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Original Research

Comparison of intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section- A clinical study

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ABSTRACT:
Background: The main challenges in obstetric anaesthesia are selection of the most effective management strategy for SAIH during CS. The present study compared intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section. **Materials & Methods:** 80parturients selected for elective caesarean section (CS) under subarachnoid block (SAB) were selected and group I subject received boluses of intravenous 8 µg norepinephrine and group II received 6 mg mephentermine for SAIH. Parameters such as systolic blood pressure (SBP), diastolic blood pressure (DBP), Apgar score and adverse effects were recorded and compared in both groups. **Results:** The mean age in group I subject was 25.8 years and in group II was 26.1 years, height was 160.2 cm in group I and 162.5 cm in group II, weight was 65.7 kgs in group I and 66.2 kgs in group II, duration of surgery was 48.3 minutes in group I and 49.2 minutes in group II, APGAR score at 1st minute was 7.22 in group I and 7.40 in group II and at 5 minutes was 9.02 in group I and 9.06 in group II. The difference was non- significant (P> 0.05).There was a non- significant difference in change in systolic and diastolic blood pressure in both groups (P> 0.05). Side effects reported were nausea/ vomiting seen 2 in group I and 4 in group II, headache seen 3 in group I and 6 in group II, shivering seen 2 in group I and 2 in group II and hypertension seen in 1 in group I and 2 in group II subjects. The difference was significant (P< 0.05). **Conclusion:** Intravenous norepinephrine was comparable with mephentermine in maintenance of blood pressure during spinal anaesthesia for caesarean section.
Key words*:* caesarean section, norepinephrine, spinal anesthesia

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INTRODUCTION

Spinal anaesthesia induced hypotension (SAIH) is reported in 2/3rd of parturients during caesarean section (CS) due to anaesthetic blockade up to T4 level.[1] Severe and sustained SAIH is harmful to both mother and baby.[2] The main challenges in obstetric anaesthesia are selection of the most effective management strategy for SAIH during CS. Many techniques and various vasopressors were studied for SAIH, but no single method was found to be adequate or superior.[3]Spinal block-induced sympatholysis leads to vasodilatation and consequently causes hypotension in mothers. A decrease in systolic pressure can compromise uterine blood flow and foetal circulation, and thus cause foetal hypoxia and acidosis.[4]Various measures have been used in clinical practice for prevention and control of SAIH, such as preloading/co-loading with crystalloid/colloid infusion, wrapping lower limbs with compression stockings, left tilt, administering an optimal local anaesthetic to obtain an optimal height and administering vasopressor/inotropes.[5]

Mephentermine is a mixed sympathomimetic with mainly indirect β stimulation effect. It is one of the most commonly used drugs shown to be as effective and safe as ephedrine for SAIH.[6] Norepinephrine is

commonly used in septic shock has been showing promising results in many studies for SAIH with respect to maternal haemodynamic stability. It is a potent α-agonist and a weak β-agonist.[7,8]The present study compared intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section.

MATERIALS &METHODS

The present consisted of 80 parturients selected for elective caesarean section (CS) under subarachnoid block (SAB). All gave their written consent to participate in the study.

Data such as name, ageetc. was recorded. They were divided into 2 groups of 40. Group I subject received boluses of intravenous 8 µg norepinephrine and group II received 6 mg mephenterminefor SAIH. Parameters such as systolic blood pressure (SBP), diastolic blood pressure (DBP), Apgar score and adverse effects were recorded and compared in both groups. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

