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Original Research

Mephentermine versus norepinephrine in cesarean section- A comparative study

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ABSTRACT:
Background: The present study was conducted to compare mephentermine and norepinephrine in cesarean section. **Materials & Methods:** 84 females of American Society of Anaesthesiologists physical status (ASA)–II and singleton term pregnancy posted for elective CS were randomly divided into 2 groups of 42 each. Group I received boluses of intravenous norepinephrine 8µg and group II received mephentermine 6 mg. Systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), Apgar score and maternal complications were analysed. **Results:** The mean systolic blood pressure was 124.2 mm Hg and 130.2 mm Hg in group I and II respectively, diastolic blood pressure was 82.4 mm Hg and 88.2 mm Hg in group I and II respectively, heart rate was 80.4 beats/minute and 86.4 beats per minute in group I and II respectively, duration of surgery was 46.2 minutes and 46.0 minutes in group I and II respectively, APGAR score at 1st minute was 7.82 and 7.64 in group I and II respectively, APGAR score at 7th minute was 9.41 and 9.45 in group I and II respectively. The difference was non- significant (p> 0.05). Common adverse events were nausea/ vomiting 9 in group I and 10 in group II, headache 7 in group I and 8 in group II, shivering 5 in group I and 4 in group II and hypertension 6 in group I and 7 in group II. The difference was non- significant (p> 0.05). **Conclusion:** Intravenous norepinephrine was better than mephentermine in cesarean section, however results can be comparable.
Key words: Apgar score, Mephentermine, Norepinephrine.

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INTRODUCTION

Spinal anaesthesia induced hypotension (SAIH) is reported in 80% parturients during caeserean section (CS) because of anaesthetic blockade up to T4 level. Severe and sustained SAIH is detrimental to both mother and baby.[1] The choice of the most effective management strategy for SAIH during CS continues to be one of the main challenges in obstetric anaesthesia. Many techniques and various vasopressors have been tried and studied for SAIH, but no single method was found to be adequate or superior.[2]

The incidence of hypotension can be as high as 70%–80% when pharmacological prophylaxis is not used. Despite numerous attempts to restrict this incidence, it continues to be a cause of concern to the anesthetist.[3] Numerous pressor agents have been tried to counteract the hypotensive effect of subarachnoid block, usually by vasoconstriction and also by increasing the cardiac output. In practice, the most commonly used drugs are the sympathomimetic agents which exert their effects through the adrenergic receptors, either acting directly or indirectly by inducing the release of nor adrenaline which further acts on these receptors.[4]

Mephentermine (a mixed sympathomimetic with mainly indirect β stimulation) is one of the most commonly used drugs in our institute and India. Norepinephrine, a potent α-agonist and a weak β-agonist, commonly used in septic shock has been showing promising results in many studies for SAIH with respect to maternal haemodynamic stability.[5] The present study was conducted to compare mephentermine and norepinephrine in cesarean section.

MATERIALS & METHODS

The present study comprised of 84 females of American Society of Anaesthesiologists physical status (ASA)–II and singleton term pregnancy posted for elective CS under SAB. The study was approved from institutional ethical committee. All were informed and their consent was taken.

Data pertaining to patients such as name and age was recorded. Patients were randomly divided into 2 groups of 42 each. Group I received boluses of intravenous norepinephrine 8µg and group II received mephentermine 6 mg. Systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), response %, Apgar score and maternal complications were analysed. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Parameters	Group I	Group II
Drug	Norepinephrine 8µg	Mephentermine 6 mg
Number	42	42

Table I shows that group I received boluses of intravenous norepinephrine 8µg and group II received mephentermine 6 mg. Each group had 42 patients.

Table II Comparison of parameters

Parameters	Group I	Group II	P value
Systolic Blood pressure	124.2	130.2	0.04
Diastolic blood pressure	82.4	88.2	0.05
Heart rate	80.4	86.4	0.05
Duration of surgery	46.2	46.0	0.15
APGAR at 1st minute	7.82	7.64	0.94
APGAR at 7th minute	9.41	9.45	0.92

