

Original article:

A comparison of haemodynamic changes under subarachnoid blockade in pre-eclampsia and normal parturients during caesarean section

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Abstract

Introduction: During obstetric anesthesia, preservation of hemodynamic stability is a big concern for anesthetists especially for preeclamptic parturients who undergo cesarean section but spinal anesthesia-induced maternal hypotension is still the most frequent complication.

Methodology : Group 1- is normal parturients group or N group .It constitute 30 ASA grade 1 patients coming for caesarean section , while Group 2- is preeclamptic parturients group or PE group.it constitute 30 ASA grade 2 ASA grade 3 preeclamptic patients coming for cesarian section. Inclusion criteria for preeclamptic parturients group (on control of blood pressure)and normal parturients group- Systolic blood pressure not more than 150 mmhg, Diastolic blood pressure not more than 90 mmhg , patient willing to include study group and ASA grade 1 and 2 parturient.

Results : The amount of blood loss seen was same in both groups and difference was not statistically significant Mephentramine was needed only in normal parturients twice the hypotension episodes as defined by MAP below 65mmhg were seen one at 8min in 5 patients and second time at 10min in 1 patient.in normal parturient while there was not that hypotension seen in preeclamptic patients that required vasopressor use mephenteramine use.

Conclusion: The present study is in agreement with the recent evidences that, subarachnoid block in preeclampsia patients associated with better perioperative hemodynamic stability, less hypotension, less vasopressor consumption and more gradual blood pressure changes. Studies show that rehydration strategy may be followed safely in preeclampsia patients and is recommended before subarachnoid block to ensure intraoperative stable hemodynamics.

Keywords: haemodynamic changes, subarachnoid blockade , pre-eclampsia

Introduction:

During obstetric anesthesia, preservation of hemodynamic stability is a big concern for anesthetists especially for preeclamptic parturients who undergo cesarean section but spinal anesthesia-induced maternal hypotension

is still the most frequent complication. Anesthetists denied spinal anesthesia for preeclamptic parturients, for years for fear of profound hypotension and its management crisis as responses are exaggerated to vasopressor treatment and pulmonary edema occurs following fluid challenges Further, the incidence of spinal anesthesia-induced maternal hypotension showed inconsistency across different studies, which makes it almost difficult to set standard guidelines and develop a local management protocol.^{1,2,3}

What are the haemodynamic consequences of spinal anaesthesia for non-emergency caesarean section, and what are the most appropriate interventions for improvement of maternal haemodynamic stability and neonatal outcome? This questions needs to be answered and mechanisms of the maternal response to spinal anaesthesia also needs to be studied. So this study was conducted as basic research involving mothers with a normal physiology and patients with preeclampsia to establish the safety of the practice of spinal anaesthesia for caesarean section in this high risk group of preclampsia , and watch for haemodynamics in mother and neonatal outcome with anticipation that rapid changes in maternal haemodynamics may occur during spinal anaesthesia for caesarean section This thesis thus examined the haemodynamic consequences of subarachnoid block also known as spinal anaesthesia for caesarean section in patients with clinically healthy and pre-eclamptic patients and to study neonatal outcomes. Interventions to reduce this haemodynamic instability mainly due to spinal anaesthesia in form of intravenous fluids or vasopressors like mephentermine were also studied.^{4,5,6,7}

Material and methods:

Study design: **Randomised prospective comparative study**

Place of study: Department of Anaesthesia tertiary care government medical college and hospital

Duration of study: **18 months**

Sampling method-simple random method

Sample size: total 60 parturients

Group 1- is normal parturients group or N group .It constitute 30 ASA grade 1 patients coming for caesarean section , while Group 2- is preeclamptic parturients group or PE group.it constitute 30 ASA grade 2 ASA grade 3 preeclamptic patients coming for cesarian section. Inclusion criteria for preeclamptic parturients group (on control of blood pressure)and normal parturients group- Systolic blood pressure not more than 150 mmhg, Diastolic blood pressure not more than 90 mmhg , patient willing to include study group and ASA grade 1and 2 parturient.

Exclusion criteria

- 1)Gestational diabetes mellitus
- 2)Inadequate analgesia where supplementation required
- 3)Blood transfusion required
- 4)Any intraoperative complication
- 5)HELLP syndrome
- 6)fetal distress
- 7)Spinal deformity
- 8)Height less than 140 cm
- 9)Patient on anticoagulation treatment
- 10)Antipartum hemorrhage
- 11)Heart disease

Results:

Mean age of the participants is 25.37 years with standard deviation of 3.316 in normal patients while it is 31.8 years with standard deviation of 2.074 in preeclamptics

Mean weight of the participants is 59.93 kg with standard deviation of 6.170 in normal patients while it is 60.27 kg with standard deviation of 7.638 in preeclamptics. mean height of the participants is 154.73 cm with standard deviation of 7.389 while it is 156.07cm with standard deviation of 7.134. mean gravida was 1.9 with standard deviation of 0.481 in normal patients while it was 1.27 with standard deviation of 0.521 in prelamptics .mean gestational age was 38.4 weeks with standard deviation 0.403 while it is 33.93 weeks with standard deviation of 0.640 in preeclamptics(table no1)

Also the association between normal and preclamptics patients with respect to various demographical variable show that there was statistical significance was seen between the two groups when compared with age. Similarly gravida variable also showed statistical significant relation between two groups and gestational age variable also showed statistical significant between two groups

