

## ORIGINAL RESEARCH

### **Analysis of mephentermine and intravenous norepinephrine for maintenance of blood pressure during spinal anaesthesia for caesarean section**

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#### **ABSTRACT**

**Background:** Regional anaesthesia for caesarean delivery is associated with a high incidence of maternal hypotension and may result in fetalacidemia due to decreased uteroplacental blood flow. The present study was compared mephentermine and intravenous norepinephrine for maintenance of blood pressure during spinal anaesthesia for caesarean section.

**Materials & Methods:** 80 parturients scheduled for elective caesarean section under subarachnoid block were divided into 2 groups of 40 each. Group I received 6 mg mephentermine for SAIH and group II received 8 µg boluses of intravenous norepinephrine. Parameters such as systolic blood pressure (SBP), diastolic blood pressure (DBP), Apgar score and maternal complications were recorded.

**Results:** Group I received 6 mg mephentermine for SAIH and group II received 8 µg boluses of intravenous norepinephrine. The mean age in group I was 24.7 years and in group II was 25.2 years, height was 152.2 cm in group I and 156.8 cm in group II, weight was 62.8 kgs in group I and 63.2 kgs in group II, duration of surgery was 45.2 minutes in group I and 46.8 minutes in group II, APGAR score at 1st minute was 7.28 in group I and 7.24 in group II and at 5 minutes was 9.05 in group I and 9.04 in group II. The number of requirement of doses were 1 time seen in 15 in group I and 4 in group II, 2 times seen 14 in group I and 11 in group II, 3 times seen 8 in group I and 13 in group II, 4 times seen 3 in group I and 5 in group II, 5 times seen 0 in group I and 4 in group II, 6 times seen 0 in group I and 2 in group II. The difference was significant ( $P < 0.05$ ). Side effects reported were Nausea/ vomiting seen 7 in group I and 4 in group II, headache seen 7 in group I and 5 in group II, shivering seen 4 in group I and 3 in group II and hypertension seen in 1 in group II. The difference was non-significant ( $P > 0.05$ ).

**Conclusion:** Mephentermine was comparable with intravenous norepinephrine in maintenance of blood pressure during caesarean section.

**Key words:** Blood pressure, Mephentermine, Hypotension

## INTRODUCTION

Regional anaesthesia for Caesarean delivery is associated with a high incidence of maternal hypotension and may result in fetal acidemia due to decreased uteroplacental blood flow. Commonly used methods to prevent or treat such hypotension include preloading with fluids, avoidance of aortocaval compression and the administration of vasopressor drugs. Various vasopressor drugs have been studied for this purpose, e.g. ephedrine, mephentermine, methoxamine, metaraminol, phenylephrine, angiotensin II, dopamine and dobutamine. Spinal anaesthesia induced hypotension (SAIH) is reported in 80% parturients during caesarean section (CS) because of anaesthetic blockade up to T4 level.<sup>3</sup> Severe and sustained SAIH is detrimental to both mother and baby. The choice of the most effective management strategy for SAIH during CS continues to be one of the main challenges in obstetric anaesthesia.

Mephentermine is one of the most commonly used drugs in our institute and India. It has been shown to be as effective and safe as ephedrine for SAIH. Norepinephrine, a potent  $\alpha$ -agonist and a weak  $\beta$ -agonist, commonly used in septic shock has been showing promising results in many studies for SAIH with respect to maternal haemodynamic stability.<sup>5</sup> The present study was compared mephentermine and intravenous norepinephrine for maintenance of blood pressure during spinal anaesthesia for caesarean section.

## MATERIALS & METHODS

The present study consisted of 80 parturients scheduled for elective caesarean section under subarachnoid block. All were informed regarding the study and their written consent was obtained.

Data such as name, age was recorded. They were divided into 2 groups of 40 each. Group I received 6 mg mephentermine for SAIH and group II received 8  $\mu$ g boluses of intravenous norepinephrine. Parameters such as systolic blood pressure (SBP), diastolic blood pressure (DBP), Apgar score and maternal complications were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

Groups	Group I	Group II
Method	6 mg mephentermine	8 $\mu$ g boluses of intravenous norepinephrine

