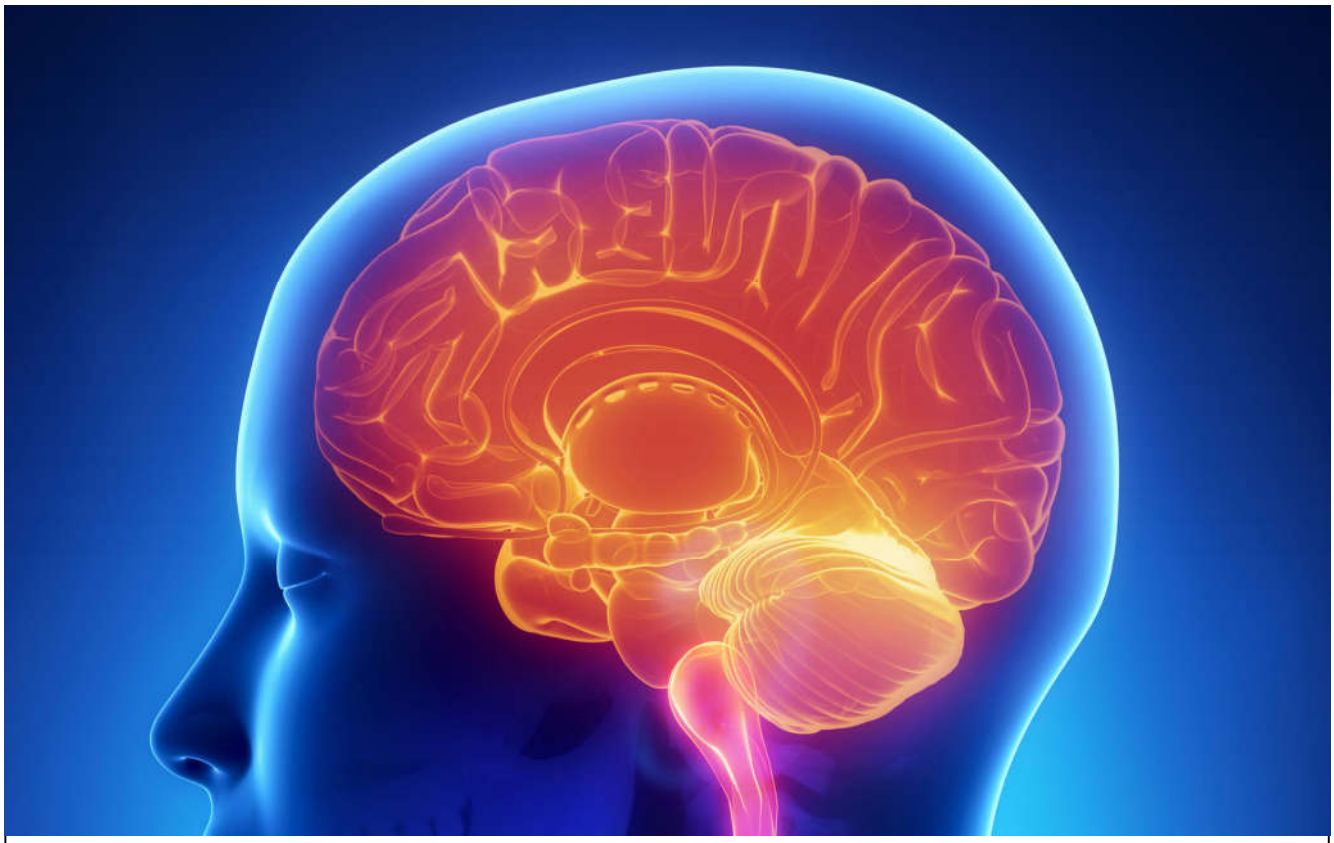

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RESEARCH ARTICLE

COMPARATIVE STUDY FOR MATERNAL AND FOETAL OUTCOME IN SPINAL ANAESTHESIA AND GENERAL ANAESTHESIA FOR LSCS

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ABSTRACT

Caesarean section (C-section) is one of the most common obstetrics surgery being done these days, preferably under regional anaesthesia. Though in previous days these operations were done in general anaesthesia but now there is a significant move towards regional anaesthesia. Various new methods are being introduced, such as combined spinal epidural (CSE) and the continuous spinal anaesthesia which offer specific advantage.

Objective/Aim: To study the result of regional versus general anaesthesia (endotracheal intubation) for C-section considering for mortality, morbidity, neonatal outcome and maternal satisfaction.

