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A Randomized Comparative Study of Spinal Anaesthesia versus General Anaesthesia for LSCS Patients with Severe Preeclampsia and Eclampsia

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Abstract

Background: It has been several controversies about technique of choice for cesarean section in severe preeclampsia and eclampsia patients for several years. Though earlier general anesthesia was routinely used for giving anesthesia in such patients, in last 10 years the picture has changed. Now, spinal anesthesia is an anesthetic choice for patient with preeclampsia unless it is contraindicated because of hypocoagulation. It was therefore decided to compare the hemodynamics of severely preeclamptic and eclamptic patients undergoing general or spinal of anesthesia. *Material:* We have studied 60 patients with severe preeclampsia and Eclampsia posted for emergency and elective caesarean section. All patients were divided randomly into two groups equally. All patients under the study underwent thorough pre-anaesthetic assessment including detailed case history, clinical examination and necessary investigations. All intraoperative and postoperative untoward complications will be recorded and treated. *Result:* There was statistically significant at all readings where group II were significantly more tachycardic compared to group I patients except preoperative readings for pulse rate, SBP, DBP, and MAP. *Conclusion:* We conclude that, severe preeclampsia and eclampsia patients undergoing spinal anesthesia, experience more hemodynamic instability (in the face of hypotension) than general group, but these changes are not severe, are transient, in the acceptable range and not influence the neonatal outcome. So, spinal anesthesia may be an appropriate anesthetic choice for woman with severe preeclampsia and stable eclampsia patients having cesarean delivery.

Keywords: Eclampsia; Pre-Eclampsia; Cesarean Section; Neonatal.

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Introduction

Severe features of preeclampsia include SBP >/ 160 mmHg or DBP>/110mmHg on two separate occasion atleast four hours apart while on bed rest, thrombocytopenia, impaired liver function with twice normal concentration of liver enzymes, right upper quadrant pain, progressive renal insufficiency with serum creatinine greater than 1.1 mg/dl or doubling of serum creatinine without other known renal disease (oliguria-<500ml in 24 hours), pulmonary edema and new onset cerebral or visual abnormalities. Eclampsia is preeclampsia complicated by seizure activity in the absence of any other pathologic brain condition [1,2].

It has been several controversies about technique of choice for cesarean section in severe preeclampsia and eclampsia patients for several years. According to the pathophysiology of severe preeclampsia and eclampsia, there has been an

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understandable caution as regards spinal anesthesia in these patients, because of the theoretical possibility of precipitous hypotension, decrease cardiac output and associated placental hypoperfusion [3].

On the other hand, the risk of general anesthesia, including failed intubation or esophageal intubation, pulmonary aspiration, drug related fetal depression, blood pressure changes during laryngoscopy and intubation and risk of cerebral hemorrhage may be more grater in preeclamptic woman than healthy patients [1,2,4,5].

Though earlier general anesthesia was routinely used for giving anesthesia in such patients, in last 10 years the picture has changed. Role of regional anesthesia is increasing day by day for LSCS in these patients. Now, spinal anesthesia is an anesthetic choice for patient with preeclampsia unless it is contraindicated because of hypocoagulation [2].

It was therefore decided to compare the hemodynamics of severely preeclamptic and eclamptic patients undergoing general or spinal of anesthesia and evaluate the neonatal outcome in each group. Presumably the use of spinal anesthesia in these patients is of considerable benefit, as it does not affect the neonatal outcome and prevent those patients from the particular hazards of general anesthesia.

Materials and Methods

We have studied 60 patients with severe preeclampsia and Eclampsia posted for emergency and elective caesarean section after ethical committee approval and obtaining informed consent. All patients were divided randomly into two groups equally.

Group I: Receive Spinal anaesthesia for caesarean section.

Group II: Receive General anaesthesia for caesarean section.

Selection of Cases

All patients under the study underwent thorough pre-anaesthetic assessment including detailed case history, clinical examination and necessary investigations. Investigations include hemogram, coagulation profile, urine routine. In the antepartum management, all the patients received magnesium sulphate as seizure prophylaxis and labetalol intravenously as vasodilator for additional blood pressure control against their standardized protocol. Previous use of other drugs (alpha – methyldopa, dexamethasone) was recorded.

