

Study of conversion of regional to general anaesthesia for caesarean section at a tertiary hospital

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Abstract

Background: Failure of spinal anaesthesia requiring supplemental analgesia or outright conversion to general anaesthesia sometimes occurs either pre- or intraoperatively exposing a patient to complications of both modes of anaesthesia. In the relevant literature, the rates of conversion to general anaesthesia are given as approximately 1 in 100 cases. In present study, we aimed to study caesarean sections in whom conversion of regional to general anaesthesia was needed. **Material and Methods:** Present study was retrospective, case record-based study conducted in parturient women undergoing caesarean section under regional anaesthesia (RA) required conversion to general anaesthesia. **Results:** During study period total 55 cases required conversion from spinal anaesthesia to general anaesthesia. Incidence of conversion was 1.88% (55/2918). Out of 55 cases 29 (53%) had documented failure of spinal anaesthesia, 33% had partial failure and 20% had complete failure. For conversion surgical causes were most common (47%), followed by technical causes (45%) and unknown (7%). Most common documented reason for conversion were prolonged surgery due to adhesions (24%) followed by inadequate dose leading to partial failure (20%) and intra-operative additional procedures done due to obstetric complications (e.g. Obstetric hysterectomy, systemic devascularisation)(16%). In those cases, 7% (4 cases) maternal mortality and 11% (6 cases) early neonatal mortality was noted. **Conclusion:** Preoperative evaluation and anticipation of obstetric complications by history and communication with treating obstetrician, addition of intrathecal adjuvants is important to prevent conversion from regional to general anaesthesia and morbidity related to it.

Keywords: regional anaesthesia, general anaesthesia, caesarean section, failure of spinal anaesthesia

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Received Date: 02/01/2021 Revised Date: 10/02/2021 Accepted Date: 22/03/2021

DOI: <https://doi.org/10.26611/10151812>

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Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 10 April 2021

INTRODUCTION

Continuous rise in caesarean sections is noted worldwide, mainly due to more advanced intrapartum fetal monitoring, allowing obstetricians to diagnose intrapartum fetal compromise earlier and more effectively, previous caesarean deliveries and maternal request. Internationally, obstetric anaesthesia guidelines recommend spinal and epidural over general anaesthesia (GA) for most caesarean sections (CSs).^{1,2} The nearly non-existing risk of systemic toxicity to the mother and fetus from the small dose of local anaesthetic used has endeared it to obstetric anaesthetists

worldwide³, while there is risk of failed endotracheal intubation and aspiration of gastric contents in pregnant women who undergo GA.⁴ Failure of spinal anaesthesia requiring supplemental analgesia or outright conversion to general anaesthesia sometimes occurs either pre- or intraoperatively exposing a patient to complications of both modes of anaesthesia. On rare occasions, insufficiency of the regional blockade and consequent conversion to general anaesthesia has been reported. In the relevant literature, the rates of conversion to general anaesthesia are given as approximately 1 in 100 cases.⁵ In present study, we aimed to study caesarean sections in whom conversion of regional to general anaesthesia was needed.

MATERIAL AND METHODS

Present study was retrospective, case record-based study conducted in department of anaesthesiology, XXX medical college and Hospital, XXX. Permission was taken from institutional ethics committee. Parturient women

undergoing caesarean section under regional anaesthesia (RA) required conversion to general anaesthesia were considered for present study. Case records of these patients from May 2018 to April 2020 were reviewed. Patient's details were entered including age, weight and height, indication for caesarean section and parity, procedure of spinal anaesthesia, cadre of anaesthetist, position during administration, anaesthetic agents that were used and the height of block during spinal anaesthesia, time of conversion, type of conversion and complication of conversion were recorded. Factors leading to failure were noted as well as feto-maternal outcome. When a small dose of intravenous induction agents or analgesics like, ketamine, propofol or opioid was used to supplement regional anaesthesia, whenever the patient complained of pain was labelled as Partial failure. While when regional anaesthesia was converted to complete general anaesthesia with intubation, or repeat spinal block was given was labelled as complete failure. Collected data was entered in Microsoft excel sheet and analysed descriptively in form of percentages and mean ± SD values.

RESULTS

During study period total 55 cases required conversion from spinal anaesthesia to general anaesthesia. Incidence of conversion was 1.88% (55/2918). Out of 55 cases 29 (53%) had documented failure of spinal anaesthesia, 33% had partial failure and 20% had complete failure.

Table 3: General parameters

Parameter	No. of cases (Mean ± SD)
Maternal age (years)	25.2 ± 4.9
Gestational age (weeks)	37.3 ± 3.2
Parity	1.9 ± 1.1
Mean duration Of surgery (min)	58.1 ± 19.3
Fetal birth weight (kgs)	3.41 ± 1.08
Failure	29 (53%)
Partial Failure	18 (33%)
Complete Failure	11 (20%)

For conversion surgical causes were most common (47%), followed by technical causes (45%) and unknown (7%). Most common documented reason for conversion were prolonged surgery due to adhesions (24%) followed by inadequate dose leading to partial failure (20%) and intra-operative additional procedures done due to obstetric complications (e.g. Obstetric hysterectomy, systemic devascularisation)(16%). In those cases, 7% (4 cases) maternal mortality and 11% (6 cases) early neonatal mortality was noted.