Subject: A total of 60 primipara women with uncomplicated pregnancy at term and scheduled to undergo elective C-section were included in this study. Patients were divided into two groups- those undergoing spinal anaesthesia were kept in group A and those undergoing general anaesthesia were kept in group B.

Methods: APGAR scores at 1 and 5 minutes and umbilical blood analysis (umbilical artery) just after delivery of new born were analysed while for maternal outcome assessment NIBP (SBP and DBP), heart rate, (chest tightness, nasal blockage, nasal congestion) for regional anaesthesia and oxygen saturation and capnography in GA were measured prospectively after 5,10 and 15 minutes of delivery.

Result: In newborns there was statistically significant difference in APGAR score recorded between two groups at 1 and 5 minutes, in which group A APGAR score recordings were higher than group B. Difference in HCO^{3-} values in the two groups was also statistically significant, in which values were significantly lower in group A. In maternal group, chest pain (or tightness) and nasal blockage were significantly higher in group A and needed treatment with 50 mg tramadol group A. In this period HR and NIBP were higher in group A.

Conclusion: In our study we observed that both the techniques were safe for new born and mother. In comparison with general anaesthesia, regional anaesthesia was safer for newborn regarding APGAR scores and acid base balance.

INTRODUCTION

The first priority to be considered during planning for anaesthesia for C section is maternal and foetal well being. Generally regional anaesthesia (RA) is more commonly used technique than general anaesthesia (GA) because mother is awake and can hear the cry of her baby and interact immediately.[1] The major complication of regional anaesthesia technique is the potential hypotension which can be overcome by use of epidural anaesthesia instead of spinal anaesthesia. But the use of Tuohy needle may lead to postdural puncture headache (PDPH) because of high epidural space pressure and low space volume.[2] In contrast to RA, GA offers less hypotension and anaesthesiologist control over airway and ventilation.[3] Our aim of this work is to highlight the safety of RA over GA on foetal and maternal morbidity and mortality outcome.

METHOD OF STUDY

A prospective, cross sectional, observational study was done on 100 patients.

Ethical Committee Approval

This study was conducted after approval of the ethical

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committee of the Department of Anaesthesia, IMS, BHU.

MATREIAL

A total number of 100 ASA grade I and II primipara with age 25±2 years and weight 65±5 Kg were scheduled to undergo elective LSCS. The women were allocated in two groups, (A) for spinal anaesthesia and (B) for general anaesthesia. The exclusion criteria were:

1) Patient having any medical complication
2) Bad obstetric history
3) PIH
4) Oligohydramnios or Polyhydramnios
5) Suspected foetal abnormality
6) Coagulopathy
7) Twin pregnancy
8) Sensitivity to local anaesthetic
9) Infection at the site of spinal anaesthesia

Preoperative evaluation of both groups as detailed anaesthetic history, maternal checkups, physical examination, routine investigations like complete blood count, fasting blood sugar or random blood sugar, TORCH complex, HIV and HBsAg (as viral markers), prothrombin time, INR, liver function test, serum urea, serum creatinine and serum electrolytes were done. In preoperative medications, patients were adviced to stay nil per oral (NPO) for 8 hours for solid and 2 hours for clear liquid. Tablet ranitidine 150 mg and tablet metoclopramide 10 mg 2 hours before operation was prescribed and were advised to lie in left lateral position at 15 degree angle to prevent supine hypotension syndrome.

Technique

On arrival to the operation theatre, standard monitor like NIBP monitor, SpO_2 probe (pulse oxymetry), five lead ECG monitor and capnography were attached. An 18 gauge cannula was inserted in all patients at volar aspect of forearm in any prominent vein. For group A, before institution of the spinal needle, intravenous (iv) fluid, 8 ml/Kg body weight ringer lactate was administered. A reading of blood pressure was taken and then spinal anaesthesia was instituted using a 25 G quincke needle, which was introduced in the midline at L_{3-4} space. After observing free flow CSF, total volume of 2.5 ml of injection bupivacaine heavy (10 mg) and 25 mcg fentanyl was injected. Patient was positioned supine at 15º trendelenberg position to avoid cephalic spread of drug and to avoid supine hypotension syndrome. For group B, after intravenous cannulation in the cephalic vein, premedication drugs were given which included, injection metoclopramide 10 mg, injection ranitidine 150 mg, iv slow, followed by preoxygenation with 100% oxygen for 5 minutes to achieve oxygen saturation of 100%. Rapid sequence induction (RSI) was done by injection propofol 1.5mg/Kg body weight iv slow and injection succinylcholine chloride 1mg/Kg iv rapid bolus was given. After disappearance of fasciculation, oral endotracheal intubation was done by appropriate size tube. Maintenance of anaesthesia was done by injection atracurium 0.5mg/Kg body weight. Controlled ventilation with 50% oxygen and 50% nitrous oxide and 1 MAC (minimum alveolar concentration) of is of lurane was done. End tidal CO_2 pressure was kept between 30 and 35 mm Hg. After the delivery of the baby and cord clamping 5 units of oxytocin iv slow was injected followed by 5 units iv diluted in 500 ml fluid. For analgesia inj fentanyl 1mcg/Kg was given iv. After the end of the surgery muscle relaxation was reversed with injection neostigmine 0.03mg/Kg body weight and injection glycopyrrolate 10 mcg/Kg body weight. Postoperative analgesia was done with injection diclofenac sodium 75 mg slow iv followed by injection paracetamol 15 mg/Kg body weight in both the groups. During perioperative period NIBP, SpO_2, $EtCO_2$and HR were regularly recorded and total duration of surgery was also noted.

Table 1 Demographic data

	Group A (Spinal Anaesthesia)		Group B (General Anaesthesia)		
	Mean	**SD**	**Mean**	**SD**	**p value**
Maternal age(Years)	27.10	±5.99	27.09	±5.00	0.95
Gestational Age (weeks)	37.98	±0.96	37.11	±0.99	0.65
Weight (Kg)	68.96	±0.11	69.13	±5.00	0.68

Table 2 Newborn outcome- APGAR score at 1 and 5 minutes

	Group A (Spinal Anaesthesia)		Group B (General Anaesthesia)		
APGAR score	**Mean**	**SD**	**Mean**	**SD**	**p value**
1 minute	7.5	±1.05	6.5	±1.10	<0.05
5 minute	9.56	±0.08	8.9	±1.08	<0.05

Table 3 Cord blood gas analysis

	Group A (Spinal Anaesthesia)		Group B (General Anaesthesia)		
ABG at birth	**Mean**	**SD**	**Mean**	**SD**	**P Value**
pH	7.30	±0.11	7.24	±0.10	0.13
PCO_2	14.92	±2.31	43.29	±4.30	0.38
HCO^{3-}	20.92	±2.91	21.89	±2.59	<0.05
ABG 5 min					
pH	7.34	±0.09	7.38	±0.09	0.062
PCO_2	38.90	±1.86	40.91	±2.11	0.569
HCO^{3-}	21.89	±2.69	22.90	±1.62	<0.05

p value <0.05 is considered to be statistically significant

Management of New Born

All the new borns were managed by paedia tricians and PGAR score was assessed at 1 and 5 minutes. Umbilical cord blood as analysed for pH, PCO_2 and $HCO_3^-$and compared in both roups. Statistical analysis was presented as mean numbers with tandard deviation and student t test. The software used was SPSS version11 for statistical analysis.

RESULT

There was no significant difference between maternal age, gestational age and maternal weight in both the groups as described in Table1. The APGAR scores of both the group were compared in which spinal anaesthesia group A showed higher APGAR scores in 1 and 5 minutes than general anaesthesia group B which is statistically significant as shown in Table2.

Table 4 Maternal vital sign (Heart rate, Systolic blood pressure and diastolic blood pressure)

	Group A (Spinal Anaesthesia)		Group B (General Anaesthesia)		
Preoperative	**Mean**	**SD**	**Mean**	**SD**	**p value**
HR	100	±11.09	104.63	±14.09	1.193
SBP	120.16	±14.50	123.17	±8.65	0.748
DBP	72	±9.00	70.50	±10.32	0.910
After 5 min					
HR	98.09	±12.39	119	±13.30	<0.05
SBP	96.98	±15.26	112	±12.30	<0.05
DBP	58.96	±16.31	70	±13.45	<0.05
After 15 min					
HR	90.96	±15.39	100	±15.36	<0.05
SBP	108	±16.99	108	±16.00	<0.05
DBP	66.85	±19.00	68	±16.80	<0.05
After 30 min					
HR	90	±11.05	96	±11.30	<0.05
SBP	114	±11.16	108	±16.00	<0.05
DBP	64	±12.00	76	±12.30	<0.05
After 45 min					
HR	80	±14.05	88	±13.00	<0.05
SBP	116	±11.30	118	±12.10	<0.05
DBP	70	±12.24	75	±11.10	<0.05
After 60 min(postop)					
HR	82	±14.60	84	±13.10	<0.05
SBP	115	±12.30	116	±13.19	<0.05
DBP	74	±10.60	76	±11.60	<0.05