Inclusion Criteria

a. Patients with severe pre eclampsia and eclampsia
b. ASA Grade III and IV

Exclusion Criteria

a. Patient refusal
b. Patient with bleeding disorder or on anticoagulant
c. Sensitivity to local Anaesthetic drugs
d. Patient with continuous convulsion
e. Infection at site of block
f. ASA Grade V

Data Collection Procedure

Patient was explained about procedure in their vernacular language, written and informed consent was taken. Basic vitals sign in the form of Heart rate, NIBP, Respiratory Rate, SpO_2, Urine output was recorded. Dose and time of inj. Magnesium sulphate ($MgSO_4$) as seizure prophylaxis was noted. Two wide bore IV line were secured.

Premedication

Group I: Inj. Ranitidine 1mg/kg i.v., Inj. Metaclopramide 0. 2 mg/kg i.v., Inj. Glycopyrrolate 0.004 mg/kg i.v.

Patients was preloaded with 10 ml/kg of Ringer lactate

Group II– Inj. Ranitidine 1 mg/kg i.v., Inj. Metaclopramide 0.2 mg/kg i.v., Inj. Glycopyrrolate 0.004 mg/kg i.v.

Anaesthesia Technique

Group I (spinal) All patients were preloaded with 10 ml/kg of Ringer Lactate and monitored with NIBP, ECG, Pulse Oxymetry. In Left lateral postion and under all aseptic precautions Lumber puncture was done in L3 – L4 interspace by 25G spinal needle, after continuous, clear and free flow of cerebrospinal fluid (CSF) inj. Bupivacaine 0.5% (Hyperbaric) 1.6cc – 2cc was injected in subarachnoid space according to height of patient. Patient was turned supine and 15° lift was given as wedge under

right buttocks to prevent supine hypotension. Peak sensory block level was assessed with pin prick. A waiting period of 20 minutes or time for maximal spinal action, whichever occurred earlier, was allowed to pass before general anesthesia induction. Any cases of failed spinal anesthesia were managed by giving general anesthesia and excluded from the study. Patients were received 4 L/min of oxygen from face mask throughout surgery.

Group II: All patients were preoxygenated with 100% Oxygen for 5 minutes. All patients were induced on inj. Propofol 2 mg/kg i.v. and muscle relaxation were achieved with inj. Suxamethonium chloride 1.5 mg/kg with rapid sequence induction and celic Maneuver. Under rapid, smooth direct laryngoscopic vision patient was intubated with proper size endotracheal tube, cuff will be inflated, endotracheal tube was connected to the close circuit, bilateral air entry will be checked and confirmed with $ETCO_2$, endotracheal tube will be fixed. Anaesthesia was maintained on Oxygen: Nitrous oxide 50:50, isoflurane 0.6%. Neuromuscular blockade was achieved with inj. Vecuronium 0.08 mg/kg i.v. Intraoperatively, Inj. Midazolam 1 mgi.v. and inj. Pentazocine 15 mgi.v was given after the delivery of baby.

At the end of surgical procedure and after appearance of spontaneous respiration reversal was given with inj. Neostigmine 0.05 mg/kg and inj. Glycopyrrolate 0.008 mg/kg. Endotracheal tube was removed after thorough oropharyngeal and ETT suction. Patients were received 6 – 8 L/min of oxygen from face mask postoperatively. Demographic data including age, gestational age was recorded. Vitals signs (BP.HR, SpO_2) were recorded before (baseline) and immediately after anesthesia, every 5 minutes thereafter throughout surgery using automated noninvasive devices. Peak sensory block level was assessed in group I (S). Mallampatti's class and grading of laryngoscopy were determined in group II(G). Any decrease or increase in blood pressure about 30% from baseline was treated with 2.5-5 mg ephedrine and repeated as needed or with inj. labetalol, respectively.

