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Original Research

Assessment of Incidence of Failure of Spinal Anesthesia Necessitating the Conversion to General Anesthesia in Women Presenting for Caesarean Section: An Observational Study

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***ABSTRACT*:**

Background: Failure of spinal anaesthesia for caesarean section may have deleterious consequences for the mother as well as the newborn baby. **Aim of the study:** To assess incidence of Failure of Spinal Anesthesia Necessitating the Conversion to General Anesthesia in Women Presenting for Caesarean Section. **Materials and methods:** The study was conducted in the Department of Anesthesia of MGM Medical College and Hospital, Mumbai. For the study, the selection of subjects was done by including all mothers scheduled for caesarean section under regional anesthesia in the obstetric theatre. A total of 62 patients were included in the study. The data was collected using a questionnaire which was partly filled by the investigator in the ward and the last part in theatre as the operation went on. Patient's details were entered including age, weight and height, indication for caesarean section and parity. **Results:** We observed that mean age of the patients was 33.92 years. Mean BMI of the patients was 28.21 kg/m^2. No. of elective cases were 12 and no. of emergency cases were 50. 9.7 % of the total cases were converted to general anesthesia due to failure of spinal anesthesia. The results were statistically significant. **Conclusion**: Within the limitations of the present study, it can be concluded that our study population had approximately 10% conversion rate from spinal anesthesia to general anesthesia because of failure of spinal anesthesia during c-section procedure.

Keywords: Spinal anesthesia, C-section, General anesthesia.

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INTRODUCTION:

Obstetric anaesthetists are faced with the unique situation of providing anaesthesia for caesarean sections, where anaesthetists have to provide care for both the mother and the unborn baby. A team approach is vital to ensure optimal outcome while ensuring that the labour process is a safe and pleasant experience for the parturient. There has been an increasing trend in the caesarean section rate in the last two decades not just in developed countries but also in developing countries. A study in the United Kingdom showed that the rate of caesarean section has increased from 12.5% in 1990 to 18.3% in 1999, [1] while in China, there has been an increase from 8.9% in 1993–1994 to 24.8% in 2001–2002. [2] In our institution in Singapore, the rate has been documented as high as 25.2%. [3] Although spinal anaesthesia is considered to be the most reliable form of anaesthesia, occasional failures are not unknown. It is essential to recognize that the failure of spinal anaesthesia during caesarean section has detrimental implications on the wellbeing of both the parturient and the neonate. Therefore, the failure must be viewed more

critically in obstetric compared with nonobstetric settings. As there are very limited options to approach the failure, utmost vigilance is warranted while performing spinal anaesthesia to minimise both failure rate as well as maternal or foetal complications. With careful performance of technique, a failure rate as low as 1% is attainable though various studies have quoted failure rate up to 17%. [4-6] Hence, the present study was conducted to assess incidence of Failure of Spinal Anesthesia Necessitating the Conversion to General Anesthesia in Women Presenting for Caesarean Section.

MATERIALS AND METHODS:

The study was conducted in the Department of Anesthesia of MGM Medical College and Hospital, Mumbai. The ethical clearance for the study was obtained from the ethical board of the institute prior to commencement of the study. For the study, the selection of subjects was done by including all mothers scheduled for caesarean section under regional anesthesia in the obstetric theatre.

Inclusion criteria:

1. All who gave informed consent.
2. Parturients who were planned caesarean section under regional anaesthesia
3. Parturients that were weighed and their heights taken.

Exclusion criteria:

1. Parturients planned for general anaesthesia.
2. Parturients who refused to participate.
3. Parturients in whom we couldn't obtain height and weight.

The eligible patient or their next of kin for those who were unable to consent gave informed consent and completed a consent form before being involved in the study. A total of 62 patients were included in the study. The data was collected using a questionnaire which was partly filled by the investigator in the ward and the last part in theatre as the operation went on. Patient's details were entered including age, weight and height, indication for caesarean section and parity. In OT, we observed the administration of spinal anaesthesia, cadre of anaesthetist, position during administration, anaesthetic agents that were used and the height of block during spinal anaesthesia were recorded. In case conversion occurred, time of conversion, type of conversion and complication of conversion were recorded.

The statistical analysis of the data was done using SPSS version 20.0 for windows. The Student's t-test and Chi-square test were used to check the significance of the data. The p-value less than 0.05 was predetermined as statistically significant.

RESULTS:

Table 1 shows the demographic data of the patients. We observed that mean age of the patients was 33.92 years. Mean BMI of the patients was 28.21 kg/m^2. No. of elective cases were 12 and no. of emergency cases were 50. Table 2 shows the incidence of Failure of Spinal Anesthesia Necessitating the Conversion to General Anesthesia. We observed that 9.7 % of the total cases were converted to general anesthesia due to failure of spinal anesthesia. The results were statistically significant ($p<0.05$) [Fig 1].

