PROPHYLACTIC ORAL Ephedrine in PREVENTION of HYPOTENSION FOLLOWING SPINAL ANAESTHESIA

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ABSTRACT: Hypotension is the most dangerous event following spinal anaesthesia. Various measures are being adopted to treat this condition. We studied the efficacy of orally administered ephedrine for the prophylaxis of hypotension following spinal anaesthesia. Around 100 patients belonging to ASA grade I undergoing lower abdominal and scrotal surgeries were randomly allocated equally into two groups (E,C). Group E received 30 mg of oral ephedrine and Group C received a placebo 30 minutes before spinal anaesthesia. We found that the incidence of hypotension and the need for the use of intravenous ephedrine for treatment of hypotension was lower in the patients who received oral ephedrine prophylaxis. There were no significant side effects noticed due to the administration of oral ephedrine prophylaxis.

KEYWORDS: Oral ephedrine, Spinal anaesthesia, Spinal Hypotension.

INTRODUCTION: Spinal anaesthesia is one of the most common techniques of anaesthesia used in practice for more than 100 years. The technique is simple to perform and is relatively safe. The resulting anaesthetic state is excellent and a wide variety of lower abdominal and lower limb surgeries can be performed under spinal anaesthesia. All these factors make the technique quite popular. However, the procedure is not devoid of complications. Hypotension, at times of severe nature, complicates the procedure. Various measures like preloading with intravenous fluids and systemic use of vasopressors are adopted to manage the condition. The present article describes a study undertaken to assess the efficacy of the use of prophylactic orally administered ephedrine for the prevention of hypotension following spinal anaesthesia.

DESCRIPTION OF THE STUDY:
AIM OF THE STUDY: The study aims to determine the efficacy of prophylactic orally administered ephedrine in minimizing the incidence of hypotension following spinal anaesthesia in patients undergoing lower abdominal and scrotal surgeries.

MATERIAL AND METHODS: The study was conducted at Government Mohankumaramangalam Medical College Hospital, Salem. The details of the study were presented before the hospital ethical committee and the approval was obtained. The study included 100 patients belonging to age group 25 to 55 years, male patients, assessed under ASA grade I and undergoing lower abdominal and scrotal surgeries. Patients who were obese (BMI > 30) and those with any known present or past medical illnesses were excluded from the study. Informed consent was taken from the patients.

All the patients were put on preoperative starvation for 6 hours and were premedicated with Tab. Ranitidine 150 mg and Tab. Diazepam 10 mg on the night before surgery. The patients were then randomly allocated into two groups, Group E (Ephedrine Group) and Group C(Control Group). The
baseline blood pressure (average of 3 readings), pulse rate and oxygen saturation were recorded. Patients in group E received 30 mg of Ephedrine tablets and Patients in group C received a placebo tablet of similar colour and shape with sips of water.

Thirty minutes later the patients were shifted to the operation theatre. Standard monitoring was done. Preloading was done with 10 ml/Kg of Ringer Lactate over 15 minutes. Anaesthetic procedure was standardized in both the groups. Spinal anaesthesia was administered with a 23 G Quincke’s needle at the L3 – L4 interspace using 3 ml of 0.5% hyperbaric bupivacaine. Level of sensory block was assessed using pinprick sensation. The level of block was optimized to be around T6 – T8 dermatomal level by suitable adjustment of the operating table till the fixation of the drug. Crystalloid at the rate of 10ml / kg/hr was used for maintenance during the intra operative period. All patients were sedated with 1.5mg of midazolam 5min prior to skin incision.

All the patients were monitored throughout the procedure. Systolic Blood Pressure, Diastolic blood pressure and mean arterial blood pressure were monitored by noninvasive automated oscillatory method and Heart rate was measured by ECG, before spinal and immediately after spinal anaesthesia. During intraoperative period the parameters were monitored at interval of 3minutes upto first 15 minutes, then every 5 minutes till 30th minute, every 10 minutes till 60th minute and every 15minutes till 120 minutes. Other parameters such as SPO2, urine output, were also monitored.