Immediately after induction and every 5 minutes intra-operatively, every 15 minutes for 2 hours postoperatively, all parameters were recorded. Apgar score will be recorded at 1 minute and at 5 minute, after delivery of baby. All intraoperative and postoperative untoward complications will be recorded and treated.

Statistical Analysis

Descriptive statistics such as mean, SD and percentage were used. Comparison between two groups was done by using unpaired t test for continuous variable and chi-square or z-test for categorical variable. A p-value less than 0.05 were considered as significant.

Result

There were no statistically differences between two groups regarding maternal age and the gestational age of the newborn compared using unpaired 't ' test. Most of the patients are young and term gestation (Table 1).

The Table 2 shows neonatal condition markers in two groups. There were no statistically significant differences between the two groups regarding APGAR score of the newborn at 1 minute and at the 5 minute compared using unpaired 't' test.

The Table 3 shows changes in the maternal mean pulse rate between the two groups at various periods. They were statistically significant at all readings where group II were significantly more tachycardic compared to group I patients except

Table 1: Basic characteristics

	Group – I(S)		Group – II(G)		P value	Inference
	Mean	SD	Mean	SD		
Maternal Age (Yrs)	23.46	3.99	22.53	3.904	0.3641	NS
Gestational age (wks)	35.83	0.63	35.63	0.54	0.1970	NS

Table 2: Neonatal condition markers

	Group – I		Group – II		P value	Inference
	Mean	SD	Mean	SD		
APGAR score at 1 min.	8.2	0.87	8.2	1.16	1.000	NS
APGAR score at 5 min.	9.96	0.17	9.93	0.24	0.5785	NS

Table 3: Shows Changes in Maternal Mean Pulse Rate/Min at Various Periods

PR	Group I Mean(SD)	Group II Mean(SD)	P value	Inference
A. Before induction				
Before Premedication	80.66 (12.37)	79.86 (9.26)	0.77	NS
After Premedication	87.033 (12.95)	87.06 (8.37)	0.9924	NS
B. After induction				
0 min	81.13 (12.03)	92.73 (9.97)	<0.0001	Significant
5 min	77.566 (11.99)	90.90 (8.87)	<0.0001	Significant
10 min	76.86 (11.11)	86.133 (7.27)	0.0003	Significant
15 min	76.366 (11.03)	84.30 (6.65)	0.0007	Significant
20 min	76.33 (11.02)	87.73 (6.239)	0.0014	Significant
25 min	76.36 (10.99)	82.766 (5.948)	0.0068	Significant
30 min	76.63 (10.57)	82.466 (5.4082)	0.0093	Significant
35 min	76.133 (10.38)	81.90 (4.7913)	0.0077	Significant
40 min	76.46 (10.33)	81.5 (4.455)	0.0172	Significant
45 min	74.275 (9.69)	80.433 (4.876)	0.0029	Significant
50 min	74 (10.1038)	80.576 (4.683)	0.0295	Significant
55 min	73.666 (9.58)	79.384 (5.107)	0.0055	Significant
60 min	74.42 (9.69)	79.4 (4.862)	0.0147	Significant
C. Postoperative				
0 min	74.70 (9.536)	81.533 (4.869)	0.0009	Significant
15 min	74.7 (9.536)	81.166 (4.817)	0.0016	Significant
30 min	73.86 (9.38)	80.633 (5.043)	0.0009	Significant
45 min	73.933 (9.193)	80.166 (4.899)	0.0018	Significant
60 min	74.2 (8.964)	79.733 (4.760)	0.0041	Significant
75 min	74.133 (9.061)	79.966 (4.708)	0.0027	Significant
90 min	74.2 (8.62)	79.80 (4.607)	0.0027	Significant
105 min	74.133 (8.605)	79.766 (4.609)	0.0025	Significant
120 min	74.2 (8.510)	79.30 (4.612)	0.0055	Significant

