

Original Research Article

Evaluation of anaesthetic techniques for caesarean

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ABSTRACT

Background: The anaesthetic technique to be used in Caesarean section is determined according to factors such as urgency, presence of coexisting health problems, preference of patient and preference and experience of the anaesthetist and surgeon.

Methods: This is a retrospective study of all the caesarean deliveries that occurred in the period between 1st Jan 2010 to 31st Dec 2017 in the department of obstetrics and Gynaecology in Silchar Medical College. The anaesthesia techniques used for caesarean sections were evaluated in this study. Anaesthesia methods were recorded as general anaesthesia (GA) and regional anaesthesia (RA), and RA was classified into spinal anaesthesia (SA), epidural anaesthesia (EA) and combined spinal epidural anaesthesia (CSEA) subgroups.

Results: During the study period a total of 75685 patients delivered and 25805 patients had undergone caesarean section. The caesarean section rate at the institution comes to be around 34.1%. Among the indications, it was observed that foetal distress (32.8%) was the commonest cause followed by post caesarean pregnancy (26.76%). The majority of the CS (75.6%) were done as an emergency procedure. Regional anaesthesia was the most frequently used method both in emergency (92.87%) and elective caesarean section (84.21%). SA was the commonest used RA (89.2%).

Conclusions: In recent years, the rate of regional anaesthesia administration in caesarean section is gradually increasing, and the spinal anaesthesia technique is the mostly preferred regional anaesthesia. There is need to explore the use of the other forms of regional anaesthesia also.

Keywords: Caesarean section, General anaesthesia, Regional anaesthesia

INTRODUCTION

One of the commonest surgery performed worldwide is caesarean section (CS). The anaesthetic technique to be used in caesarean section is determined according to some factors such as urgency, presence of coexisting health problems, preference of patient and preference and experience of the anaesthetist and surgeon. Considering

all these factors, the most appropriate general or regional anaesthetic technique is selected.¹⁻³ In obstetric anaesthesia, regional anaesthesia (RA) is usually preferred mostly because of the distinctive state of pregnancy, unless there is a contraindication. Regional anaesthesia has some advantages like faster recovery of gastrointestinal functions after surgery, better postoperative analgesia, early mobilization of the patient

in the postoperative period, early communication between mother and baby and lower risk of drug toxicity for the mother and the baby.^{4,5} Some important disadvantages of RA are the possibility of developing hypotension and bradycardia, possibility of an insufficient analgesia level, sometimes causing surgical difficulty because of not using muscle relaxants, headache depending on the technique, back pain, post-operative immobility, occasional urinary retention and development of allergy and toxicity because of local anaesthetics.^{3,6}

General anaesthesia (GA) has an advantage of being a fast and safe technique in emergency cases with high bleeding risk.⁷ The frequency of difficult intubation during general anaesthesia in caesarean sections is 8-fold higher than that in normal population because of physiological changes caused by pregnancy.⁸ Higher frequency of intubation and ventilation difficulty associated with physiological changes during pregnancy (such as bigger-sized breasts and oedema in the laryngopharyngeal regions), hypotension due to fast induction, gastric fluid regurgitation and pulmonary aspiration risk, airway complications in the early post-operative period, pain and nausea-vomiting are the disadvantages of GA. Other disadvantages include decreased Apgar scores of newborns because of the passage of intravenous anaesthetics through the placenta and haemodynamic and circulatory disorders that are associated with stress response to trauma in mothers using low-dose anaesthetic agents to prevent newborns from being affected by these agents.^{2,3,9} In the present study, the anaesthesia techniques used for caesarean sections were evaluated.

METHODS

This is a retrospective study of all the caesarean deliveries that occurred in the period between 1st Jan 2010 to 31st Dec 2017 in the department of obstetrics and Gynaecology in Silchar Medical College, Assam. Laparotomy for rupture uterus/haemoperitoneum/post partum haemorrhage etc were not included in the study. Data were analysed from the hospital records. Maternal data collected included the age, parity, type of CS (emergency or elective), indication of CS and anaesthesia methods. The caesarean rate was calculated as-(total number of caesarean deliveries/total number of deliveries) × 100. The indications for caesarean section included foetal distress, malpresentation, previous caesarean section, multiple gestation, failed induction, failed progression (including failed forceps or vacuum extraction), cephalopelvic disproportion, maternal indications, obstetric indication and foetal indications. Anaesthesia techniques were recorded as GA and RA, and RA was further classified into spinal anaesthesia (SA), epidural anaesthesia (EA) and combined spinal epidural anaesthesia (CSEA) subgroups. These various anaesthetic techniques used in CS were grouped and recorded year wise for evaluation. Descriptive statistics

were presented as patient number and percentages (%) for nominal variables.