The pH and PCO_2 was similar in both the groups but there was significantly higher bicarbonate level in group B than group A in 1 and 5 minutes as shown in Table 3. The heart rate was similar preoperatively but significant tachycardia was observed in Group B patients than the Group A from 5 min onwards as shown in table 4. Likewise there was significant difference in systolic BP and diastolic BP in group A than group B in different time interval from 5 min to 60 min as shown in Table 4. None of the patient complained about vomiting. Chest tightness was complained in group A which was treated with rescue analgesia tramadol 50mg slow iv.

DISCUSSION

Previous studies have always highly recommended regional anesthesia over general anesthesia being safer for both mother and fetus, allows the mother to be awake and immediately interact with her baby. But this study is based on giving emphasize mainly on the new born outcome. It showed that 1 and 5 min APGAR score were higher in newborns of parturients who received spinal anesthesia.[4] The possible mechanism of lower APGAR score in parturients receiving GA is the fetal transmission of anaesthetic drugs though placental barrier. A similar study was done by Mancuso and colleagues[5] who compared the effect of general and spinal anesthesia on 179 pregnant women undergoing elective cesarean section. They were allocated randomly to general or spinal anesthesia. Umbilical cord artery pH, APGAR score and need for assisted ventilation were evaluated and found that spinal anesthesia is superior to general in fetal outcome. An another study conducted by Kavac and colleagues[6], investigated the short term outcome of the fetus in parturients undergoing elective cesarean section under spinal versus general Anesthesia, in addition to APGAR score and acid base measurement they assessed the perinatal stress by measuring serum creatine kinase (the myocardial-specific), alanine and aspartate aminotransferase, and total cortisol levels to rule out any neonatal asphyxia. They found all parameters normal and comparable in both general and spinal anesthesia. Maghsoudloo and colleagues[7] did a study on the effect of general anesthesia on the newborn Apgar scores and blood gases analysis with and without fentanyl intravenous and the results were comparable and did not affect the newborn outcome. They explained their results that fentanyl has short acting effect and rapid metabolism, so there is minimal possibility that it can hamper the neonates. In our study, no statistically significant difference was present between the two groups regarding newborns pH and CO_2 but HCO_3 was statistically significant higher in parturients of general anesthesia group compared to spinal group which reflected neonatal metabolic acidosis in the group received regional anesthesia[8] as shown by Afolabi *et al*, but this was not significant clinically. This can be explained by the presence of fetal respiratory depression and accumulation of PCO_2 which was promptly corrected.

In complicated patients such as in severe preeclampsia, moslemi and colleagues studied the effect of spinal anesthesia on both maternal hemodynamic and neonatal APGAR score, umbilical arterial pH and PCO_2 and showed spinal anaesthesia preferable over general anesthesia[9]. A meta-analysis on different types of anesthesia was done by Reynolds and Seed and they found that cord pH was significantly lower with spinal than with both general and epidural anesthesia and concluded that spinal anesthesia cannot be considered safer than epidural or general anesthesia for fetus[10]. The study results showed, there was a higher incidence of intra-operative tachycardia with general anesthesia patients as compared to spinal anesthesia patients which could be attributed to the stress of rapid sequence induction and inadequate analgesia as we postponed giving analgesic drugs till delivery of the fetus. On the other hand, carefully administrated spinal anesthesia as properly explained avoids stress of general anesthesia. Also spinal anesthesia with adequate precaution can avoid sudden onset of blockade of sympathetic nervous system providing better hemodynamic stability when compared with general anesthesia or even with other techniques of regional anesthesia. Also in this study, there was a lower systolic and diastolic blood pressures in spinal parturients compared to general anesthesia group. This could be due to the sympathetic block associated with regional anesthesia, which was rapidly and successfully treated by fluid bolus and ephedrine shots.

Limitations of the study are discussed as:

- Although the research comparing general versus regional anesthesia is well studied during the development of anesthesiology yet the new era of debate between both techniques and needs further research.
- Although the sample size is representative yet the number is still low due to patient refusal owing to perceived myths of both parturients and obstetricians related to regional anesthesia.

CONCLUSION

Combined spinal – spinal anesthesia is safer on the newborn than general anesthesia regarding the APGAR scores and acid–base balance.

Conflict of interest

No conflict of interest

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