Table 4: Shows Changes in Maternal mean SBP in mmHg at Various Periods

SBP (mmHg)	Group I Mean(SD)	Group II Mean(SD)	P value	Inference
A. Before induction				
Before Premedication	153.43 (4.40)	154.33 (4.51)	0.0437	NS
After Premedication	153.43 (4.40)	154.33 (4.51)	0.5043	NS
B. After induction				
0 min	127.733 (11.084)	160.0667 (15.33)	<0.0001	Significant
5 min	124.30 (10.45)	157.53 (12.33)	<0.0001	Significant
10 min	124.0 (9.39)	139.133 (7.60)	<0.0001	Significant
15 min	122.8 (10.25)	134.46 (6.23)	<0.0001	Significant
20 min	121.66 (9.71)	133.2 (5.50)	<0.0001	Significant
25 min	121.8 (10.44)	132.333 (4.706)	<0.0001	Significant
30 min	122.4 (9.024)	131.26 (3.66)	<0.0001	Significant
35 min	121.40 (8.456)	130.53 (3.461)	<0.0001	Significant
40 min	122.66 (8.202)	130.533 (3.499)	<0.0001	Significant
45 min	122.48 (8.62)	130.533 (3.383)	<0.0001	Significant
50 min	121.39 (8.05)	130.384 (3.420)	<0.0001	Significant
55 min	123.33 (6.666)	131.692 (1.896)	<0.0001	Significant
60 min	124.57 (4.86)	131.8 (2.088)	<0.0001	Significant
C. Postoperative				
0 min	125.46 (7.28)	134.333 (3.9015)	<0.0001	Significant
15 min	125.46 (7.62)	137.80 (6.352)	<0.0001	Significant
30 min	125.06 (7.51)	138.933 (7.243)	<0.0001	Significant
45 min	125.33 (7.030)	142.3 (4.899)	<0.0001	Significant
60 min	125.60 (7.273)	136.8 (8.603)	<0.0001	Significant
75 min	125.2 (6.56)	136.48 (7.5132)	<0.0001	Significant
90 min	125.26 (6.64)	136.266(7.531)	<0.0001	Significant
105 min	124.93 (6.60)	135.333 (7.32)	<0.0001	Significant
120 min	125.2 (6.665)	134.7 (7.085)	<0.0001	Significant

preoperative readings.

The Table 4 shows changes in mean systolic blood pressure values at various periods between the two groups. They were statistically significant at all readings except preoperative reading.

The Table 5 shows changes in mean diastolic blood pressure at various periods in both groups. Differences in mean diastolic blood pressure values between the two groups were statistically significant and lower in group I compared to group II at all readings except preoperative reading.

The table 6 shows changes in mean MAP at various periods in both groups. Differences in mean arterial blood pressure values between the two

Table 5: Shows Changes in Maternal mean DBP in mmHg at Various Periods

DBP (mmHg)	Group I Mean (SD)	Group II Mean (SD)	P value	Inference
A. Before induction				
Before Premedication	92.06 (4.93)	94.43 (4.81)	0.0645	NS
After Premedication	92.06 (4.931)	94.43 (4.81)	0.0645	NS
B. After induction				
0 min	78.60 (5.46)	97.233 (7.994)	<0.0001	Significant
5 min	76.020 (5.92)	95.06 (5.67)	<0.0001	Significant
10 min	75.66 (5.51)	92.0 (4.28)	<0.0001	Significant
15 min	75.46 (5.11)	91.06 (3.85)	<0.0001	Significant
20 min	74.93 (5.28)	90.333 (3.90)	<0.0001	Significant
25 min	74.4 (5.75)	89.733 (3.375)	<0.0001	Significant
30 min	75.33 (4.011)	88.0 (3.055)	<0.0001	Significant
35 min	74.80 (4.052)	85.0 (2.7688)	<0.0001	Significant
40 min	75.6 (4.144)	84.4 (2.550)	<0.0001	Significant
45 min	76.06 (4.21)	83.333 (3.319)	<0.0001	Significant
50 min	74.69 (4.476)	83.0769 (3.2453)	<0.0001	Significant
55 min	77.11 (3.54)	82.307 (3.122)	<0.0001	Significant
60 min	78.28 (2.24)	80.8 (1.833)	<0.0001	Significant
C. Postoperative				
0 min	77.2 (4.57)	82.666 (2.844)	<0.0001	Significant
15 min	76.733 (5.151)	82.344 (2.815)	<0.0001	Significant
30 min	76.8 (4.085)	81.8 (4.641)	<0.0001	Significant
45 min	77.26 (3.776)	82.3 (12.21)	<0.0001	Significant
60 min	76.40 (4.363)	81.8 (5.594)	<0.0001	Significant
75 min	76.8 (3.745)	81.933 (4.304)	<0.0001	Significant
90 min	76.066 (4.14)	81.733 (4.464)	<0.0001	Significant
105 min	77.066 (3.60)	81.133(4.022)	<0.0001	Significant
120 min	76.46 (3.63)	81.133 (3.922)	<0.0001	Significant