RESULTS

During the study period a total of 75685 patients delivered and 25805 patients had undergone caesarean section. Year wise deliveries, caesarean section and caesarean section rates in the hospital from 2010 to 2017 is shown in Table 1. The caesarean section rate at the institution comes to be around 34.1%.

Table 1: Year wise deliveries, caesarean section and caesarean section rates.

Year	Total deliveries	Caesarean section	Rate of CS
2010	7843	2154	27.5%
2011	8159	2378	29.1%
2012	9038	2848	31.5%
2013	9677	3174	32.8%
2014	10001	3605	36.04%
2015	10084	3538	35.08%
2016	10071	3819	37.9%
2017	10812	4289	39.6%
Total	75685	25805	34.1%

Demographic analysis shows maximum number of patients to be between 21-30 years (73.24%). Those of 20 years and below were 14.8%. 14057 patients (54.47%) were primipara (Table 2).

Table 2: Distribution of CS cases according to age and parity.

	No. of cases (%)	
Age	20 years and below	3826 14.8%
	21-30 years	18902 73.24%
	31-40 years	2814 10.9%
	>40 years	263 1.01%
Parity	Primi	14057 54.47%
	Multi	11748 45.52%

Among the indications, it was observed that foetal distress (32.8%) was the commonest cause followed by post caesarean pregnancy (26.76%) as shown in Table 3.

The majority of the CS (75.6%) were done as an emergency procedure. Regional anaesthesia was the most frequently used method both in emergency (92.87%) and elective caesarean section (84.21%) (Table 4). General anaesthesia was administered in case of failure of regional anaesthesia. In our study period 78 such failure cases were observed. The year wise distribution of anaesthetic techniques used in caesarean section surgeries is presented in Table 5. It was observed that the rate of spinal anaesthesia increased from 84.9% in 2010 to 93.3% in 2017. Figure 1 represents the overall

distribution of various anaesthesia techniques used for CS in the study period. Spinal anaesthesia was the commonest anaesthesia technique used in the present study (89.2%).

Table 3: Indication of caesarean deliveries.

Indication	Number of cases	Percentage (%)
Foetal distress	8462	32.8%
Malpresentation	1893	7.33%
Post Caesarean Pregnancy	6905	26.76%
Failed Induction	948	3.67%
Failed Progression	2706	10.5%
cephalopelvic Disproportion	476	1.84%
Multiple Pregnancy	695	2.7%
Maternal Indication	492	1.9%
Obstetric Indication	2137	8.2%
Foetal Indication	1091	4.2%

Table 4: Type of anaesthesia used in emergency and elective caesarean section.

Type of CS	GA N* (%)	RA N* (%)	Total (%)
Emergency	1389 (7.12)	18119 (92.87)	19508 (75.6)
Elective	994 ((15.78)	5303 (84.21)	6297 (24.4)
Total	2383 (9.23)	23422 (90.76)	25805

N* = number of cases

Table 5: Anaesthetic techniques used in caesarean section surgeries.

Year	GA N* (%)	SA N* (%)	EA N* (%)	CSEA N* (%)
2010	297 (13.78)	1829(84.9)	13 (0.6)	15 (0.7)
2011	291 (12.23)	2056 (86.4)	19 (0.8)	12 (0.5)
2012	395 (13.86)	2398 (84.2)	27 (0.9)	28 (0.9)
2013	319 (10)	2794 (88)	34 (1.07)	27 (0.85)
2014	304 (8.43)	3246 (90)	31 (0.85)	24 (0.66)
2015	283 (8)	3205 (90.6)	29 (0.8)	21 (0.6)
2016	268 (7.01)	3487 (91.3)	35 (0.9)	29 (0.7)
2017	226 (5.26)	4004 (93.3)	39 (0.9)	20 (0.4)
Total	2383 (9.23)	23019 (89.2)	227 (0.87)	176 (0.68)

N* = number of cases

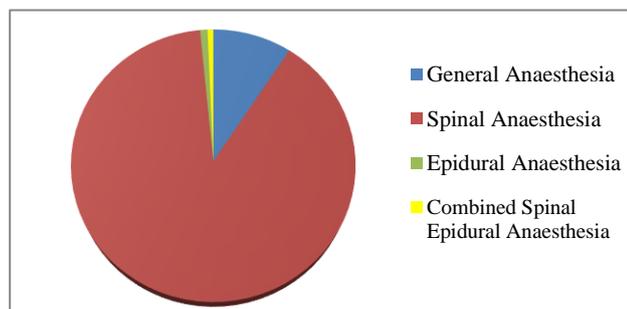


Figure 1: Distribution of caesarean section surgeries performed according to the anaesthetic method used.

