

ORIGINAL ARTICLE

Intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section

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ABSTRACT:

Background: Due to anesthetic blocking up to the T4 level, spinal anaesthesia induced hypotension (SAIH) has been seen in two thirds of parturients after caesarean sections (CS). The present study compared intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section. **Materials & Methods:** 90 parturients selected for elective caesarean section (CS) under subarachnoid block (SAB) were divided into 2 groups. 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. **Results:** The mean age in group I subject was 23.2 years and in group II was 24.6 years, height was 162.3 cm in group I and 161.4 cm in group II, weight was 64.5 kgs in group I and 67.3 kgs in group II, duration of surgery was 47.3 minutes in group I and 48.2 minutes in group II, APGAR score at 1st minute was 7.4 in group I and 7.5 in group II and at 5 minutes was 9.01 in group I and 9.07 in group II. The difference was non-significant ($P > 0.05$). There was a non-significant difference in systolic and diastolic blood pressure in both groups ($P > 0.05$). Side effects reported were nausea/ vomiting seen 1 in group I and 3 in group II, headache seen 2 in group I and 4 in group II, shivering seen 1 in group I and 3 in group II and hypertension seen in 2 in group I and 5 in group II subjects. The difference was significant ($P < 0.05$). **Conclusion:** When it came to blood pressure maintenance during spinal anaesthesia for caesarean sections, intravenous norepinephrine and mephentermine were comparable.

Key words: norepinephrine, spinal anaesthesia, mephentermine

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INTRODUCTION

Due to anesthetic blocking up to the T4 level, spinal anaesthesia induced hypotension (SAIH) has been seen in two thirds of parturients after caesarean sections (CS).¹ Both the mother and the unborn child suffer from severe and persistent SAIH. Choosing the best management plan for SAIH during CS is one of the primary issues in obstetric anaesthesia. For SAIH, numerous methods and vasopressors were investigated; however, no one approach was deemed sufficient or better than the others.² Mothers experience hypotension as a result of vasodilatation brought on by spinal block-induced sympatholysis. Fetal hypoxia and acidosis can result from a drop in systolic pressure because it can impair uterine blood flow and fetal circulation. In clinical practice, a number of strategies have been employed to prevent and manage SAIH, including wrapping smaller limbs with compression stockings, left tilt, administering an optimal local anaesthetic to obtain an optimal height and administering vasopressor/inotropes.³ Mephentermine is a mixed sympathomimetic that primarily stimulates β receptors indirectly. It is one of the most widely used medications that has been demonstrated to be just as safe and effective for SAIH

as ephedrine.⁴ In numerous studies for SAIH, norepinephrine which is frequently administered in septic shock—has demonstrated encouraging outcomes in terms of maternal hemodynamic stability. In addition to being a modest β-agonist, it is a strong α-agonist.^{5,6} The present study compared intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section.

MATERIALS & METHODS

The present was conducted on 90 parturients selected for elective caesarean section under subarachnoid block (SAB). All gave their written consent to participate in the study.

Data such as name, age etc. was recorded. They were divided into 2 groups of 45 each. 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 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	45	45