Table 6: Shows Changes in Maternal mean MAP in mmHg at Various Periods

MAP (mmHg)	Group I Mean(SD)	Group II Mean(SD)	P value	Inference
A. Before induction				
Before Premedication	112.52 (4.56)	114.40 (4.48)	0.1126	NS
After Premedication	112.52 (4.56)	114.40 (4.48)	0.1126	NS
B. After induction				
0 min	95.0 (6.936)	118.17 (10.226)	<0.0001	Significant
5 min	92.23 (7.23)	115.88 (7.76)	<0.0001	Significant
10 min	91.77 (6.57)	107.71 (4.901)	<0.0001	Significant
15 min	91.24 (6.56)	105.53 (4.10)	<0.0001	Significant
20 min	90.51 (6.43)	104.622 (3.894)	<0.0001	Significant
25 min	90.20 (6.98)	103.93 (3.482)	<0.0001	Significant
30 min	91.02 (5.26)	102.422 (3.042)	<0.0001	Significant
35 min	90.333 (5.197)	100.177 (2.677)	<0.0001	Significant
40 min	91.28 (5.018)	99.777 (2.399)	<0.0001	Significant
45 min	91.54 (5.19)	99.066 (2.642)	<0.0001	Significant
50 min	90.260 (5.37)	98.846 (2.491)	<0.0001	Significant
55 min	92.51 (4.48)	98.769 (2.153)	<0.0001	Significant
60 min	93.71 (2.89)	97.80 (1.550)	<0.0001	Significant

C. Postoperative				
0 min	93.28 (5.30)	99.888 (2.547)	<0.0001	Significant
15 min	92.977 (5.151)	100.777 (3.333)	<0.0001	Significant
30 min	92.88 (5.028)	100.84(4.82)	<0.0001	Significant
45 min	93.28 (4.59)	102.65(9.233)	<0.0001	Significant
60 min	92.28 (5.136)	100.133 (6.108)	<0.0001	Significant
75 min	92.93 (4.35)	100.111 (5.006)	<0.0001	Significant
90 min	92.466 (4.670)	99.11 (5.079)	<0.0001	Significant
105 min	93.022 (4.013)	99.2 (4.597)	<0.0001	Significant
120 min	92.71 (4.219)	98.98 (4.5448)	<0.0001	Significant

Table 7: Comparison of Complications

Complications	Group I	Group II	P value	Interference
Difficult Intubation	Nil	3 (10%)	0.0758	NS
Intraoperative hypertension	0	2 (6.67%)	0.1498	NS
Intraoperative hypotension	1 (3.33)	0	0.3125	NS
Delayed Awaking	0	0	0	
Intraoperative pulmonary edema	0	0	0	
Postoperative Hypotension	0	0	0	
Postoperative Hypertension	0	1(3.33%)	0.3125	NS
Postoperative IPPV	0	0	0	
Convulsion	0	0	0	
Postoperative nausea vomiting	3	8	0.09492	NS
Postoperative pulmonary edema	0	0	0	

z-test for proportion

groups were statistically significant and lower in group I compared to group II at all readings except preoperative reading.

