akpak YK. Comparison of maternal and foetal outcomes among patients undergoing caesarean section under general and spinal anaesthesia: a randomized clinical trial. *Sao Paulo Med J.* 2015;133:227–34.