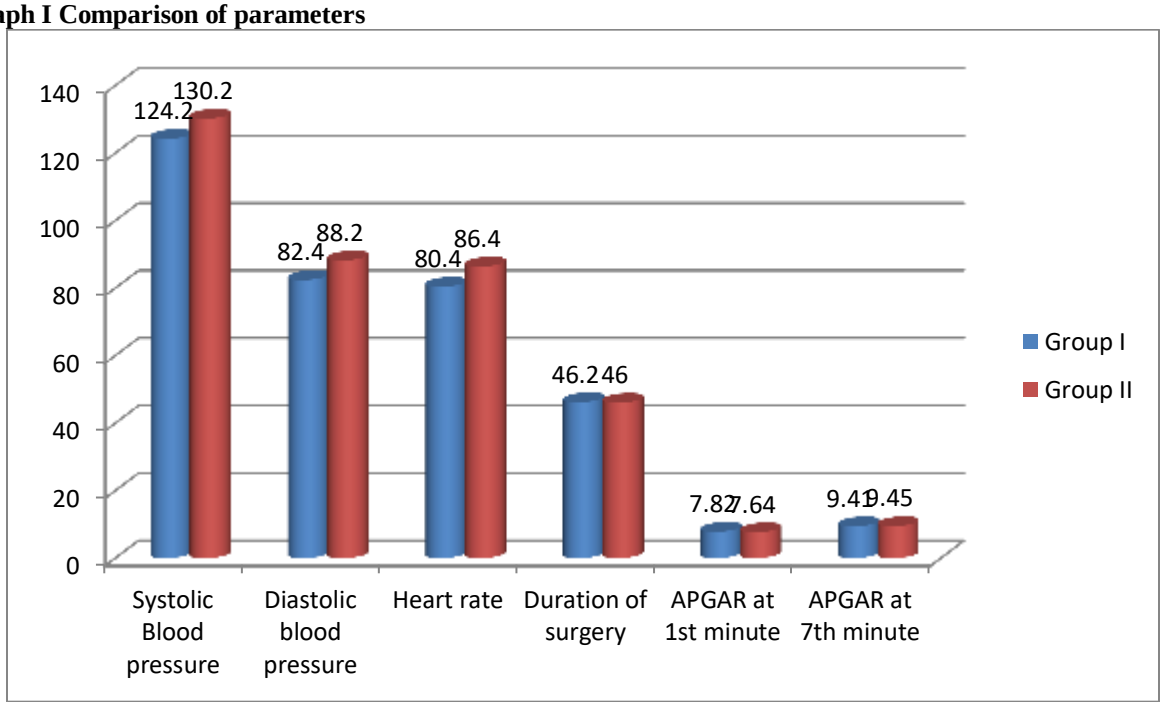
Table II, graph I shows that mean systolic blood pressure was 124.2 mm Hg and 130.2 mm Hg in group I and II respectively, diastolic blood pressure was 82.4 mm Hg and 88.2 mm Hg in group I and II respectively, heart rate was 80.4 beats/minute and 86.4 beats per minute in group I and II respectively, duration of surgery was 46.2 minutes and 46.0 minutes in group I and II respectively, APGAR score at 1st minute was 7.82 and 7.64 in group I and II respectively, APGAR score at 7th minute was 9.41 and 9.45 in group I and II respectively. The difference was non-significant ($p > 0.05$).

