ORIGINAL RESEARCH

A Study of Comparative Efficacy Analysisof Spinal and General Anaesthesia in Caesarean Section Procedures

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ABSTRACT

Background:The two types of regional anesthesia used for caesarean sections are spinal and epidural anesthesia. The advantages of regional anesthesia include reduced complications associated with general anesthesia and promotion of initial bonding between the mother and the baby. The present study was conducted for comparatively evaluating efficacy of spinal and general anaesthesia in patients undergoing caesarean section.**Materials and Methods**:This study comprised of 120 women who underwent caesarean section delivery. The procedure was explained to the subjects and the patients were asked to give consent. Overall, 100 women were enrolled in the study after applying inclusion and exclusion criteria.All the subjects were randomized into two study groups' Spinal group and general anesthesia group. Various maternal and fetal parameters had been evaluated. Statistical analysis had been conducted using SPSS software.**Results**: In this study, there were total 100 women of which 26 belonged to the age group of 20-25 years, 65 belonged to the age group of 26-30 years and 9 belonged to the age group of 31-35 years. The mean pre-operative SBP among women of group 1 and group 2 were 134.8 ± 14.3 mm Hg and 130.7 ± 0.8 mm Hg, respectively. The mean post-operative SBP among women of group 1 and group 2 were 135.9 ± 15.7 mm Hg and 123.4 ± 10.2 mm Hg, respectively. The mean pre-operative HR among women of group 1 and group 2 were 82.9 ± 13.1 beats/min and 86.3 ± 14.4 beats/min, respectively. The mean post-operative HR among women of group 1 and group 2 were 89.6 ± 17.8 beats/min and 69.9 ± 17.7 beats/min, respectively.**Conclusion**: The general group exhibits a higher incidence of maternal blood loss and a greater percentage of newborns with 5-minute Apgar scores below 7 compared to the spinal group during caesarean deliveries.

Keywords: Efficacy, Spinal Anaesthesia, General Anaesthesia, Caesarean.

INTRODUCTION

The two types of regional anesthesia used for caesarean sections are spinal and epidural anesthesia. The advantages of regional anesthesia include reduced complications associated with general anesthesia and promotion of initial bonding between the mother and the baby (because the mother is awake during the operation).[1] Recently, spinal anesthesia has been preferred over epidural anesthesia for caesarean section because of its rapid onset, effectiveness, and lower requirement for local anesthetics; however, it is associated with a higher incidence of arterial hypotension.[2] Spinal anesthesia using small amounts of local anesthetics is less likely to cause maternal systemic toxicity or total spinal anesthesia. Therefore, it is pertinent to compare the effects of general and spinal anesthesia during caesarean sections on maternal and fetal outcomes.[3]Previous studies have compared postoperative maternal hematocrit (hct) levels between general and spinal anesthesia for caesarean section.[3,4] The Cochrane database[5] has three papers on maternal blood loss in relation to caesarean section; one study has compared epidural and general anesthesia and two studies have compared spinal and general anesthesia.The proportion of women giving birth by caesarean delivery has increased in both developed and developing countries.[6] 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.[7,8]This study was a comparative evaluation of efficacy of spinal and general anaesthesia in patients undergoing caesarean section.

MATERIALS AND METHODS

Present study was conducted in Department of Anesthesiology, LNCT Medical College and Sewakunj Hospital, Indore, Madhya Pradesh, India. This study comprised of 120 women who underwent caesarean section delivery. The aim of this study was to compare the efficacy of spinal anaesthesia and general anaesthesia. The procedure was explained to the subjects and the patients were asked to give consent. The subjects who gave consent for the study had been included in the study while those who refused to give consent had been excluded from the study. 20 women refused to give consent for the study and hence, they had been excluded from the study. overall, 100 women were enrolled. All the subjects were randomized into two study groups' Spinal group and general anesthesia group. Various maternal and fetal parameters had been evaluated. Statistical analysis had been conducted using SPSS software.