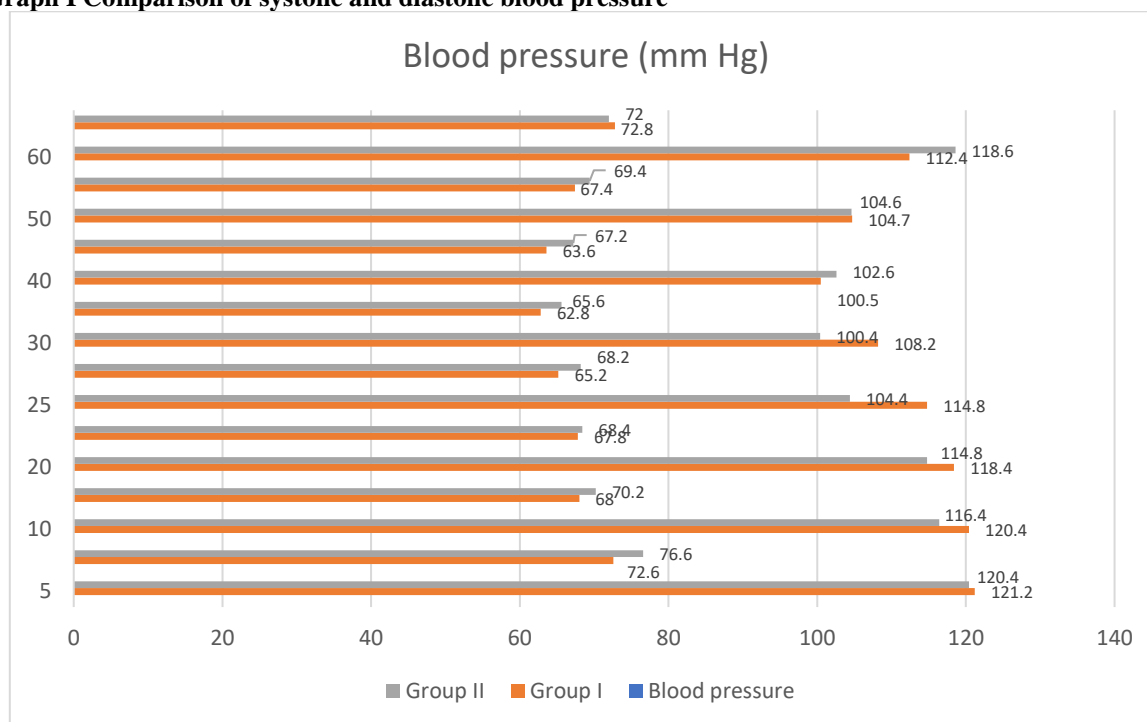
Table I shows that group I subject received intravenous 8 µg norepinephrine and group II received 6 mg mephentermine. Each group comprised 45 subjects.

Table II Baseline parameters

Parameters	Group I	Group II	P value
Age (years)	23.2	24.6	0.25
Height (cm)	162.3	161.4	0.62
Weight (Kgs)	64.5	67.3	0.74
Duration of surgery (mins)	47.3	48.2	0.81
APGAR score at 1 st minute	7.4	7.5	0.90
APGAR score at 5 minutes	9.01	9.07	0/92

Table II shows that the mean age in group I subject was 23.2 years and in group II was 24.6 years, height was 162.3 cm in group I and 161.4 cm in group II, weight was 64.5 kgs in group I and 67.3 kgs in group II, duration of surgery was 47.3 minutes in group I and 48.2 minutes in group II, APGAR score at 1st minute was 7.4 in group I and 7.5 in group II and at 5 minutes was 9.01 in group I and 9.07 in group II. The difference was non-significant (P> 0.05).

Graph I Comparison of systolic and diastolic blood pressure



Graph I shows that there was a non- significant difference in systolic and 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	1	3	0.05
Headache	2	4	0.04
Shivering	1	3	0.05
Hypertension	2	5	0.01

Table III shows that side effects reported were nausea/ vomiting seen 1 in group I and 3 in group II, headache seen 2 in group I and 4 in group II, shivering seen 1 in group I and 3 in group II and hypertension seen in 2 in group I and 5 in group II subjects. The difference was significant (P< 0.05).

DISCUSSION

Because it allows for early mother-baby bonding, early breastfeeding initiation, quicker recovery of gastrointestinal functions following surgery, early mobilization, improved postoperative analgesia, and a decreased risk of placental drug transfer, SAB has been the preferred anesthesia technique for caesarean sections.^{7,8} Nevertheless, concomitant sympatholysis causes a reduction in systemic vascular resistance and triggers the Bezold-Jarisch response, resulting in bradycardia, hypotension, and vasodilation that may be harmful to the parturient and the unborn child.^{9,10} The compression of the aorta exacerbates this. Severe and prolonged SAIH impairs uteroplacental circulation, resulting in subsequent fetal hypoxia, bradycardia, acidosis, and neurological damage. It also raises the risk of nausea-vomiting, aspiration, acute renal failure, and altered mental status in parturients.^{11,12} The present study compared intravenous norepinephrine and mephentermine for maintenance of blood pressure during spinal anaesthesia for caesarean section.

We found that the mean age in group I subject was 23.2 years and in group II was 24.6 years, height was 162.3 cm in group I and 161.4 cm in group II, weight was 64.5 kgs in group I and 67.3 kgs in group II, duration of surgery was 47.3 minutes in group I and 48.2 minutes in group II, APGAR score at 1st minute was 7.4 in group I and 7.5 in group II and at 5 minutes was 9.01 in group I and 9.07 in group II. In their study, Bhattarai et al¹³ included 90 patients who experienced hypotension after subarachnoid blockade during elective and emergency caesarean sections. The parturients were randomly assigned to three groups, each consisting of 30 patients: Group P received a 25 micrograms bolus of phenylephrine, while Group E received 5 mg of ephedrine, and Group M received 6 mg of mephentermine. The study found that the bolus of ephedrine and mephentermine caused tachycardia, while newborn APGAR scores were similar in the three groups.