Table III Adverse events

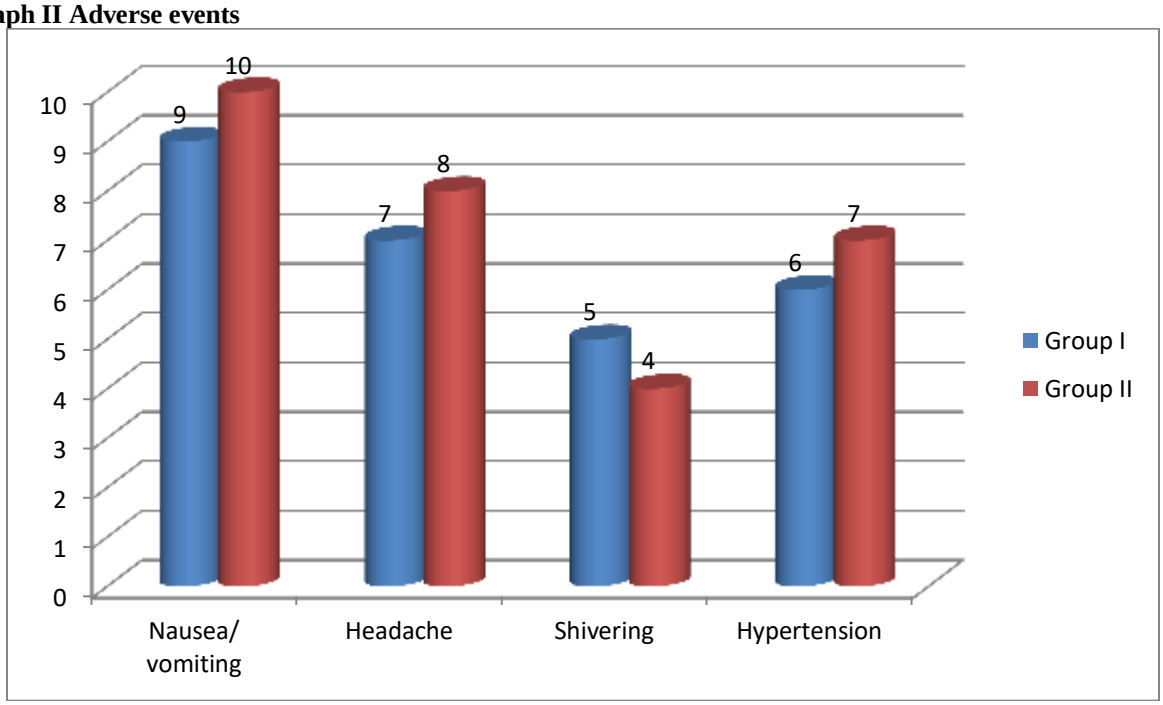
Adverse events	Group I	Group II	P value
Nausea/ vomiting	9	10	0.12
Headache	7	8	0.15
Shivering	5	4	0.21
Hypertension	6	7	0.30

Table III, graph II shows that common adverse events were nausea/ vomiting 9 in group I and 10 in group II, headache 7 in group I and 8 in group II, shivering 5 in group I and 4 in group II and hypertension 6 in group I and 7 in group II. The difference was non- significant ($p > 0.05$).

Graph I Comparison of parameters



Graph II Adverse events



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, better postoperative analgesia, early mobilisation and lower risk of placental drug transfer.[6] 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. 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.[7]

Hypotensive effects of spinal anesthesia are widely studied in cesarean procedures owing to the compounding effect of aortocaval compression. Despite numerous attempts to restrict this incidence, it continues to be a cause of concern to the anesthetist.[8] 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. Vasopressors are effective in preventing and treating SAIH but the choice of vasopressor has been debated.[9] The present study was conducted to compare mephentermine and norepinephrine in cesarean section.

In present study, group I received boluses of intravenous norepinephrine 8µg and group II received mephentermine 6 mg. Each group had 42 patients. The mean systolic blood pressure was 124.2 mm Hg and 130.2 mm Hg in group I and II respectively, diastolic blood pressure was 82.4 mm Hg and 88.2 mm Hg in group I and II respectively, heart rate was 80.4 beats/minute and 86.4 beats per minute in group I and II respectively. Shah et al[10] compared the effect of intermittent intravenous boluses of norepinephrine and frequently used mephentermine for management of SAIH in caesarean section (CS) to prove whether norepinephrine produces comparable effects or superior to mephentermine. 256 parturients posted for elective CS under SAB were randomly allocated into Group-N and Group-M (n = 84) using chit system, 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).

In this study duration of surgery was 46.2 minutes and 46.0 minutes in group I and II respectively, APGAR score at 1st minute was 7.82 and 7.64 in group I and II respectively, APGAR score at 7th minute was 9.41 and 9.45 in group I and II respectively. Ngan Kee et al[11] conducted 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.

We found that common adverse events were nausea/ vomiting 9 in group I and 10 in group II, headache 7 in group I and 8 in group II, shivering 5 in group I and 4 in group II and hypertension 6 in group I and 7 in group II. Kaur et al[12] in their study 90 adult patients of either sex who developed hypotension during surgery under subarachnoid block were allocated into three groups to receive bolus phenylephrine, ephedrine, and mephentermine. The number of boluses and time taken to recover from hypotension was noted. Occurrence of adverse effects in the perioperative and postoperative period was also noted. Four hypotensive events took place in mephentermine group. In phenylephrine group, a total of 53 hypotensive events took place. On an average, the group had a total of 1.61 hypotensive events per patient. No hypotensive event took place in ephedrine group after the first bolus of drug. Mean heart rate in phenylephrine group was significantly lower as compared to the other two groups.

CONCLUSION

Authors found that intravenous norepinephrine was better than mephentermine in cesarean section, however results can be comparable.

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