RESULTS

In this study, there were total 100 women of which 26 belonged to the age group of 20-25 years, 65 belonged to the age group of 26-30 years and 9 belonged to the age group of 31-35 years.

The mean pre-operative SBP among women of group 1 and group 2 were 134.8 ± 14.3 mm Hg and 130.7 ± 0.8 mm Hg, respectively. The mean post-operative SBP among women of group 1 and group 2 were 135.9 ± 15.7 mm Hg and 123.4 ± 10.2 mm Hg, respectively. The mean pre-operative HR among women of group 1 and group 2 were 82.9 ± 13.1 beats/min and 86.3 ± 14.4 beats/min, respectively. The mean post-operative HR among women of group 1 and group 2 were 89.6 ± 17.8 beats/min and 69.9 ± 17.7 beats/min, respectively. The mean duration of hospital stay for women of group 1 was 5.0 ± 0.8 days and the mean duration of hospital stay for women of the 2nd group was 5.0 ± 0.9 days.

The weight of the newborns delivered by the women of group 1 was 2,869.7 ± 558.7 g, while the weight of the newborns delivered by the women of group 2 was 2,871.5 ± 603.8 g.

Table 1: Age-wise distribution of subjects

Age	Number of subjects	Percentage
20-25 years	26	26
26-30 years	65	65
31-35 years	09	09
Total	100	100

Table 2: MaternalParameters

Maternal parameters	Group 1 (GA)	Group 2 (SA)
Preoperative SBP (mm Hg)	134.8 ± 14.3	130.7 ± 0.8
Postoperative SBP (mm Hg)	135.9 ± 15.7	123.4 ± 10.2
Preoperative HR (beats/min)	82.9 ± 13.1	86.3 ± 14.4
Postoperative HR (beats/min)	89.6 ± 17.8	69.9 ± 17.7
Hospital stay duration (days)	5.0 ± 0.8	5.0 ± 0.9

Table 3: Fetal parameters

Fetal parameters	Group 1 (GA)	Group 2 (SA)
Fetal weight (g)	2,869.7 ± 558.7	2,871.5 ± 603.8
Apgar score (1 min) < 7 (%)	29	21
Apgar score (5 min) < 7 (%)	05	00

DISCUSSION

Physiological changes in pregnancy, including hematological, cardiovascular and respiratory changes, all increase the risks during caesarean sections (CS) and anesthetic management of a parturient is a challenge because it involves simultaneous care of both mother and baby.[9-12]

These risks and complications are related to the level of urgency.[13] Clinical experience of the majority ofanesthetists with general anesthesia (GA) in obstetrics is very low. GA is mostly conducted for emergency caesarean section due to the time factor dictated by fetal condition which usually precludes regional anesthesia.[14] Technical placement of a spinal anesthetic (SA) is easier than an epidural block in epidural anesthesia (EA). Onset of action of spinal anesthesia is fast and it provides a reliable surgical anesthesia from the mid-thoracic level to the sacrum with a failure rate of less than 1%. Moreover, SA was found to provide better and more cost-effective anesthesia for uncomplicated, elective caesarean sections than EA.[15,16]Caesarean section is a widely performed surgery with a rate of maternal mortality that is much higher than vaginal delivery and the leading causes of death are complications of preeclampsia, pulmonary thromboembolism, amniotic fluid embolism, obstetric hemorrhage and cardiac disease.[17]This study was a comparative evaluation of

efficacy of spinal and general anaesthesia in patients undergoing caesarean section.

