

CHANGES IN HEMODYNAMIC READING IN SPINAL ANESTHESIA FOR CESAREAN SECTION

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ABSTRACT:

OBJECTIVE:

To compare the pre and post induction blood pressure and heart rate readings in spinal anesthesia during Cesarean section.

METHODOLOGY:

This was a cross sectional study conducted in Capital Development Authority Hospital, Islamabad. 100 patients were included in this study. Data was collected through structured Performa. Convenient sampling method was used for the selection of participants. Informed consent was taken from the patients and the concerns doctors to collect the data. The ethical approval was taken from the ethical committee of the Capital Development Authority Hospital, Islamabad.

RESULTS:

Total was 100 cases selected in which the patients had surgery history, 32 patients had no surgery history. There was difference in the blood pressure and heart rate readings of the pre and post induction of the spinal anesthesia during cesarean of the patients.

CONCLUSION:

It was concluded that spinal Spinal anesthesia is commonly used for elective cesarean delivery.

KEYWORDS: Spinal Anesthesia, Hemodynamic, Blood pressure, Heart rate, Cesarean-Section

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INTRODUCTION:

Female Patients that present for surgery during pregnancy pose several important challenges for anesthesiologists. Anesthetic technique for C-section has changed since last 30 years from general anesthesia to regional anesthesia¹. Spinal anesthesia has become the main technique both for elective and urgent C- section. There are several

techniques for administering regional anesthesia; spinal, epidural, combine spinal epidural and continuous spinal anesthesia². Although spinal block provides excellent anesthesia for cesarean section it is frequently accompanied by hypotension generally proportional to the degree (level) of sympathectomy (height of block)³. Many methods to decrease the risk of hypotension have been studied, which include ensuring proper maternal position with uterus displaced off vena cava, infusion of fluids to increase effective blood volume, administration of ephedrine and phenylephrine, physical intervention such as leg wrapping⁴. In elective cesarean delivery, spinal

anesthesia is frequently used⁵. An intensification in venous capacitance and a decrease in systemic vascular resistance results in hypotension. Because uterine blood flow is dependent on perfusion pressure, hypotension results in reduced uterine blood flow, with a potential compromise in fetal oxygenation⁷. In Spinal anesthesia the risk of toxicity is reduced as minimum dose of local anesthesia are used and the block is faster and reliable as compared to epidural anesthesia⁸. Hemodynamic changes have been related with adjustments in Doppler waveform indices in the umbilical artery and a reduction in umbilical arterial pH at delivery. This is due to reduce arterial pressure and cardiac output with a single subarachnoid injection⁹. Several studies have investigated the hemodynamic effects of spinal anesthesia in severely affected patients. The hemodynamic fluctuations linked with spinal anesthesia signify the utmost latent risk of this method for mother and fetus¹⁰. Contraindications to regional anesthesia are patient refusal or patient not being able to cooperate, increase intracranial pressure, coagulopathy, and local skin infection. The occurrence of post Dural puncture headache (PDPH) after spinal anesthesia using small (25 G, 27 G) pencil point needles is low unintentional dura puncture with an epidural needle (18 G) has an incidence of 52% of PDPH¹¹. Long lasting neurologist deficit is extremely rare, estimated to 1:240 000. The incidence of spinal hematoma after obstetric epidural blockade has been estimated to be 1:168 000¹².

METHODOLOGY:

The study design was cross sectional observational study. This study was performed among the patient of the Capital Development Authority, Islamabad. The study time duration was October 2018 and April 2019. A total of 100 females visited hospital gynaecology and Obstetrics department were selected for the study. All those patients that were undergo cesarean section in elective surgeries for spinal anesthesia were included. All emergency gynaecology cases were excluded. The approval was taken from hospital ethical committee, in Capital Development Authority Hospital, Islamabad. Informed written consent was taken from each patient. Initial data about age and date of admission was recorded on predesigned Performa. Detailed history and examination were done by senior surgeon or anesthesiologist under supervision. Data was entered and analyzed in SPSS 23.0.

