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RESEARCH ARTICLE

TRENDS OF ANESTHESIA PRACTICE FOR OBSTETRIC ANESTHESIA IN A TERTIARY CARE INSTITUTE

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ABSTRACT

Background: Obstetric critical care with its fast-evolving modalities of care is developing to match the advances and novel concepts in obstetric perioperative care. Goals for anesthesia for cesarean delivery must include the comfort and safety of the parturient, and the well-being of the fetus and neonate. Our study aimed to analyse the trends of anesthesia in our tertiary care institute. **Methodology:** This observational prospective study was conducted over a period of 18 months including 24,366 obstetric patients for emergency or elective cases for surgical procedures during pregnancy. In OT all demographic details, ASA Status, Indication of surgery, Type of anaesthesia, any complications, Patient satisfaction, Neonatal outcome and need of resuscitation, time interval between spinal skin prick to delivery of baby and interval between induction of General Anaesthesia to delivery of baby were noted. **Results**: In elective OT, Spinal versus General anesthesia was 77.6% vs 22.4% of cases. In emergency OT, it was 95.5% vs. 4.5%, respectively. The time interval from induction to delivery of baby in general anesthesia was 5–10 min, whereas time interval from spinal prick to delivery was 10-15 min. Patient's satisfaction showed that spinal anesthesia is associated with higher patients' satisfaction rates. **Conclusion**: By understanding these trends and time intervals, we can refine anesthesia practice, improve patient outcomes, and enhance the quality of obstetric anesthesia services at our tertiary care institute

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INTRODUCTION

Ensuring safety for women receiving cesarean delivery remains a continuing challenge for anesthesiologists in general hospitals with an obstetric service. Goals for anesthesia for cesarean delivery must include the comfort and safety of the parturient, and the well-being of the fetus and neonate[1]. Internationally, obstetric anesthesia guidelines recommend spinal over general anesthesia (GA) for most caesarean sections[2,3]. The primary reason for recommending regional blocks is the risk of failed endotracheal intubation and aspiration of gastric contents in pregnant women who undergo GA[4]. In addition to better neonatal and maternal outcomes, regional anesthesia is associated with less cost to the hospital, less charge to the patient and better client satisfaction to the service due to good post-operative analgesia without additional analgesics [5]. For urgent and emergent cesarean deliveries due to fetal concerns, general anesthesia can be seen as the technique of choice to facilitate an expedited delivery. However, general anesthesia for emergent cesarean delivery is associated with lower neonatal Apgar scores, assisted ventilation, and admission to the neonatal intensive care unit[6]. Of importance as well, and less often reported, failed maternal intubation is associated with increased neonatal intensive care unit admissions[7,8]. Therefore, even though general anesthesia may appear to be saving time, maternal risks and neonatal outcomes may not justify such a choice. So, the present study was undertaken to evaluate the trends of anesthesia practice in obstetric anesthesia, at Obstetrics and Gynaecology Department of a tertiary care hospital.

AIMS AND OBJECTIVES

- To observe the trend of types of anesthesia used on pregnant patients for obstetric surgical procedures in our setup.
- To observe the time interval between spinal skin prick to the delivery of baby and the time interval between induction to the delivery of baby.
- To observe the intra-operative and post-operative complications related to anesthesia.
- To see the patient's satisfaction post-operatively with various types of anesthesia techniques.

- To compare the neonatal outcomes and resuscitation requirements of infants born to mothers receiving general anesthesia versus spinal anesthesia during cesarean delivery.

MATERIAL AND METHODOS

This observational prospective study was conducted over a period of 18 months in Obstetrics and Gynaecology Department of our Tertiary care institute. After the approval from Institutional Ethical Committee, 24,366 obstetric patients were included in our study that came to our OT (operation theatre) (emergency or elective) for various surgical procedures during pregnancy. In OT we recorded all demographic details like age, weight, BMI, gestational age, parity and other details like ASA Status, Indication of surgery, Type of anaesthesia used, Complications related to anaesthesia in intra operative and post operative period, Patient's satisfaction post-operatively, Neonatal outcome and need of resuscitation, time interval between spinal skin prick to delivery of baby and interval between induction of General Anaesthesia to delivery of baby.

INCLUSION CRITERIA: All patients who came to OT for obstetric procedures during pregnancy in our tertiary care institute.

EXCLUSION CRITERIA: Patients who refused to give consent.

STATISTICAL METHOD

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then analyzed using SPSS Version 23.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by tables and bar diagrams.

RESULTS

Our study aimed to analyse the trends of anesthesia in tertiary care institute over a period of 18 months. Majority of patients were in age group 18-30 yrs (71.12%), Obese BMI (53.76%), multiparous (68.24%) (Table 1).

Majority (95%) of obstetric cases were conducted under emergency operating theatre (OT) (Table 1). In elective OT, spinal anesthesia technique was used in 77.6% of cases, and general anesthesia used in the remaining 22.4% of cases (Table 1). In emergency OT, spinal anesthesia was used in 95.5% of cases, with GA used in only 4.5% of cases (Table 1). Most common indication of general anesthesia in emergency ot was ectopic ruptured pregnancy (37.5 %) whereas in elective ot it was ectopic pregnancy (39.6%) (Table 2). Most common indication of spinal anesthesia in emergency ot was previous LSCS (21.0 %) whereas in elective ot it was cesarean section (96.0%) (Table 3). In general anesthesia need of neonatal resuscitation was felt in 19.88% whereas in spinal anesthesia this need was felt in 1% cases only (p value <0.001) (Table 4). The time interval from induction to delivery of baby in general anesthesia ranged from 5–10 minutes in contrast the time interval from spinal prick to delivery ranged from 10 to 15 (Fig 1). Most common complications observed with GA was PONV whereas with spinal anesthesia it was PDPH (Fig. 2). Patient's satisfaction criteria showed that spinal anesthesia is associated with higher patient satisfaction rates as compared to general anesthesia (Fig. 3).

DISCUSSION

A total of 24,336 women were enrolled in the study that underwent obstetrics procedures for delivery and non-delivery interventions. Patients were given either general anesthesia or spinal anesthesia for the subsequent procedure. In our study, most of the women were in the age group of 18 to 30 years (71.12%) (Table 1). This finding is consistent with the study conducted by Valimungighe M et al[9] which reported that the most represented age group observed was 20-24 years included 22.39% of patients. Alshabibi M et al[10] reported a slightly higher age group than ours with the most common age group of 26-35 (average 30) years. Similar results were obtained by Binam F et al[11] in which the incidence of 33.3% of gynecology-obstetrics anesthesia procedures done on young population. In our study, 68.24% cases were multiparous and 31.76% were nulliparous (Table 1). Our results corresponds with Alshabibi M et al[10] study in which they found that 77.8% were multiparous and rest 22.2% were nulliparous. In our study, 53.76% were obese women, 28.2% women were overweight, 17.12% had normal BMI and 0.92% were underweight (Table 1).

Table 1. Baseline demographics and anesthesia modes

	Age Group (in years)	Frequency (n)	Percent (%)
Age Group (in years)	18-30	17308	71.12
	31-40	5957	24.48
	>40	1071	4.4
BMI	Underweight	224	0.92
	Normal	4166	17.12
	Overweight	6863	28.2
	Obese	13083	53.76
Parity	Multiparous	16,607	68.24
	Primiparous	7,729	31.76
Anesthesia type	Elective	1217	5
	Emergency	23119	95
Mode of Anesthesia in Elective OT	General	273	22.4
	Spinal	944	77.6
Mode of Anesthesia in Emergency OT	General	1,040	4.5
	Spinal	22,079	95.5

Abbreviation: BMI- Body Mass Index, OT: Operation Theatre

Table 2. Indications for General Anesthesia in Emergency and Elective OT

	Indications	Frequency (n)	Percent (%)
Indications for General Anesthesia in Emergency OT	**Ectopic rupture pregnancy**	390	37.5
	Antepartum haemorrhage	206	19.81
	Eclampsia	128	12.31
	Placenta previa completely covering os	118	11.35
	Placenta accreta	101	9.71
	Pregnancy with severe PIH	73	7.02
	Cord prolapse	20	1.92
	Pregnancy with fibroids	4	0.38
	Total	**1040**	**100**
Indications for General Anesthesia in Elective OT	**Ectopic Pregnancy**	108	39.6
	Pregnancy with Placenta completely covering os	63	23
	Pregnancy with Placenta accreta	49	18
	Pregnancy with Fibroids	32	11.7
	Pregnancy with cardiac conditions	21	7.7
	Total	**273**	**100**