Table 2: Distribution according to Documented reason

Documented reason	No. of cases	Percentages
Surgical		
Prolonged surgery due to adhesions	13	24%
Additional procedures due to obstetric complications (e.g., Obstetric hysterectomy, systemic devascularisation)	9	16%
Bowel/bladder complications	4	7%
Technical		
Inadequate dose	11	20%
Lack of free flow of CSF	5	9%
Ineffective batch of drug	4	7%
Early start of surgery	3	5%
Difficulty in positioning	2	4%
Unknown	4	7%

DISCUSSION

For extreme emergency caesarean deliveries like cord prolapse, placental abruption, or antepartum hemorrhage, where there is an immediate threat to the life of the mother or baby, GA remains the first choice.⁶ General Anesthesia with its superior control over ventilation, avoidance of hypotension seen with spinal anesthesia, speed of induction, and lack of awareness of the perioperative period is preferred in emergency situations and in selected elective procedures.⁷ There is an increasing use of regional anaesthesia in obstetrics recently due to its proven better maternal and fetal outcomes compared with general anaesthesia. Although GA has many advantages, such as faster induction, better cardiovascular stability with lower incidence of hypotension, and good control over ventilation, use of anesthetic drugs that cross the placental barrier can nevertheless produce neonatal depression.⁸ Moreover, complications such as maternal aspiration syndrome and intubation failure, which may occur during general anesthesia and contribute towards maternal mortality, have been reported.^{9,10} Airway problems are more common in pregnancy due to anatomical and physiological changes. Some anatomic changes which affect the obstetric airway include upper airway edema, breast enlargement and excessive weight gain.¹¹ Also concerns about the effects of GA on the neonate have mostly focused on acid-base status, resuscitation and the Apgar score at 1 minute, with the presumption that the effect of GA on the infant is short lived.¹² Conversion rates of less than 1% for electives and less than 3% for non-elective Caesarean section suggested by the Royal College of Anaesthetists.¹³ In present study, incidence of conversion was 1.88%. A teaching maternity unit in the United Kingdom recently performed an audit including 3,519 elective caesarean sections using the CSE technique over a 10-year period. The result showed a need for conversion to general anaesthesia of only 0.23%.¹⁴ Other studies with single-shot spinal anesthesia, which has a general anaesthesia conversion rate of 1.2–1.4%.^{15,16} Vinod P¹⁷ noted incidence of cases converted to C-section because of failure of spinal anesthesia as 8.62%. In study by Kundra P *et al.*,¹⁸ 2,610 parturient were looked at, 1.9% had failed spinal necessitating general anaesthesia. While 2.2% had endotracheal intubation after surgery had begun due to prolonged surgery, hemodynamic instability, and inadequate block. Similar results were noted in present study. Kinsella *et al.* reviewed regional anaesthesia failure in caesarean section. In this review 1.6% of the incidents related to general anaesthesia were tied to conversion. Among them were hypotension, bradycardia, pulmonary oedema, bronchospasm and persistent hypoxemia. Some mothers ended up in intensive care unit because of the morbidities.¹⁹ A study of obstetric patients has shown an

association between difficult intubation and a short neck, obesity, receding mandible and protruding maxillary incisors.²⁰ It is therefore necessary to ensure that there is a well thought-out difficult obstetric airway algorithm with availability of airway adjuncts to deal with airway emergencies during difficult or failed intubation. In similar study Seema Y *et al.*,²¹ noted that the incidence of failed regional anaesthesia was 1.90%, as partial failure 1.28% and complete failure 0.62 % and incidence of conversion of regional to general anaesthesia was 1.77%. In majority of cases, failure occurred due to anaesthetic factors like early start of surgery before establishment of adequate block (33.77%), inadequate dose of local anaesthetic (10.39%), ineffective batch of drug (9.09%), technical factors like lack of free flow of CSF (23.38%), difficulty in positioning (16.89%) and surgical factors like adhesions (1.29%). In 5.19% cases, no reasons of failure were found. None of the factor was found to have significant association with occurrence of failure. Seljogi D *et al.*,²² determined whether the administered spinal bupivacaine dose for performing a cesarean section under spinal anesthesia was related to the conversion rate to general anaesthesia, relative risk of conversion with an 8 mg dose or lower was 4.88. Pokhara A²³ noted a 1.5% total failure requiring repeat spinal in study of 1197 parturient. After the repeat, only 1 patient was converted to general anaesthesia and another 1 had a high spinal requiring intravenous anaesthesia supplementation and support. From this study, it was proposed that repeat spinal may actually reduce the risk of conversion to general anaesthesia. However, urgency of caesarean section will dictate which method will be used and it might also affect the conversion. Common causes for conversion were uterine exteriorization, surgical complications, and postpartum sterilization were identified risk factors for supplemental intra-operative analgesic. Postpartum sterilization was a significant risk factor for partial failure necessitating intra-operative supplemental analgesics.¹³ Other causes include less drug dosage which may be caused by spillage, improper rate of injection, deposition of the drug in the wrong place, failure to recognize dural puncture, improper placement of the needle and lack of co-operation.

CONCLUSION

Preoperative evaluation and anticipation of obstetric complications by history and communication with treating obstetrician, addition of intrathecal adjuvants is important to prevent conversion from regional to general anaesthesia and morbidity related to it. General anaesthesia should be preferred for high-risk cases, surgeries requiring prolonged duration.

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Source of Support: None Declared
Conflict of Interest: None Declared