RESULTS:

A total of 100 cases were taken for this study with a mean age of 30+4.942 years. It was found that 68(68.0) patients had previous history of surgery, while 32(32.0) had no previous history of surgery. The mean Hemoglobin Concentration was found to be 11.21+1.311. Table 1 shows the blood pressure and heart rate before induction.

Table 1: Mean and standard deviation of the patients

	Pre induction n= 100	Post induction	After 10 min induction n= 100	After20 minutes
Scales	Mean+ SD	Mean+ SD	Mean+ SD	Mean+ SD
Systolic BP	128.86+11.793	123.500+19.035	113.500+12.716	106.520+ 13.37
Diastolic BP	77.300+11.152	73.640+18.828	67.900+15.52	57.700+ 14.8
Heart rate	99.440+12.756	101.820+16.126	96.480+12.726	97.900+10.35

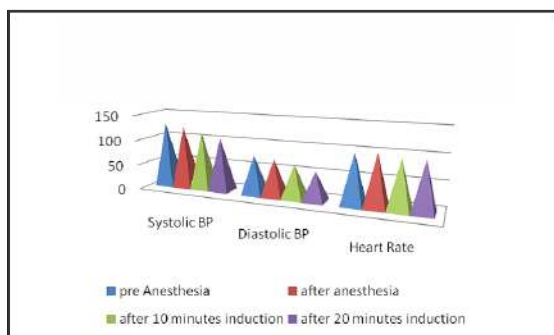


Figure: 1: Mean Difference of Blood Pressure and Heart Rate

DISCUSSION:

Spinal anesthesia used in elective cesarean delivery are associated with hypotension which is caused by an increase in venous capacitance and a reduction in systemic vascular resistance¹³. In one study it was concluded that after spinal anesthesia, Mean Arterial Pressure (MAP) decreased significantly and was maintained at a lower level than the baseline value until fetal delivery. Like MAP, Cardiac Output decreased significantly at 5 min after spinal anesthesia until delivery¹⁴. Although Total Peripheral Resistance (TPR) also decreased after spinal anesthesia, it was not significant. Similarly, another study showed that total vascular resistance was maintained in patients with single fetus in post spinal period¹⁵. Liu and co-workers reported no significant reduction of systemic vascular resistance (SVR) except at 5 min after spinal anesthesia¹⁶. Since they used phenylephrine to treat hypotension after spinal anesthesia. In our study, there was significant difference between the pre and post results of blood pressure and heart rate of the cesarean patients having spinal anesthesia during the elective surgery. As recently conducted a study about the physiological changes after Spinal Anesthesia in 2008, it was stated that CO typically decreases due to a decrease in venous return¹⁷. Hypotension after spinal anesthesia for C- section is common and is a risk factor for adverse maternal and fetal events. After identifying the association of hypotension with

spinal anesthesia and its prevalence, the clinician with better serve the patients with precautionary measures. The prognostic capability non-invasive hemodynamic parameters for hypotension has been investigated in parturient with single fetus undergoing C-section²⁰. Yukos and co-workers demonstrated that preanesthetic HR may be a prognostic factor for hypotension associated with spinal anesthesia¹⁹. In this study, we found a tendency to a lower baseline Cardiac Output for parturient with twins who developed hypotension.

CONCLUSION:

Spinal anesthesia is commonly used for elective cesarean delivery. Associated hypotension is caused by an increase in venous capacitance and a reduction in systemic vascular resistance. According to the result of our study it was concluded that SA effects the hemodynamic stability of the patients. Patients develop hypotension and bradycardia after the induction of SA. It was clearly identified according to the results of our study that there is difference in pre-induction HR and BP and post-induction HR and BP.

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CONTRIBUTORS

1. **Shakir Ullah Khan** - Concept & Design; Data Acquisition; Data Analysis / Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval