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Original Research Article

Anesthetic complications in cesarean section

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ABSTRACT

Background: Obstetric anesthetists need to face with the unique situation of providing anesthesia for caesarean sections, where they have to provide care for both the mother and the unborn baby. This study was performed in 100 women who underwent cesarean section, either elective or emergency to evaluate type of anesthesia, anesthetic complications and neonatal outcome.
Methods: A retrospective study was conducted in 100 women with singleton pregnancy undergoing cesarean section in the department of Anesthesiology in collaboration with department of Obstetrics and gynecology at Dr PDMMC and Hospital, Amravati from January 2017 to March 2018. Detailed information regarding medical and obstetric history, intrapartum course, postpartum complications diagnosed before hospital discharge, and infant outcome were collected directly from maternal and infant charts. Other details like age of the patient, parity, type of cesarean section and type of anesthesia was noted. American Society of Anesthesiologists (ASA) scores and type of anesthesia was noted.
Results: In our study, spinal anesthesia was given in 62 (62%) patients, epidural anesthesia was given in 20 (20%) patients, combined spinal-epidural anesthesia was given in 10 (10%) patients while general anesthesia was given in 8 (8%) patients. Anesthetic complications were less. About 10 (10%) patients had spinal headache, 4 (4%) patients had failed regional anesthesia, 2 (2%) patients had failed intubation while 2 (2%) patients had high spinal anesthesia. Babies of 96 (96%) patients had Apgar score at 5 minutes of more than 7 and babies of 4 (4%) patients had Apgar score at 5 minutes of less than 7. Only babies of 2 (2%) patients required intubation for resuscitation.
Conclusions: This study provides strong evidence that the guidelines recommending regional block over GA for most cesarean section. It is beneficial for neonates as well as for mothers.

Keywords: Caesarean section, Obstetrics, Regional anesthesia

INTRODUCTION

There is increase in the caesarean section rate in the last two decades. This may be due to increase in elective caesarean sections due to the patient's and obstetrician's preference.

An increase emergency caesarean sections is attributed to more advanced intrapartum fetal monitoring, allowing obstetricians to diagnose intrapartum fetal compromise earlier and more effectively.[1]

Internationally, obstetric anesthesia guidelines recommend spinal and epidural than general anesthesia for most caesarean sections.[2] The main reason to recommend regional blocks is the risk of failed endotracheal intubation and aspiration of gastric contents in pregnant women who receive GA.[3]

According to American Society of Anesthesiologists (ASA) scores assigned by obstetric anesthesia providers, healthy parturient has a minimum score of 1 or 2, using a 1-5 scale. A score of 1 denotes no increased risk, 2 implies mild-to-moderate preoperative risk, 3 equates to severe preoperative risk, and 4 represents the presence of a life-threatening illness with or without surgery. A score of 5 is reserved for the moribund patient who has little chance of survival without operation.[4]

A Cochrane database of systematic reviews of anesthesia for cesarean section of two randomized studies with 10 Apgar 5<7 and one trial with oxygen therapy as an outcome concluded that there was no evidence that regional anesthesia was superior to GA for neonatal outcome.[5]

There are many indications for general anesthesia like failed regional anesthesia, contraindications of regional anesthesia, maternal request and life-threatening fetal compromise.[6]

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.[7]

Pulmonary aspiration is one of the important complications of general anesthesia in obstetric patients. Increased risk of aspiration is due to prolonged gastric emptying time in labour, increased intra-abdominal pressure due to the gravid uterus and relaxation of the lower oesophageal sphincter due to hormonal changes. To reduce this risk, prophylaxis is given prior to anaesthesia.[8]

The LMA (Laryngeal Mask Airway) and the LMA Proseal is very useful in the management of the obstetric airway. The LMA Proseal has a second tube to permit continuity with the gastrointestinal tract and isolation from the airway. It minimizes gastric insufflations during positive-pressure ventilation. The LMA Proseal is used as a rescue device during failed rapid sequence induction in obstetric patients.[9]