In postoperative period, 3 patients in group I and 9 patients in group II were reported to have problems. This difference is significant (p=0.04). From 3 patients of group I, 2 patients had transient nausea without vomiting and one had nausea with mild vomiting. None of them need for treatment. From 9 patients of group II, 1 patient had hypertension, which were consulted with physician for BP control. From another 8 patients, 5 had nausea without vomiting and they need not for treatment. Only 3 patients had persistent nausea and vomiting, treated with inj. Ondensetron (0.08 mg/kg). Other complications including hypotension, pulmonary edema, delayed awaking and cardiac arrhythmias were not seen.

Discussion

Fetal development is related to gestational age and to cronic utero-placental insufficiency, which result in intrauterine growth restriction. In addition any acute maternal deterioration may impact unfavorably on fetal outcome [2,3].

In this study equivalence is seen between the two study group in terms of demographic and clinical data, severity of maternal disease and gestational age. Such that mean baseline systolic and diastolic blood pressure of all mothers were high inspite of preoperative antihypertensive therapy. All of these, allow us to assess the influence of anesthesia independently.

One of the most important factor in the spinal anesthesia is sensory block level. The appropriate sensory level for cesarean section is T4 [2]. Adequate analgesia eliminates the using of supplemental systemic analgesia which could more interfere with maternal and fetal condition. On the other hand, high spinal level of block may influence the hemodynamic of mother with higher sympathetic block which could more lessen blood pressure of them.

In this study the sensory level of spinal group patients were adequate and there was not seen any decrement in maternal blood pressure in higher level (T4) in compared with lower level (T7). Also the quality of analgesia was satisfactory, so it did not necessitate for additional systemic analgesia or anesthesia.

Alteration in blood pressure were evaluated from two aspect. First systolic and diastolic changes were assessed in each group before (baseline) and after anesthesia. In the spinal group these changes were significant and all patients in this group became hypotensive following spinal anesthesia, but in the general group these changes were not significant

probably due to variable blood pressure changes, were seen in this group. Such that some of the patients became hypertensive following induction of anesthesia (due to laryngoscopy and intubation), some became hypotensive and the other did not experience blood pressure changes. Of course, most of these alterations were in the acceptable range (less than 30% from baseline) and only 1 patient in group I (S) and no patient in group II (G) had systolic blood pressure reduction higher than 30% of baseline and 2 patients from group II and no patient from group I had systolic BP increases by 30% from baseline . This was treated promptly with inj. ephedrine and inj. labetalol respectively.

Also, systolic and diastolic BP alterations were evaluated between two groups. Systolic pressure changes from baseline were 25.7±7.78 and 5.7333± 9.92 in group I and group II respectively, this between –group differences is significant. Changes in diastolic BP were 13.466±5.20 and 3.200±6.404 in group I and group II respectively. These changes were significant when comparing the two groups with each other. These changes reveal that systolic and diastolic BP changes in spinal group were more notable than general group although in the range of 30% from the baseline.

In the study of Ahmed et al. [4], the effects of spinal anesthesia was compared with general anesthesia in preeclamptic patients. Hypotension was seen in 47.1% of spinal group and 68.8% of general group became hypertensive.

Antoine et al. [6] showed that patients with severe preeclampsia experience less hypotension (6 times lesser) during spinal anesthesia with 0.5% Bupivacaine plus sufentanyl and morphine intrathecaly than healthy patients.

Clark AV et al. [7] study suggest that hypotension induced by spinal anesthesia in woman with severe but haemodynamically stabilized preeclampsia, is less than that of normotensive patients.

F. Moslemi et al. [8], examined both markers of neonatal conditions and hemodynamic in severely preeclamptic patients receiving spinal or general anesthesia. They concluded that although the incidence of hypotension was higher in spinal group as compared with general group, but it was in the acceptable range without any dangerous effects on the mother or her neonate.

Ranjusingh et al. [9] studied 12 stable eclampsia patients who received spinal anesthesia for cesarean section and found that one out of twelve patients had an episode of hypotension.

Ashok Deshpande et al. [10], prospective study concluded that incidence and severity of hypotension following spinal anesthesia was less in preeclampsia patients compared to healthy patients.