Table 3. Indications for spinal anesthesia in emergency and elective OT

	Indications	Frequency (n)	Percent (%)
Indications for Spinal Anesthesia in Emergency O.T.	**In view of previous LSCs**	4641	21.02
	Acute foetal distress	2548	11.54
	Non-progression of labour	2142	9.7
	Cephalo pelvic disproportion	1836	8.31
	Lowlying placenta	1764	7.99
	Twin pregnancy	1494	6.77
	Pregnancy with PIH	1336	6.05
	Anhydrominos	1260	5.71
	Meconium Stained Liquor	1188	5.38
	Post-dated pregnancy	1098	4.97
	Refusal to NVD	954	4.32
	Malpresentation	684	3.10
	Polyhydrominos	468	2.12
	IVF pregnancy	432	1.96
	Precious Pregnancy	234	1.06
	Total	**22079**	**100**
Indications for Spinal Anesthesia in Elective O.T.	**Caesarean Section**	905	96
	Circlage operations	39	4
	Total	**944**	**100**

So, our findings are consistent with the study Alshabibi M et al[10] wherein they found that most of the women who underwent anesthesia for obstetric procedures were obese (30.7%), while as only 14.5% women had a normal BMI. In our study, 95% procedures were done as emergency cases, and 5% procedures were done as elective cases (Table 1). Zewditu Abdissa Denu. et al[12] reported that 89.9% procedures were done as emergency cases and 10.1% were elective cases. This study was consistent with our study. Alshabibi M et al[10] reported that out of 34.6% procedures were done as elective cases, and 65.4% procedures were done as emergency cases. The number of patients that underwent the study was less than our study and was the cause of difference in results. In our study, spinal anesthesia was the main type of anesthesia accounting for 95.5% and only 4.5% cases were done under General anesthesia in emergency O.T, while in elective O.T, 77.6% procedures were done under spinal anesthesia and 22.4% procedures were done under general anesthesia (Table 1). In contrast Zewditu Abdissa Denu et al[12] reported that 65% of cases were operated under general anesthesia and the rest 35% were done under spinal anesthesia. So, this study was not in favor of our study. Guglielminotti Jet al[13] analysed 4,66,014 cesarean deliveries, of these 26,431 were completed with general anesthesia (5.7%), So this was consistent with our study. Similarly, Juang Jet al[14] analysed recent obstetric anesthesia practice patterns with 2,18,285 caesarean deliveries cases which were identified between 2010-2015 wherein general anesthesia was used in 5.8% of caesarean deliveries and rest 94.2% were under spinal anesthesia. In our study, the most common indication of General anesthesia in emergency theatre was ruptured ectopic pregnancy that accounted for 37.5% followed by Antepartum hemorrhage (19.8%). The most common indication for general anesthesia in elective cases were ectopic pregnancy and placenta previa completely covering the os accounted for 39.6% and 23%, respectively (Table 2). Ikeda T et al[15] reported the results of review of all caesarean deliveries that were performed under general anesthesia with placenta previa accounting for the main indication in both elective and emergent cases. This was not consistent with our study. Considering the spinal anesthesia indications in present study in emergency cases, the most common indications were previous caesarean section scars and acute fetal distress accounted for 21.02% and 11.54%, respectively. Among the 944 elective cases of spinal anesthesia, the most common indications included caesarean sections in 96% and Cervical encirclage operations in 4% (Table 3). While comparing with other authors, the most common indication for both emergency and elective anesthesia was caesarean sections and tubal ligation as reported by Valimungighe M et al[9] on evaluating the practice of obstetric anesthesia that included 14,563 patients. This was consistent with our study. Alshabibi M et al[10] did a retrospective cross-sectional study to evaluate the practice of obstetric anesthesia in which they observed that C-section was the most common indication in both elective and emergency cases. So, this study favours the results of our study. El Nwobodo et al[16] did a

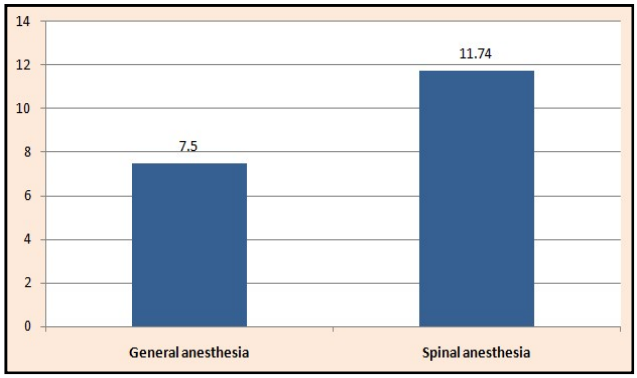

Figure 1. Time Interval from Induction to Delivery

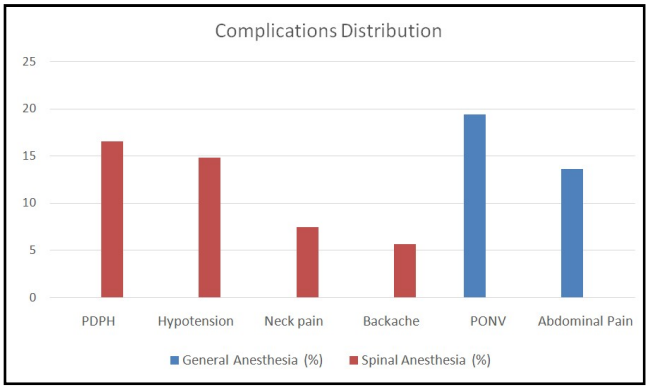

Figure 2. Complications Distribution in general and spinal anesthesia groups

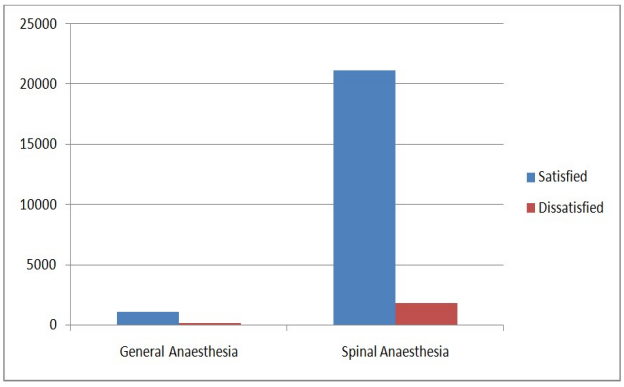

Figure 3. Patients satisfaction in post operative period in general and spinal anesthesia group

	Mode of Anaesthesia	Frequency (n)/total	Percent (%)	p Value
Correlation between Type of Anesthesia and Need for Neonatal Resuscitation.	General	261/1313	19.88	< 0.001
	Spinal	224/23023	1	
	Total	485/24336		

retrospective study of all patients that had C-section between Jan 2002-Dec 2010 at Usmanu Danfodiyo University Teaching Hospital, Nigeria, reported that repeated C-section and Malpresentation of fetus were most common indications for elective caesarean deliveries. This study was also in favour of our study, because in our study, the most common indication of C-section was also previous LSCS. In our study, the mean time interval taken from induction to delivery of baby with general anesthesia was less (mean 8.3 ± 2.9 min) as compared to spinal anesthesia from spinal skin prick to delivery of baby (mean 11.74±1.96 min). General anesthesia takes 2-4 minutes less time than spinal anesthesia in the present study, with a statistically significant difference (p value= 0.001) (Fig. 1). In contrast Bhattacharya, et al[17] found that the time interval taken for rapid sequence general anesthesia was 8.5 ± 0.6 and for rapid sequence spinal anesthesia was 3.7 ± 0.2, also with a statistically significant difference (P < 0.001). Our study found that out of 485 newborns requiring resuscitation, a significantly higher proportion were born to mothers who received general anesthesia (13.94%) compared to spinal anesthesia (1%), with a highly statistically significant difference (p value <0.001). This finding is consistent with the results of Iddrisu M et al[18], who also reported a higher incidence of low Apgar scores and need for resuscitation among babies born to mothers who received general anesthesia compared to spinal anesthesia, with a statistically significant difference (p value < 0.05). Consistent with our findings, Metogo et al[19] also reported that general anesthesia (GA) for emergency cesarean sections (CS) requires adequate anticipation of neonatal resuscitation, with a statistically significant association (p = 0.014).