The main types of regional techniques used for caesarean delivery are single-shot spinal anesthesia, epidural anesthesia and CSE anesthesia. The advantages of regional anesthesia include avoiding the problem of a difficult airway, avoidance of multiple drugs required for general anesthesia and allowing the parturient to be awake for the delivery of her baby.[10]

In patients who already have indwelling epidurals for labour analgesia and who subsequently require a caesarean delivery, a “top-up” dose of local anesthetics can be given to extend their block. Before giving top up, it is important to ensure that the epidural is functioning well during labour and that no blood or cerebral spinal fluid is aspirated from the catheter prior to giving boluses of local anaesthetics.[10]

CSE (Combined spinal and epidural) combines the advantages of the two regional techniques. It o produces a quick and dense block and allows an anesthetist to administer subsequent doses of local anesthetics via the epidural catheter when needed. The epidural catheter is used for post-operative analgesia also.[10]

This method is especially useful in patients with certain medical conditions, such as high-risk cardiac patients, where it is necessary to titrate the block height carefully.[10]

This retrospective study was performed in 100 women who underwent cesarean section, either elective or emergency. This study was conducted to evaluate type of anesthesia and complications due to anesthesia.

METHODS

A retrospective study was conducted in 100 women with singleton pregnancy undergoing cesarean section in the department of Anesthesiology in collaboration with department of Obstetrics and Gynecology at Dr PDMMC and Hospital, Amravati from January 2017 to March 2018.

Detailed information regarding medical and obstetric history, intrapartum course, postpartum complications diagnosed before hospital discharge, and infant outcome were collected directly from maternal and infant charts American Society of Anesthesiologists (ASA) scores were noted.

A cesarean section was categorized as elective if performed prior to the onset of labour and as emergency if performed after labour had begun.

Anaesthetic procedures used for cesarean delivery was noted. Cesarean section where a regional block was needed in addition to GA were referred to as 'conversions' to GA and represented failed regional blocks.

The primary infant outcomes were resuscitation requiring intubation of the neonate at the time of delivery and the 5-minute Apgar score.

Inclusion criteria

Women undergoing elective and emergency cesarean section:

- With low fetal risk prior to delivery,
- Maternal age 20 to 44 years,
- Gestation 37 to 40 completed weeks,
- Singleton pregnancy, vertex and appropriate for gestational age (AGA),

- Women who were willing to give consent for the study.

Exclusion criteria

- Women who were not willing to give consent for the study,
- High risk pregnancy like pre-eclampsia, oligohydramnios, polyhydramnios, antepartum hemorrhage, or suspected fetal abnormality,
- Maternal age <20 years or >44 years,
- Gestational age <37 weeks or >40 weeks.

RESULTS

In our study, 43 (43%) patients were between 31-35 years, 36 (36%) patients were between 26-30 years, 11 (11%) patients were between 36-40 years 6 (6%) patients were between 41-44 years while 4 (4%) patients were between 21-25 years (Table 1).

Table 1: Age distribution.

Age distribution	No. of patients	Percentage
21-25 years	4	4%
26-30 years	36	36%
31-35 years	43	43%
36-40 years	11	11%
41-44 years	6	6%

In our study, 68 (68%) patients were primigravida while 32 (32%) patients were multigravida (Table 2).

Table 2: Parity.

Parity	No. of patients	Percentage
Primi	68	68%
Multi	32	32%

In our study, 62 (62%) patients were delivered by emergency cesarean section while 38 (38%) were delivered by emergency cesarean section (Table 3).

Table 3: Type of cesarean section.

Type of cesarean section	No. of patients	%
Elective	38	38%
Emergency	62	62%

Comparisons were made for three pre-specified 'risk' groups, defined by the indications for CS: 'low-risk' pregnancies were planned repeat CS; 'moderate-risk' pregnancies were for failure to progress and where fetal distress was absent; 'high-risk' pregnancies were unplanned CS for fetal distress.

In our study, indication for cesarean section was classified as moderate risk in 53 (53%) of patients, high risk in 27 (27%) patients and low risk in 20 (20%) patients (Table 4).