In this study, there were total 100 women of which 26 belonged to the age group of 20-25 years, 65 belonged to the age group of 26-30 years and 9 belonged to the age group of 31-35 years. The mean pre-operative SBP among women of group 1 and group 2 were 134.8 ± 14.3 mm Hg and 130.7 ± 0.8 mm Hg, respectively. The mean post-operative SBP among women of group 1 and group 2 were 135.9 ± 15.7 mm Hg and 123.4 ± 10.2 mm Hg, respectively. The mean pre-operative HR among women of group 1 and group 2 were 82.9 ± 13.1 beats/min and 86.3 ± 14.4 beats/min, respectively. The mean post-operative HR among women of group 1 and group 2 were 89.6 ± 17.8 beats/min and 69.9 ± 17.7 beats/min, respectively. The mean duration of hospital stay for women of group 1 was 5.0 ± 0.8 days and the mean duration of hospital stay for women of the 2nd group was 5.0 ± 0.9 days. Ghaffari S et al[18] determined whether pregnant women who undergo general anesthesia (GA) for caesarean delivery compared with spinal anesthesia (SA) differ regarding their perceived HRQoL. They enrolled 160 pregnant women with American Society of Anesthesiologists (ASA) class II, scheduled for CDMR with GA or SA. Anesthesia modality was based on patient's preference. Participants assessed their state of health with the EuroQoL-5 Dimensions-3 Levels (EQ-5D-3L) self-administered questionnaire at four time points: six hours before caesarean delivery, 24 hours after caesarean delivery, one week and one month after caesarean delivery. Patients also rated their health on the EQ visual analog scale (EQ-VAS) from 100 mm "best imaginable health state" to 0 mm "worst imaginable health state". More women who underwent spinal anesthesia reported "no problem" with regards to "mobility' (64% vs. 30%, p = 0.00), "usual activities" (90% vs. 38%, p = 0.00), and "pain/discomfort" (20% vs. 5%, p = 0.007). Repeated measurement analysis showed that the two groups started off with the same EQ-VAS score, however, both decreased over time with different slope resulting in different scores at 24 hours after CS. Then the scores increased in both groups over time and ended up being rather close at one month after CS. Unless there is a contraindication, neuraxial anesthesia is the anesthetic technique of choice for caesarean delivery in all parturient in general. This concept is based on more mortality and morbidity that have been seen with general anesthesia in this particular population. Their study demonstrated significant advantages of spinal anesthesia compared to general anesthesia in caesarean section regarding postoperatively perceived HRQoL. They showed that more pregnant women who chose spinal anesthesia as their anesthesia modality reported "no problem" with respect to "mobility" and "Self-care" 24 hours after caesarean section. On the top of that, more women in this group had "no problem" in their "usual activities" at one week and one month after caesarean delivery time points. Moreover, EQ-5D general health score was higher 24 hours after caesarean delivery with regional anesthesia comparing to general anesthesia. They determined that compared to general anesthesia, spinal anesthesia is the technique of choice for caesarean section because not only it avoids a general anesthetic and the risk of failed intubation, but also because it provides effective pain control, mobility and fast return back to daily activities for new mothers and increase their quality of life.

The weight of the newborns delivered by the women of group 1 was 2,869.7 ± 558.7 g, while the weight of the newborns delivered by the women of group 2 was 2,871.5 ± 603.8 g.Sung TY et al [19] compared maternal and fetal outcomes between general and spinal anesthesia for caesarean section based on perioperative hemodynamic parameters (pre- and postoperative systolic blood pressure, heart rate), mean difference of hematocrit and estimated blood loss, and neonatal Apgar scores at 1 and 5 min. Data from electronic medical records of 331 singleton pregnancies between January 2016 and December 2018 were analyzed retrospectively; 44 cases were excluded, and 287 cases were assigned to the general group (n = 141) or spinal group (n = 146). Postoperative hemodynamic parameters were significantly higher in the general group than the spinal group. The mean difference between the pre- and postoperative hematocrit was also significantly greater in the general than spinal group. The estimated blood loss was significantly lower in the spinal than general group. There was a significantly larger proportion of newborns with 5-min Apgar scores < 7 in the general than spinal group. General group is associated with more maternal blood loss and a larger proportion of newborns with 5-min Apgar scores < 7 than spinal group during caesarean sections.

CONCLUSION

The general group exhibits a higher incidence of maternal blood loss and a greater percentage of newborns with 5-minute Apgar scores below 7 compared to the spinal group during caesarean deliveries.

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