Table 1: Demographic data of the patients

Characteristic parameters	Mean values
Mean age (years)	33.92
Mean BMI (kg/m^2)	28.21
Classification of cesarean section • Elective (cases) • Emergency (cases)	 • 12 • 50

Table 2: Incidence of Failure of Spinal Anesthesia Necessitating the Conversion to General Anesthesia

Variables	No. of cases n, %	p-value
Total no. of cases	116	0.001
Converted cases	6 (9.7%)	
Non-converted cases	56 (90.3%)	

DISCUSSION:

In the present study, we studied the assess failure of spinal anesthesia to general anesthesia in women presenting for C-section surgery. We observed that in our study population, a total of 9.7 % cases were converted to general anesthesia due to failure of spinal anesthesia. The results were compared with previous studies from the literature and were found to be consistent. At A et al [7] determined the incidence of failure of spinal anaesthesia necessitating the conversion to general anaesthesia or the use of supplemental analgesia in women presenting for Caesarean section and to identify the contributory factor(s) to the failure. It was a prospective study of 414 women who had spinal anaesthesia for Caesarean section. Women who had single-shot spinal anaesthesia for Caesarean section from April 2010 to March 2011 were prospectively studied using a standard proforma to record details of their demographic, clinical features, surgical and anaesthetic data and outcome. The failed spinal anaesthesia rate in this study was 6.0%. The experience of the anaesthetist was a significant contributing factor for partial or complete failure necessitating conversion to general anaesthesia. Intra-operative supplemental analgesic was required in 6.4% of those who had their surgery completed under spinal anaesthesia. Postpartum sterilization, exteriorization of the uterus during surgery, and surgical complications were significant risk factors for partial failure necessitating supplemental intra-operative analgesic. They conclueded that spinal anaesthesia conversion rate is high in this study when compared with reports from developed countries. Adequate training for residents in anaesthesia will decrease the failure rate. Parturients undergoing sterilization during Caesarean section may require supplementary analgesia. Desai N et al [8] surveyed if conversion of labor epidural analgesia to cesarean delivery anesthesia fails, the anesthesiologist can be confronted with a challenging clinical dilemma. All members of the Obstetric Anaesthetists' Association in the United Kingdom were emailed an online survey in May 2017. It obtained information on factors influencing the decision to utilize an existing labor epidural for cesarean section and, if epidural top up resulted in no objective sensory block, bilateral T10 sensory block, or unilateral T6 sensory block, factors influencing the management and selection of anesthetic technique. Differences in management options between respondents were compared using the chi-squared test. They received 710 survey questionnaires with an overall response rate of 41%. Most respondents (89%) would consider topping up an existing labor epidural for a category-one cesarean section. In evaluating whether or not to top up an existing labor epidural, the factors influencing decision-making were how effective the epidural had been for labor pain (99%), category of cesarean section (73%), and dermatomal level of blockade (61%). In the setting of a failed epidural top up, the most influential factors determining further anesthetic management were the category of cesarean section (92%), dermatomal level of blockade (78%), and the assessment of maternal airway. Spinal anesthesia was commonly preferred if an epidural top up resulted in no objective sensory block (74%), bilateral T10 sensory block (57%), or unilateral T6 sensory block (45%). If the sensory block level was higher or unilateral, then a lower dose of intrathecal local anesthetic was selected and alternative options such as combined-spinal epidural and general anesthesia were increasingly favored. They concluded that variations in the clinical management of a failed epidural top up for cesarean delivery, suggesting guidelines to aid decision-making are needed.

Ismail S et al [9] analyzed the effect of labor epidural (LE) on the incidence of cesarean section (CS) and assess the risk factors involved in failed conversion of LE to surgical anesthesia for CS. A prospective observational study of 18 months from January 2012 to June 2013 was conducted on all patients who had delivered in the labor room suit of our hospital. The data collected for all 4694 patients included their demographics, parity and mode of delivery. In addition, a predesigned proforma, with additional information was used for 629 parturient with LE. During the study period, total numbers of deliveries performed in our hospital were 4694, with an epidural rate of 13.4% (629/4694). No significant difference was observed in the rate of CS among women with or without LE, however, a statistically significant difference was observed in the rate of assisted delivery in patients receiving LE as compared to those delivering without it. For 176 patients requiring CS, LE utilization for surgical anesthesia was 52.8% and factors identified for not utilizing LE in 47% were; failure to achieve surgical anesthesia in 6.8%, emergency CS in 28.4%, patient preference in 6.8% and inadequate labor pain relief with LE in 5.1% patients. Non-obstetric anesthesiologists were involved in 59% (49/83) of cases where LE was not used for CS. They concluded that LE had no effect on the rate of CS; however it significantly increased ($P < 0.01$) the rate of assisted delivery. Factors like inadequate LE, emergency situations and non-obstetric anesthesiologists can all be responsible for failed conversion of LE to surgical anesthesia for CS. Bhar D et al [10] compared the outcome between two different doses of 0.5% hyperbaric bupivacaine repeated intrathecally after failed spinal. After taking informed consent and Ethical Committee approval this prospective, randomized single-blinded study was conducted in 100 parturients of American Society of Anesthesiologists I-II who were posted for elective LSCS and had Bromage score 0 and no sensory block

even at L4 dermatome after 10 min of first spinal anesthesia; were included in the study. Group A patients received 2.4 ml and Group B patients received 2 ml of 0.5% hyperbaric bupivacaine respectively for administering repeat spinal anesthesia. Heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), oxygen saturation, respiratory rate and electrocardiogram were monitored both intra- and post-operatively and complications were recorded. Incidence of high spinal, bradycardia, hypotension, respiratory complications, and nausea vomiting are significantly higher in Group A compared to Group B. SBP, DBP, and HR were significantly low in Group A patients compared to Group B in the first 10 min. They concluded that spinal anesthesia can be safely repeated in the cesarean section with 10 mg of 0.5% hyperbaric bupivacaine provided after first spinal anesthesia, the level of sensory block is below L4 and motor power in Bromage scale is 0.

CONCLUSION:

Within the limitations of the present study, it can be concluded that our study population had approximately 10% conversion rate from spinal anesthesia to general anesthesia because of failure of spinal anesthesia during c-section procedure.

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