Table 4: Indication for cesarean section.

Indication for cesarean section	No. of patients	Percentage
Low risk	20	20%
Moderate risk	53	53%
High risk	27	27%

Anaesthetic procedures used for cesarean delivery were grouped into spinal (subarachnoid block), epidural, combined spinal-epidural, or general, based upon the first anaesthetic administered. Women were given a general anaesthetic because the initial regional procedure was inadequate. They were categorized as failed regional anesthesia. In our study, spinal anesthesia was given in 62 (62%) patients, epidural anesthesia was given in 20 (20%) patients, combined spinal-epidural anesthesia was given in 10 (10%) patients while general anesthesia was given in 8 (8%) patients (Table 5).

Table 5: Anesthetic procedure.

Anesthetic procedure	No. of patients	Percentage
Spinal (subarachnoid block)	62	62%
Epidural	20	20%
Combined spinal- epidural	10	10%
General	8	8%

In our study, anaesthetic complications were less. 10 (10%) patients had spinal headache, 4 (4%) patients had failed regional anesthesia, 2 (2%) patients had failed intubation while 2 (2%) patients had high spinal anesthesia. Not a single patient had chemical meningitis, epidural hematoma or extradural abscess (Table 6).

Table 6: Anesthetic complications.

Anesthetic complications	No. of patients	%
High spinal	2	2%
Failed intubation	2	2%
Failed regional anesthesia	4	4%
Spinal headache	10	10%
Chemical meningitis	0	0%
Epidural hematoma	0	0%
Extradural abscess	0	0%

The primary infant outcomes were resuscitation requiring intubation of the neonate at the time of delivery and the 5-minute Apgar score as <7 or ≥ 7. An Apgar 5 score of <7 is associated with increased risk of infant mortality and neurological impairment. The rates of these outcomes for infants exposed to cesarean section under GA were compared with cesarean section under any regional block technique. The GA category in the analyses included

those deliveries where both GA and regional block were used (converted regional blocks).

There was no difference in the rate of neonatal death associated with general anesthesia. Of note, infant outcomes for those women who required general anesthesia for a failed regional procedure were not worse than for those women who received a primary general anaesthetic.

Babies of 96 (96%) patients had Apgar score at 5 minutes of more than 7 and babies of 4 (4%) patients had Apgar score at 5 minutes of less than 7. Only babies of 2 (2%) patients required intubation for resuscitation (Table 7).

Table 7: Neonatal outcome.

Neonatal outcome	No. of patients	%
Apgar score at 5 min <7	4	4%
Apgar score at 5 min >7	96	96%
Resuscitation requiring intubation	2	2%

DISCUSSION

Obstetric anaesthetists need to face with the unique situation of providing anesthesia for caesarean sections, where they have to provide care for both the mother and the unborn baby. This study was performed in 100 women who underwent cesarean section, either elective or emergency to evaluate type of anesthesia, anaesthetic complications and neonatal outcome.

In our study, 43 (43%) patients were between 31-35 years, 36 (36%) patients were between 26-30 years, 11 (11%) patients were between 36-40 years 6 (6%) patients were between 41-44 years while 4 (4%) patients were between 21-25 years. Contrast to our study, Patil P et al found that the majority of patients who underwent cesarean were in the age group of 15-25 years. So younger patients were seen in their study.[11]

In our study, 68 (68%) patients were primigravida while 32 (32%) patients were multigravida. Contrast to our study, Patil P et al found that they were multigravidas except in 2016 in which the majority were primigravidas.[11] Contrast to our study and similar to study by Patil et al, Gupta M et al found that maximum no. of caesarean sections were in multiparous females (53.82%).[12]

In our study, 62 (62%) patients were delivered by emergency cesarean section while 38 (38%) were delivered by emergency cesarean section. Similar to our study, Gupta M et al found that 62.08% CS were done as emergency procedure.[12]

In our study, Indication for cesarean section was classified as moderate risk in 53 (53%) of patients, high risk in 27 (27%) patients and low risk in 20 (20%) patients.