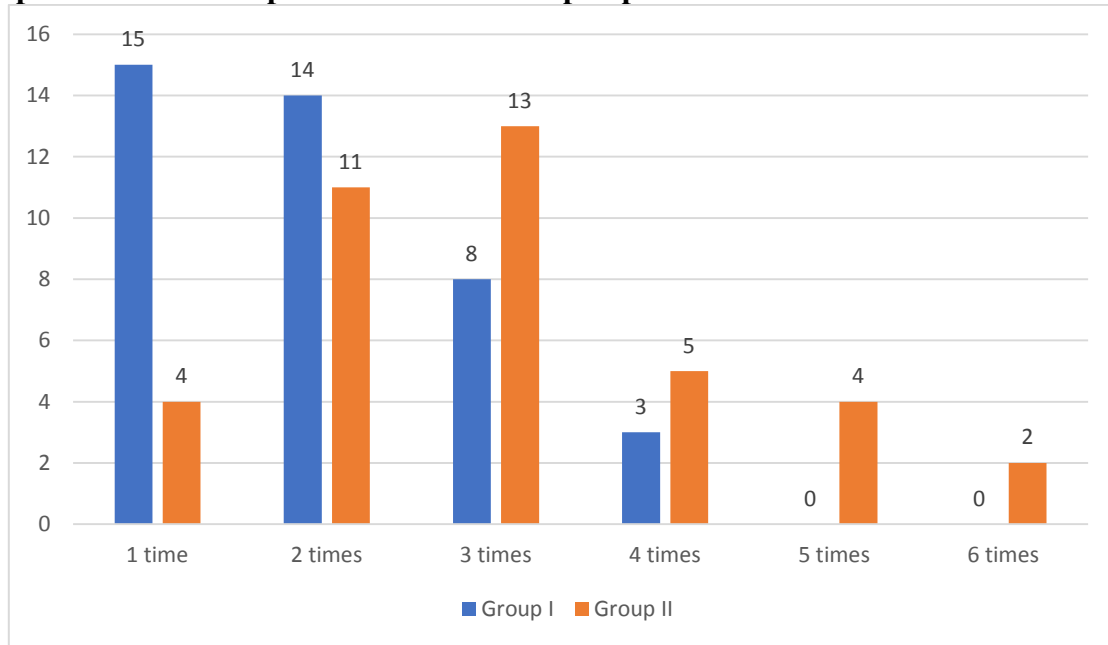
Table I shows that group I received 6 mg mephentermine for SAIH and group II received 8  $\mu$ g boluses of intravenous norepinephrine.

**Table II Comparison of parameters**

Parameters	Group I	Group II	P value	
Age (years)	24.7	25.2	0.11	
Height (cm)	152.2	156.8	0.16	
Weight (Kgs)	62.8	63.2	0.12	
Duration of surgery (mins)	45.2	46.8	0.07	
APGAR score	At 1 <sup>st</sup> minute	7.28	7.24	0.92
	At 5 minutes	9.05	9.04	0.94

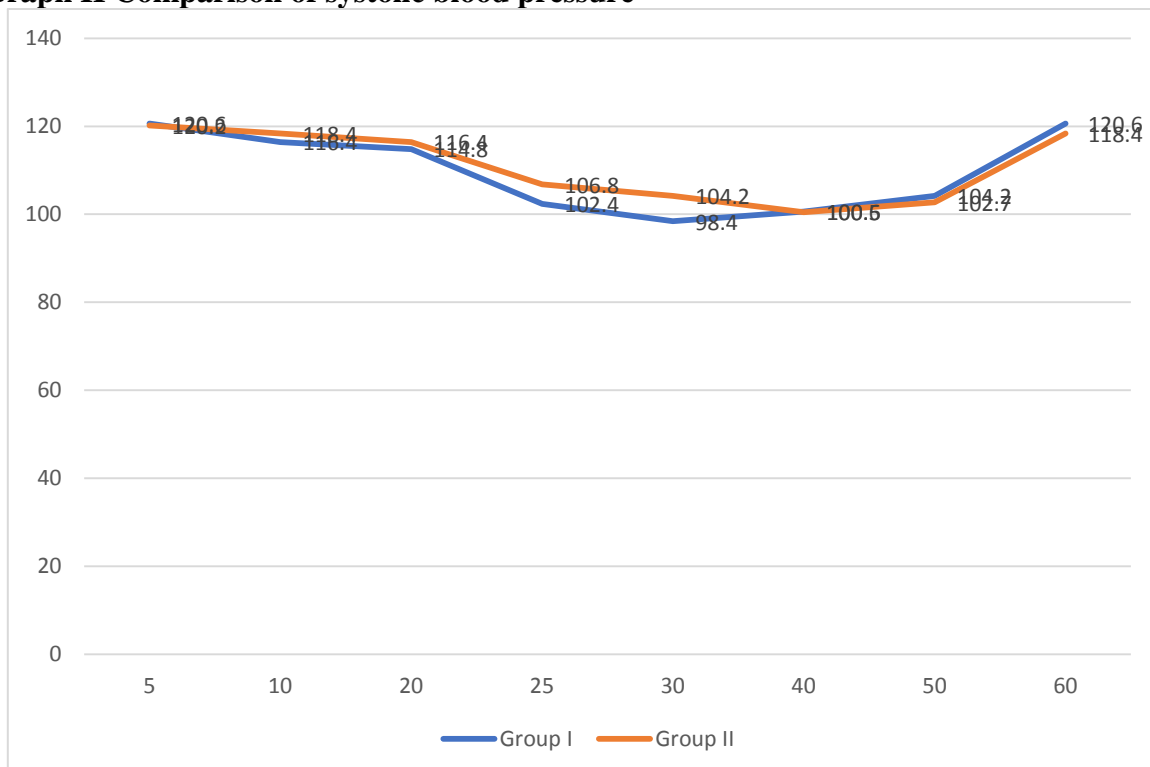
Table II shows that mean age in group I was 24.7 years and in group II was 25.2 years, height was 152.2 cm in group I and 156.8 cm in group II, weight was 62.8 Kgs in group I and 63.2 kgs in group II, duration of surgery was 45.2 minutes in group I and 46.8 minutes in group II, APGAR score at 1st minute was 7.28 in group I and 7.24 in group II and at 5 minutes was 9.05 in group I and 9.04 in group II. The difference was non-significant ( $P > 0.05$ ).