Table no1: comparison of Intravenous fluids requirement, amount of blood loss in patients ,duration of surgery and vasopressor(here mephentermine use) in both groups

Variables	Normal parturients	preeclmptics	P value
intravenousfluids given	1430.00+/- 89.635	1250.00+/-118.903	<0.01
Amount of blood loss	488.67+/- 19.429	496.67+/- 22.180	0.143
duration of surgery	61.17+/-3.395	45.33+/- 2.249	<0.01
Mephenteramine use mean in normal patients after 8min	1.83mg+/-0.379	0	<0.01
Mephenteramine use mean in normal patients after 10min	1.97+/-0.181	0	0.321

The intravenous fluid requirements, duration of surgery, and vasopressor requirement was more in normal parturients than preclampsia patients and results were statistically significant. Mean intravenous fluid i.e normal saline transfused was 1430 ml with standard deviation 89.635 and in preeclamptics it was 1250 ml mean with standard deviation of 118.903

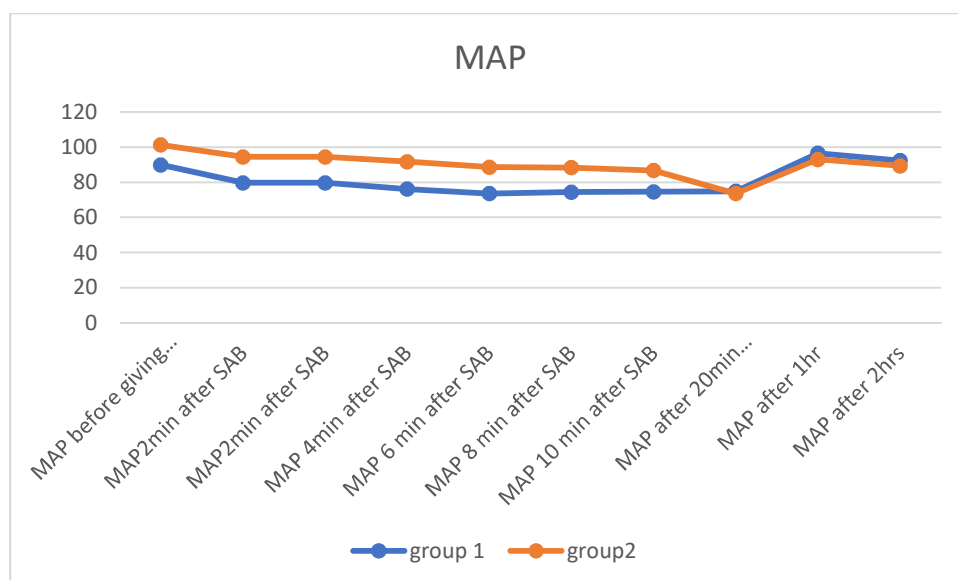
The amount of blood loss seen was same in both groups and difference was not statistically significant Mephentramine was needed only in normal parturients twice the hypotension episodes as defined by MAP below 65mmhg were seen one at 8min in 5 patients and second time at 10min in 1 patient.in normal parturient while there was not that hypotension seen in preeclamptic patients that required vasopressor use mephenteramine use.

Table no 2: Neonatal outcomes in both groups

Neonatal outcomes	Normal parturients	Preeclamptic parturients	P value
APGAR Score at 1min	8.17+/-0.379	7.00 +/-0.371	<0.01
APGAR Score at 5min	9.17 +/-0.379	8.87 +/-0.346	<0.01

Neonatal outcomes were comparable in both groups with one min apgar score being slightly less in preeclampsics. The difference in Apgar score at 1 min and 5 min in both groups were statistically significant .

Figure no 1:Changes in mean arterial pressure in both groups over various time intervals



Discussion:

In our study from the preoperative vitals and intraoperative (given after subarachnoid block) vitals and it was seen that there was fall in heart rate and mean arterial pressure and systolic and diastolic pressure in both groups normal patient and preeclampsia patients immediately after subarachnoid block.and result was statistically significant for systolic blood pressure

Aya et al⁷ in study found risk of hypotension to be six times less in patients with severe preeclampsia.

Khatri et al⁸. conducted a study and observed less hypotension but neonatal outcomes in form of Apgar score comparable in patients with severe pre-eclampsia.

The study by Saha et al⁹ also concluded that there is similar outcome in terms of perioperative hypotension, phenylephrine consumption and apgar score in preeclampsia and healthy counterparts

In our study vasopressor was not required in Preeclampsics. The duration of hypotension, duration of surgery, intravenous fluid requirements and vasopressor requirement was more in normal parturients than preclampsia patients and difference were statistically significant.

Mean intravenous fluid i.e saline transfused was 1430 ml with standard deviation 89.635 in normal parturient and in preclampsics it was 1250 ml mean with standard deviation of 118.903

Volume preload before SAB is a proven method to prevent hypotension and studies conducted have shown that 20 ml/kg of crystalloid had been shown to one of the effective means to reduce hypotension under SAB. Although some researchers findings found inconsistency in results preloading and coloadng is still recommended by the ASA task force to prevent hypotension associated with SAB

Conclusion

The present study is in agreement with the recent evidences that, subarachnoid block in preeclampsia patients associated with better perioperative hemodynamic stability, less hypotension, less vasopressor consumption and more gradual blood pressure changes. Studies show that rehydration strategy may be followed safely in preeclampsia patients and is recommended before subarachnoid block to ensure intraoperative stable hemodynamics.

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