Begum T found that, only 1.4% was conducted for absolute maternal indications. Major indications of C-sections included: repeat C-section (24%), fetal distress (21%), prolonged labour (16%), oligohydramnios (14%) and post-maturity (13%).[13]

In our study, Spinal anesthesia was given in 62 (62%) patients, epidural anesthesia was given in 20 (20%) patients, combined spinal-epidural anesthesia was given in 10 (10%) patients while general anesthesia was given in 8 (8%) patients.

Similar to our study, Bloom et al found that spinal anesthesia was used most commonly in a repeat cesarean section. Epidural anesthesia was most commonly used in a primary cesarean delivery. General anesthesia was commonly used in emergency cesarean section. 900 (38%) of the general anesthetics administered were in emergency caesareans where the decision-to-incision interval was less than 15 minutes. Women with ASA score = 4 or more were 7-fold more likely to receive a general anesthetic. Women with preeclampsia were more likely to receive regional analgesia than a general anaesthetic (90% versus 10%), as compared with women with eclampsia (70% versus 30%, overall P <0.001).[14]

In our study, anesthetic complications were less. 10 (10%) patients had spinal headache, 4 (4%) patients had failed regional anesthesia, 2 (2%) patients had failed intubation while 2 (2%) patients had high spinal anesthesia. Contrast to our study, Hawkins et al found that 86 pregnancy related deaths were associated with complications of anesthesia i.e. 1.6% of total pregnancy related deaths. Deaths mostly occurred in younger women. The percentage of deaths in women aged 35-39 years increased substantially. Deaths due to general anesthesia were 16.8 per million in 1991-1996 and 6.5 per million in 1997-2002. Deaths due to regional anesthesia were 2.5 and 3.8 per million respectively. [15]

Contrast to our study, Deneux T found that the risk of postpartum death was 3.6 times higher after cesarean section than after vaginal delivery. Cesarean section was associated with significantly increased risk of maternal death from anesthetic complications, puerperal infection and venous thromboembolism.[16]

In our study, there was no difference in the rate of neonatal death associated with general anesthesia. Of note, infant outcomes for those women who required general anesthesia for a failed regional procedure were not worse than for those women who received a primary general anesthetic. Babies of 96 (96%) patients had Apgar score at 5 minutes of more than 7 and babies of 4 (4%) patients had Apgar score at 5 minutes of less than 7. Only babies of 2 (2%) patients required intubation for resuscitation.

Similar to our study, Deneux T found that at mean gestational age of 34.8 weeks at delivery, all infants were born with good Apgar scores and umbilical arterial blood gas determinations. Maternal hypotension due to regional anesthesia was managed without excessive IV fluid administration and maternal BP was managed without severe hypertensive effects in women with general anesthesia.[16]

CH Huang et al, found that out of 6609 patients who underwent painless labor, 334 were converted to CS. Spinal anesthesia was used in 163 parturient, and epidural anesthesia in 96. No high-level block or total SA was noted. The time from anesthesia to surgical incision and the total anesthesia time were shorter, hypotension episodes were more frequent, the rate of perioperative ephedrine administration was higher, and the rate of midazolam was lower in the SA group.[17]

Similar to our study, CH Huang et al found that Apgar scores of the neonates at 1 minute and 5 minutes and maternal satisfaction were similar in both groups. The patients in the spinal morphine group had lower dosages and visual analogue scale (VAS) pain scores on postoperative day 1.[17]

CONCLUSION

Regional technique is the preferred type of anesthesia for cesarean section. It is safe. Also, procedure related complications are rare. The increased rates of neonatal intubation after GA cause harm and the persistence of low 5-minute Apgar scores suggests that deleterious effects may last longer than the immediate aftermath of delivery. The greatest absolute increase in the rate of intubation and of a 5-minute Apgar score <7 for deliveries performed under GA occurred in the most vulnerable infants: those that were delivered by emergency cesarean section due to fetal distress.

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