**Graph I Boluses of mephentermine and norepinephrine administered**

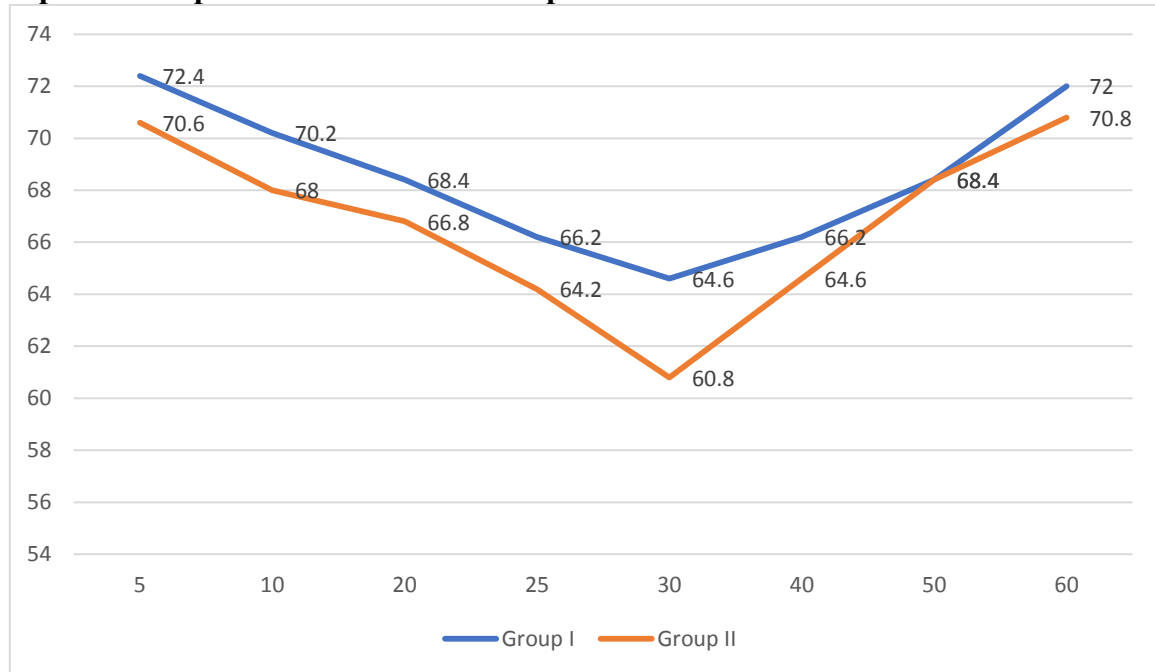


Graph I shows that number of requirement of doses were 1 time seen in 15 in group I and 4 in group II, 2 times seen 14 in group I and 11 in group II, 3 times seen 8 in group I and 13 in group II, 4 times seen 3 in group I and 5 in group II, 5 times seen 0 in group I and 4 in group II, 6 times seen 0 in group I and 2 in group II. The difference was significant ( $P < 0.05$ ).

**Graph II Comparison of systolic blood pressure**



Graph II shows non- significant difference in change in systolic blood pressure in both groups ( $P > 0.05$ ).