We observed that there was a non-significant difference in systolic and diastolic blood pressure in both groups ($P > 0.05$). Side effects reported were nausea/vomiting seen 1 in group I and 3 in group II, headache seen 2 in group I and 4 in group II, shivering seen 1 in group I and 3 in group II and hypertension seen in 2 in group I and 5 in group II subjects. Although a bolus injection of 6 μ g norepinephrine was found to be effective in the previous dose-finding study, Ganeshanavar et al¹⁴ conducted a comparative dose-response analysis and found that the relative potency of norepinephrine: phenylephrine when given as a bolus for restoring BP in SAIH in obstetric patients was 13.1:1.0. They also found that phenylephrine 100 μ g was equivalent to norepinephrine 8 μ g. As a result, we calculated the relative potencies of mephentermine and norepinephrine and employed equipotent dosages of 6 mg mephentermine and 8 μ g norepinephrine.

CONCLUSION

Authors found that when it came to blood pressure maintenance during spinal anesthesia for caesarean sections, intravenous norepinephrine and mephentermine were comparable.

REFERENCES

1. Hasanin A, Mokhtar AM, Badawy AA, Fouad R. Post-spinal anesthesia hypotension during caesarean delivery, a review article. *Egypt J Anaesth.* 2017;33:189–93.
2. Burns SM, Cowan CM, Wilkes RG. Prevention and management of hypotension during spinal anaesthesia for elective Caesarean section: a survey of practice. *Anaesthesia.* 2001;56:794–8.
3. Ngan Kee WD, Khaw KS, Ng FF. Comparison of phenylephrine infusion regimens for maintaining maternal blood pressure during spinal anaesthesia for Caesarean section. *Br J Anaesth.* 2004;92:469–74.
4. Rout CC, Rocke DA, Levin J, Gouws E, Reddy D. A re-evaluation of the role of crystalloid preload in the prevention of hypotension associated with spinal anaesthesia for elective Caesarean section. *Anesthesiology* 1993;79:262-9.
5. Thomas DG, Robson SC, Redfern N, Hughes D, Boys RJ. Randomized trial of bolus phenylephrine or ephedrine for maintenance of arterial pressure. During spinal anaesthesia for caesarean section. *British Journal of Anaesthesia* 1996;76:61-5.
6. Kestin IG. Spinal anaesthesia in obstetrics. *Br J Anaesth.* 1991;66:596–607.
7. Salinas FV, Sueda LA, Liu SS. Physiology of spinal anaesthesia and practical suggestions for successful spinal anaesthesia. *Best Pract Res Clin Anaesthesiol.* 2003;17(3):289–303.
8. McClure JH, Brown DT, Wildsmith JA. Effect of injected volume and speed of injection on the spread of spinal anaesthesia with isobaric amethocaine. *Br J Anaesth.* 1982;54:917–20.
9. Moran DH, Dutta S, Perillo M, Laporta RF, Bader A. Phenylephrine is the prevention of hypotension following spinal anaesthesia for caesarean delivery. *Journal of Clinical Anaesthesia* 1991;3(4):301-5.
10. Ramanathan S, Grant GJ. Vasopressor therapy for hypotension due to epidural anaesthesia for caesarean section. *Acta Anaesthesiol Scand* 1988;32:559-65.
11. Hall Pa, Bennett A, Wikes MP, Lewis M. Spinal anaesthesia for caesarean section. Comparison of infusion of phenylephrine and Ephedrine. *British Journal of Anaesthesia* 1994;73:471-4.
12. Taylor JC, Tunstall ME. Dosage of phenylephrine in spinal anaesthesia for caesarean section. *Anaesthesia* 1991;46:314-5.
13. Bhattarai B, Bhat SY, Upadya M. Comparison of bolus phenylephrine, ephedrine and mephentermine for maintenance of arterial pressure during spinal anesthesia in cesarean section. *JNMA; Journal of the Nepal Medical Association.* 2010 Jan 1;49(177):23-8.
14. Ganeshanavar A, Ambi US, Shettar AE, Koppal R, Ravi R. Comparison of bolus phenylephrine, ephedrine and mephentermine for maintenance of arterial pressure during spinal anaesthesia in caesarean section. *J Clin Diagn Res* 2011;5:948-52.