DISCUSSION

Although the CS rate is said to vary from one country to another, worldwide there has been an increasing trend of caesarean section deliveries. The World Health Organization (WHO) has identified an ideal caesarean section (CS) rate for a nation of around 10-15%. Manjulatha B et al found the CS rates to increase from 16.6% in 2002 to 22.4% in 2012.¹⁰ Our study also showed an increase in CS rates from 27.5% in 2010 to 39.6% in 2017. Liberal use of caesarean in high risk cases like breech presentation, previous caesarean delivery, growth retarded foetus etc along with avoidance of difficult manipulative or instrumental vaginal deliveries may be some of the reasons for increase in CS rates. Detection of foetal distress especially with the use of continuous electronic foetal monitoring may also be an important reason.

In the present study, foetal distress was the commonest indication (32.8%) of CS which is similar to studies by Barber EL et al and Liu S et al.^{11,12} We observed that majority of the CS (75.6%) were performed as emergency cases which is comparable with findings of Gupta M et al who found emergency cases to be 62.08%.¹³ Sari MA et al, found in their study 59.2% of cases were elective and 40.8% were of emergency CS.⁷

Although drugs and materials used in anaesthetic techniques and developments in surgery and post-operative care have decreased caesarean-induced mortality and morbidity at present, the risks of infection, bleeding, transfusion need, thromboembolic disorders, longer hospitalisation, longer time for recovery and more pain still continue.¹⁴ The use of RA in CS has increased over the years because of developed tools used in RA, increased knowledge and skills of anaesthetists in using these techniques and more conscious patients.¹⁵ Many studies have revealed that complications associated with general anaesthesia are more frequent than those associated with regional anaesthesia. In the administration of general anaesthesia, difficult intubation related to anaesthesia, esophageal intubation, aspiration, insufficient ventilation and respiratory problems, and more suppressed immune system can be observed.^{16,17}

Considering the global situation, there is an increase in the use of regional anaesthesia techniques in Germany after 2002, and it has been reported that the most frequently used anaesthetic method in caesarean section surgeries is SA with a 90.8% usage rate.¹⁸ In Spain, the usage rate of regional anaesthesia in caesarean sections is 98%, and among them the usage rate of SA is 75%.¹⁹ In our study, the use of RA in CS was 90.76% and both in elective and emergency cases mostly RA was used. Spinal anaesthesia (89.2%) was the commonest used RA. Sari MA et al, observed that in 75.2% cases of caesarean, RA was used and compared with GA, the administration rate of RA was observed to be higher both in elective and emergency cases (82% elective, 65.2% emergency).⁷

We also observed that the rate of spinal anaesthesia increased from 84.9% in 2010 to 93.3% in 2017. Aksoy et al, reported that 45% of total 9049 CS were performed under GA and 54% were performed under RA between the years of 2003 and 2012 and the rate of RA administration was 34% in 2003 but increased to 69% in 2012.²⁰

In Nigeria, Okafor UV et al, found that 47.6% of 729 CS were performed under GA, while 51.3% and 1.1% were performed with spinal SA and EA, respectively.²¹ Use of EA in our centre was around 0.87% which is similar to the findings of Okafor UV et al, though the use of GA was comparatively higher in their centre. Aksoy et al, found that while CSEA technique was not used in any of the caesarean section surgeries performed in 2003 in their clinic but it was used in 27% of surgeries in 2012 whereas in our study CSEA was used in a fairly constant manner all throughout the study period.²⁰ Use of CSEA need to be increased because it facilitates the administration of an additional dose in the case of prolonged surgery and post-operative analgesia.

CONCLUSION

In recent years, the rate of regional anaesthesia administration in caesarean section is gradually increasing, and the spinal anaesthesia technique is the mostly preferred regional anaesthesia. There is need to explore the use of the other forms of regional anaesthesia also.

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