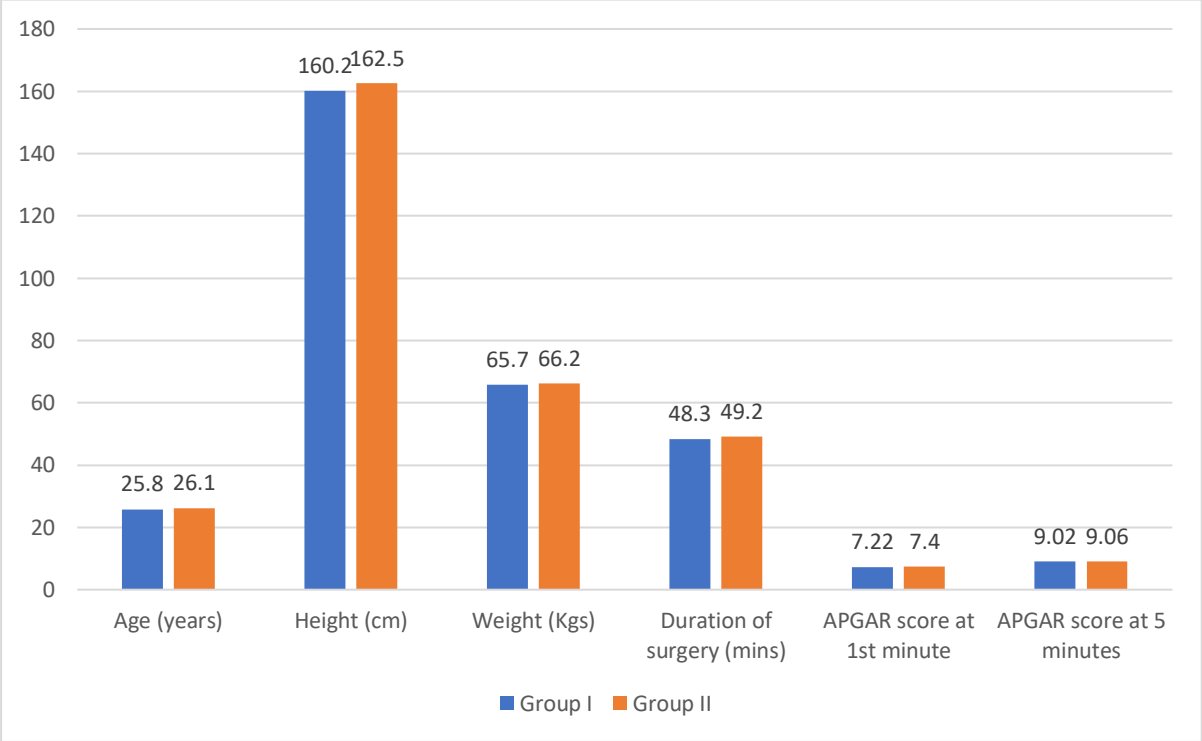
RESULTS

Table I: Distribution of patients

Groups	Group I	Group I
Agent	8 µg norepinephrine	6 mg mephentermine
Number	40	40

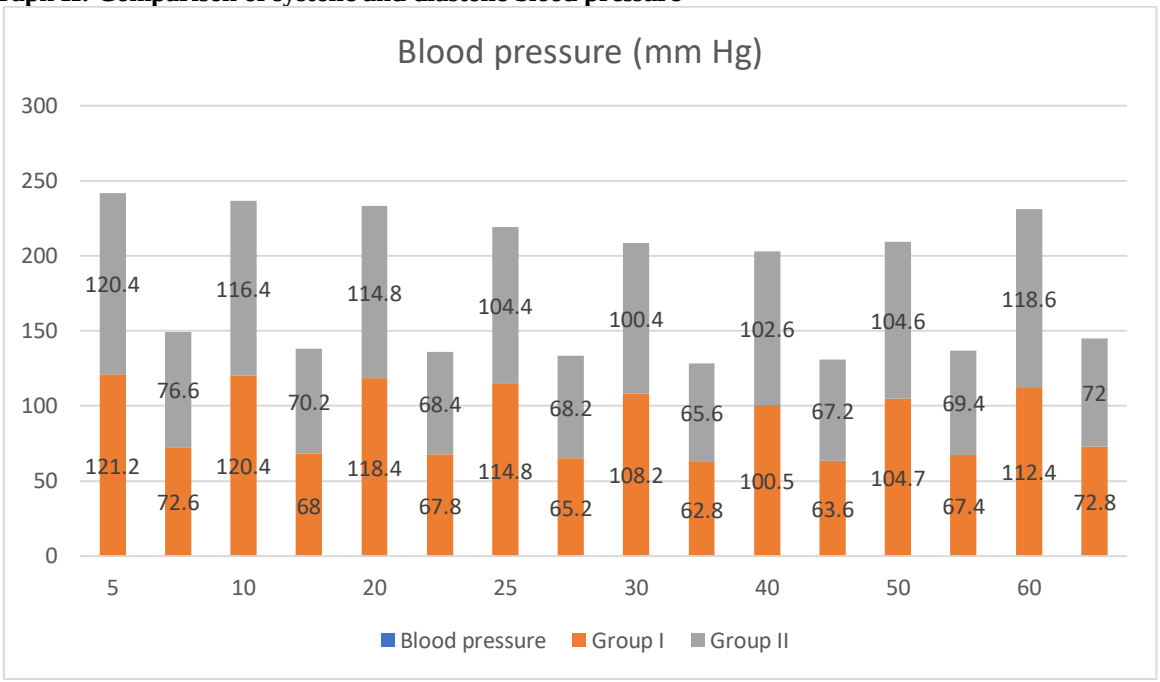
Table I shows that group I subject received intravenous 8 µg norepinephrine and group II received 6 mg mephentermine. Each group comprised 40 subjects.

Graph I: Assessment of baseline parameters



Graph I shows that the mean age in group I subject was 25.8 years and in group II was 26.1 years, height was 160.2 cm in group I and 162.5 cm in group II, weight was 65.7kgs in group I and 66.2kgs in group II, duration of surgery was 48.3 minutes in group I and 49.2 minutes in group II, APGAR score at 1st minute was 7.22 in group I and 7.40 in group II and at 5 minutes was 9.02 in group I and 9.06 in group II. The difference was non- significant (P> 0.05).