**Graph III Comparison of diastolic blood pressure**

Graph III shows non- significant difference in change in diastolic blood pressure in both groups ( $P > 0.05$ ).

**Table III Comparison of side effects**

Side effects	Group I	Group II	P value
Nausea/ vomiting	7	4	0.05
Headache	7	5	0.21
Shivering	4	3	0.93
Hypertension	0	1	0.08

Table III shows that side effects reported were Nausea/ vomiting seen 7 in group I and 4 in group II, headache seen 7 in group I and 5 in group II, shivering seen 4 in group I and 3 in group II and hypertension seen in 1 in group II. The difference was non- significant ( $P > 0.05$ ).

## DISCUSSION

Higher sensitivity to local anaesthetics combined with aortocaval compression of the pregnant uterus are the main reasons for increased incidence and higher levels of hypotension in pregnant women, compared to non-obstetric patients.<sup>8</sup> Pregnant women also exhibit an increased level of sympathetic activity compared to parasympathetic activity. Sympatholysis therefore leads to a higher degree of peripheral vasodilatation and a predominance of parasympathetic activity, consequently reducing the venous return and cardiac pre-load, and resulting in bradycardia, nausea and vomiting. The reduced pre-load in turn results in reduced cardiac output (CO), leading to systemic hypotension. This state is further aggravated by aortocaval compression.<sup>9</sup> The present study was conducted to compare mephentermine and intravenous norepinephrine for maintenance of blood pressure during spinal anaesthesia for caesarean section.

We found that group I received 6 mg mephentermine for SAIH and group II received 8  $\mu$ g boluses of intravenous norepinephrine. The mean age in group I was 24.7 years and in group II was 25.2 years, height was 152.2 cm in group I and 156.8 cm in group II, weight was 62.8 kgs in group I and 63.2 kgs in group II, duration of surgery was 45.2 minutes in group I and 46.8 minutes in group II, APGAR score at 1st minute was 7.28 in group I and 7.24 in group II

and at 5 minutes was 9.05 in group I and 9.04 in group II. Kansal et al found that sixty patients who developed hypotension following subarachnoid block for Caesarean section were randomly divided into two groups of 30 each to receive an intravenous infusion of ephedrine or mephentermine. Hypotension was defined as a decrease in systolic blood pressure of 20% from the baseline value or an absolute value of <100 mmHg, whichever was higher. The vasopressor infusion was titrated to maintain systolic blood pressure between 'hypotension' and baseline values. Baseline haemodynamic parameters, haemodynamic changes subsequent to the start of vasopressor infusion, duration of hypotension and amount of vasopressor required were statistically similar for both groups. Neonatal APGAR scores and acid-base profiles were also comparable.

We found that number of requirement of doses were 1 time seen in 15 in group I and 4 in group II, 2 times seen 14 in group I and 11 in group II, 3 times seen 8 in group I and 13 in group II, 4 times seen 3 in group I and 5 in group II, 5 times seen 0 in group I and 4 in group II, 6 times seen 0 in group I and 2 in group II. Shah et al, 256 parturient posted for elective CS under SAB were randomly allocated into Group- N and Group- M (n = 84) who received boluses of intravenous norepinephrine 8µg and mephentermine 6mg for SAIH, respectively. Systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), Response%, Apgar score and maternal complications were analysed. The changes in SBP and DBP were comparable in both the groups. It was significantly low after SAB compared to baseline and significantly high compared to 1st hypotensive value in both the groups throughout the study period (<0.0001). HR was comparable for initial 10 min, thereafter it was significantly high in Group- M (<0.0001) till 40 min. Response% after the first bolus was significantly high in Group- N ( $59.30 \pm 29.21$  vs  $39.78 \pm 25.6$ ;  $P = <0.0001$ ).

We observed that there was non-significant difference in change in systolic and diastolic blood pressure in both groups ( $P > 0.05$ ). Side effects reported were Nausea/ vomiting seen 7 in group I and 4 in group II, headache seen 7 in group I and 5 in group II, shivering seen 4 in group I and 3 in group II and hypertension seen in 1 in group II. Mohta et al<sup>10</sup> compared 5µg norepinephrine with 5mg ephedrine to prevent SAIH in lower limb orthopaedic surgery and coronary artery disease patients undergoing knee arthroscopy. They found that norepinephrine is more effective compared with ephedrine in the maintenance of blood pressure and has less adverse effects on HR in patients. These results are in agreement with the results obtained in our study although we conducted our study in parturients.

The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that mephentermine was comparable with intravenous norepinephrine in maintenance of blood pressure during caesarean section.

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