In our study, although the incidence of hypotension was higher in spinal group, but it was in the acceptable range without any dangerous effect on the mother or her neonate. It was appeared that many factors such as prehydration and other unknown preeclampsia related factors contribute to the lower incidence and severity of hypotension in severe preeclampsia and stable eclampsia patients.

After delivery, most common method used to detecting neonatal conditions is 1, 5 and occasionally 10 minutes Apgar score. Also, the more accurate and predictive measure, especially in high risk conditions such as fetal distress is neonatal umbilical Arterial acid base values [2].

Accepted criteria used to identify newborn infants at risk of fetal hypoxia are Apgar score less than 7 at one and five minutes, neonatal umbilical PH < 7.2 and umbilical Arterial base deficit greater than 10mm [3].

In the current study, 1 and 5 minutes Apgar score were evaluated; there was not seen significant difference between groups in 1 and 5 minutes Apgar scores. Three neonates in spinal group and six neonates in general groups had 1 minute Apgar score less than 7, but their 5 minute Apgar score became 9 or 10 after simple resuscitation (stimulation, free flow oxygen and positive pressure ventilation).

Shifman and Filippovich [11], contains data on retrospective observation study of 54 cases with subarachnoid anesthetic management for cesarean section in preeclampsia. The results showed that no complications were detected in mother and fetus of the experimental group and confirmed the safety of this method in the patients with preeclampsia.

Visalyaputra et al. [12], comparing the effect of spinal and epidural anesthesia for cesarean delivery in severely preeclamptic patients showed that although the incidence and severity of hypotension and ephedrine use were more in spinal group than in epidural group, but the duration was short (≤ 1 minute) in both groups and neonatal Apgar score and the umbilical arterial blood gas analysis were similar in either groups.

F.Moslemi et al. [8], compared neonatal condition and maternal hemodynamic in severlypreeclamptic patients receiving spinal or general anesthesia for cesarean section. They concluded that there was no significant group difference in 1 and 5 minutes Apgar score of neonates.

Mai Wedad Abdullah et al. [13], compared Apgar score at 1 and 5 minutes in patients receiving combine spinal epidural or general anesthesia for

cesarean section. They found that combine spinal epidural group Apgar score readings were higher than general anesthesia group.

In the present study, we evaluated the probable complications might be seen intra-operatively and in recovery period after anesthesia. According to Ahmed et al. [4], commonest complications during general anesthesia group were rise in BP in 68%,difficult intubation in 25% cases, pulmonary edema in 12.8%, delayed recovery and mortality 4.3%.

In our study we found the rise of BP in 60% of patients at the time of intubation and difficult intubation in 10% cases. In general group, postoperative hypertension and nausea and vomiting were higher than spinal group .No patient had convulsion and conversion of spinal anesthesia into general anesthesia. In the study of Salman Waris et al. [5], they found difficult intubation in 12%, pulmonary edema 13%, delayed recovery in 26%, rise in BP in 63% and mortality in 10% cases of general anesthesia group compared to spinal group patients. While in spinal anesthesia group there was no mortality.

In study of F. Moslemi et al. [8], found that general group patients had significantly higher postoperative hypertension, nausea and vomiting than spinal anesthesia group.

Ranjusingh et al. [9], studied spinal anesthesia in 12 stable eclamptic patients for cesarean section and saw no convulsion over 48 hours after delivery. He also concluded that spinal anesthesia avoided the known risks of general anesthesia and was not associated with any major complications.

Conclusion

We conclude that severe preeclampsia and Eclampsia patients undergoing spinal anesthesia, experience more hemodynamic instability (in the face of hypotension) than general group, but these changes are not severe, are transient, in the acceptable range and not influence the neonatal outcome. So, spinal anesthesia may be an appropriate anesthetic choice for woman with severe preeclampsia and stable eclampsia patients having cesarean delivery. Furthermore, because of its simplicity and rapidity we also believe that spinal anesthesia should be considered as an alternative to general anesthesia for emergency cesarean section in preeclamptic and eclamptic woman who have been adequately prepared with judicious amount of IV preload.

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