Graph II: Comparison of systolic and diastolic blood pressure



Graph II shows that there was a non- significant difference in change in systolic and diastolic blood pressure in both groups (P> 0.05).

Table II: Number of boluses of norepinephrine and mephentermine administered and side effects

Parameters	Variables	Group I	Group II	P value
Number of boluses	1 time	5	10	0.02
	2 times	10	13	0.26
	3 times	15	10	0.82
	4 times	5	4	0.97
	5 times	2	3	0.85
	6 times	2	0	0.05
Side effects	Nausea/ vomiting	2	4	0.05
	Headache	3	6	0.04
	Shivering	2	2	1
	Hypertension	1	2	0.85

Table II shows that the number of requirement of doses were 1 time seen in 5in group I and 10 in group II, 2 times seen 10 in group I and 13 in group II, 3 times seen 15 in group I and 10 in group II, 4 times seen 5 in group I and 4 in group II, 5 times seen in 2in group I and 3 in group II and 6 times seen 2 subjects in group I. Side effects reported were nausea/ vomiting seen 2 in group I and 4 in group II, headache seen 3 in group I and 6 in group II, shivering seen 2 in group I and 2 in group II and hypertension seen in 1 in group I and 2 in group II subjects. The difference was significant (P< 0.05).

DISCUSSION

SAB has been the preferred anaesthesia technique for caesarean section due to awake post-operative state for early mother-baby bonding, early initiation of breastfeeding, faster recovery of gastrointestinal functions after surgery, early mobilisation, better postoperative analgesia and lower risk of placental drug transfer.[9,10] However, associated sympatholysis induces a decrease in systemic vascular resistance and activates Bezold-Jarisch reflex, leading to vasodilation, bradycardia and hypotension which may be deleterious to both parturient and baby. This is further aggravated by aortocaval compression.[11] Severe and sustained SAIH not only increases the risk of nausea-vomiting, aspiration, acute renal failure and altered mental status in parturients but also compromises uteroplacental circulation with consecutive foetal hypoxia, bradycardia, acidosis and neurological injury.[12]The present study compared intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section.

We found that group I subject received intravenous 8 µg norepinephrine and group II received 6 mg mephentermine. Each group comprised 40 subjects. Ganeshanavar et al[13]conducted a comparative dose-response analysis and revealed relative potency for norepinephrine: phenylephrine when given as a bolus for restoring BP in SAIH in obstetric patients to be 13.1:1.0 and found that phenylephrine 100µg was

equivalent to norepinephrine 8 µg, although in the previous dose-finding study bolus injection of 6µg norepinephrine was reported effective. Therefore, we derived the relative potency of norepinephrine vs. mephentermine and used 8µg norepinephrine and 6mg mephentermine as equipotent doses.

We found that mean age in group I subject was 25.8 years and in group II was 26.1 years, height was 160.2 cm in group I and 162.5 cm in group II, weight was 65.7 kgs in group I and 66.2 kgs in group II, duration of surgery was 48.3 minutes in group I and 49.2 minutes in group II, APGAR score at 1st minute was 7.22 in group I and 7.40 in group II and at 5 minutes was 9.02 in group I and 9.06 in group II. We found that there was a non- significant difference in change in systolic and diastolic blood pressure in both groups ($P> 0.05$). Onwochei et al[14] studied the effect of different intermittent i.v. boluses of norepinephrine to prevent SAIH in caesarean delivery. The results obtained were feasible and were not associated with significant maternal or fetal adverse effects.

We found that the number of requirement of doses were 1 time seen in 5 in group I and 10 in group II, 2 times seen 10 in group I and 13 in group II, 3 times seen 15 in group I and 10 in group II, 4 times seen 5 in group I and 4 in group II, 5 times seen in 2 in group I and 3 in group II and 6 times seen 2 subjects in group I. Side effects reported were nausea/ vomiting seen 2 in group I and 4 in group II, headache seen 3 in group I and 6 in group II, shivering seen 2 in group I and 2 in group II and hypertension seen in 1 in group I and 2 in group II subjects. Bhattarai et al[15]included 90 patients undergoing elective and emergency caesarean section who developed hypotension following subarachnoid blockade. Parturient were randomly divided into three groups each group had 30 patients. Group P received bolus of Phenylephrine 25 microgram, whereas group E received Ephedrine 5mg and Group M received Mephentermine6mg.It was found that rise of blood pressure was significantly higher in case of phenylephrine group in first six minutes, after the bolus, there was significant reduction in the heart rate in phenylephrine group, but there was tachycardia following administration of bolus ephedrine and mephenteramine. Neonatal APGAR score were similar in all three groups.

CONCLUSION

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

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