In our study, a total of 10,805 complications were observed, of which most (n=9951) of the complications were related to spinal anesthesia. The most common complication of spinal anesthesia was postdural puncture headache (PDPH), affecting 16.5% of patients. Hypotension was the second most common complication, occurring in 14.8% of cases. Additionally, neck pain (7.4%) and backache (5.6%) were also associated with spinal anesthesia. In contrast, patients who underwent general anesthesia experienced a different set of complications, with postoperative nausea and vomiting (PONV) being the most common (19.34%), followed by abdominal pain (13.57%) (Fig. 2). Shawana Javed et al[20] reported that post-dural puncture headache, hypotension, vomiting, shivering and backache were the most common complications associated with spinal anesthesia. So, this study was consistent to our study. Yehuda Ginosar et al[21] reported that the complications associated with General anesthesia were vomiting, abdominal pain, aspiration of gastric content and awareness but in our study, the complication associated with general anesthesia were PONV, abdominal pain. Our study demonstrated a statistically significant difference (p <0.001) in postoperative satisfaction between parturients who received spinal anesthesia and those who received general anesthesia, with spinal anesthesia associated with higher satisfaction rates (Fig. 3). This finding is corroborated by the study of Sobot Novakovic et al[22], which reported a similar significant difference (P <0.001) in satisfaction rates, with spinal anesthesia being preferred over general anesthesia.

CONCLUSION

Our study aimed to analyse the trends of anesthesia in tertiary care institute over a period of 18 months. An overwhelming majority (95%) of obstetric anesthesia cases were conducted under emergency operating theatre (OT), highlighting the urgent nature of most obstetric interventions. In elective OT, spinal anesthesia was the preferred technique, used in 77.6% of cases, with general anesthesia (GA) used in the remaining 22.4% of cases. In emergency OT, spinal anesthesia was used in 95.5% of cases, with GA used in only 4.5% of cases. The high percentage of spinal anesthesia used in both elective and emergency settings suggest a strong preference for regional

anesthesia techniques in obstetric anesthesia practice at tertiary care institute. According to global benchmarks, the utilization rate of general anesthesia in elective obstetric surgical procedures is approximately 1%. However, in our clinical setting, we observed a significantly higher rate of 22.4% for general anesthesia administration, primarily attributed to its preferential use in laparotomies performed for ectopic pregnancies.

The time interval from induction to delivery of baby in general anesthesia was remarkably short ranging from 5–10 minutes highlighting the rapid sequence induction and swift surgical intervention in contrast the time interval from spinal prick to delivery was slightly longer ranging from 10 to 15 minutes indicating a more controlled and gradual onset of anesthesia. These findings suggest that general anesthesia is often used in urgent or emergency situations where rapid delivery is crucial and spinal anesthesia is preferred in situations where more controlled and gradual onset of anesthesia is required. Patient's satisfaction with anesthesia was also assessed in our study and the results showed that spinal anesthesia is associated with higher patients' satisfaction rates as compared to general anesthesia. By understanding these trends and time intervals, we can refine anesthesia practice, improve patient outcomes, and enhance the quality of obstetric anesthesia services at *tertiary care institute.*

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Glossary of Abbreviations

BMI: Body Mass Index
CS: Cesarean Section
GA: General Anesthesia
OT: Operation Theatre
LSCS: Lower Segment Cesarean Section
PONV: Post Operative Nausea Vomiting
PDPH: Post Dural Puncture Headache
PIH: Pregnancy Induced Hypertension
NVD: Normal Vaginal Delivery
IVF: In vitro Fertilisation

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