Hypotension was defined as decrease in systolic BP of more than 20% of Baseline value. Hypotension was treated with IV fluids and inj. Ephedrine IV boluses of 6mg increments. Bradycardia was defined as heart rate less than 60/min and treated with inj. Atropine 0.3 mg increments. The patients were observed in the recovery room. Blood pressure and other vital parameters were monitored every 30 minutes thereafter till the complete regression of the sensory & motor blockade. Occurrence of side effects like dry mouth, headache, palpitations, urinary retention, anxiety, restlessness, tremor, nausea and vomiting were recorded.

RESULTS: The results of the study were tabulated and analysed using the Chi square test and Student “t” test. Both the groups were comparable with respect to age, height and weight of the patients. There was no significant difference in the baseline blood pressure values in both the groups.

The number of patients who had a significant fall in systolic blood pressure following spinal anaesthesia was 19(38%) in the group C and 1(2%) in the group E. This was statistically significant (p value 0.00001).

| SL. No | Physical Parameter | Control gp Mean | SD | Ephedrine gp Mean | SD | P value | Significance |
|-------|-------------------|-----------------|----|-------------------|----|---------|-------------|
| 1     | Age(Yrs)          | 37.96           | 7.93 | 38.84             | 8.53 | 0.498   | Not signific. |
| 2     | Height(cm)        | 166.7           | 3.18 | 166.3             | 2.93 | 0.323   | Not signific. |
| 3     | Weight(Kg)        | 58.52           | 4.19 | 58.78             | 4.11 | 0.632   | Not signific. |

Table 1: Physical parameters
Table 2: Number and proportion of Patients requiring vasopressor (Inj, Ephedrine i.v) following spinal Hypotension

| SL. No | Group  | No. of patient studied | No. of pts requiring vasopressor therapy | Percentage | P Value | Significance |
|--------|--------|------------------------|------------------------------------------|------------|---------|-------------|
| 1.     | Control-C | 50                  | 19                                       | 38         | .00001  | Significant |
| 2.     | Ephedrine-E | 50                  | 1                                        | 2          |         |             |

**Graph 1**: Systolic Blood Pressure trends.

![Graph 1](image1.png)

**Graph 2**: Diastolic Blood Pressure trends.

![Graph 2](image2.png)
DISCUSSION: Hypotension is one of the most important and significant complications following spinal anesthesia. Sudden and severe hypotension may compromise vital organ perfusion which may result in irreversible insult to the organ functions. Various mechanisms have been postulated as the cause for the hypotension. Pooling of blood in the lower extremities due to the sympathetic blockade following spinal anesthesia and the blockade of sympathetic accelerator fibres to the heart are the major contributors to this phenomenon.

Many methods are being employed for the prevention and treatment of this condition. Preloading the patients with crystalloids or colloids before administration of spinal anesthesia is being adopted in usual practice for the prevention of hypotension. However the efficacy and usefulness of this method have been questioned.1,2 Systemic administration of vasopressors has been shown to be effective both as a prophylactic measure and as treatment for hypotension. Ephedrine is one of the most studied and the most common drug used in clinical practice. Various studies have proved the role of prophylactic use of ephedrine administered in different doses via the intravenous and intramuscular route.3-11

In the present study, we used ephedrine in a dose of 30 mg by oral route as a prophylaxis administered 30 minutes before spinal anesthesia. We have observed a statistically significant difference in the incidence of hypotension following spinal anesthesia in the ephedrine group compared to the control group where a placebo was used. Subsequently ephedrine had to be administered intravenously with increased incidence following hypotension in the control group. Prophylactic use of ephedrine administered orally thus decreases the incidence of hypotension significantly following spinal anesthesia.

The oral route for ephedrine administrations is easy and simple to practice. No significant complications were observed due to ephedrine use in our study. Previously few studies have showed similar results with the use of oral ephedrine prophylaxis for prevention of hypotension following spinal anaesthesia.12,13
CONCLUSION: We conclude that prophylactic oral ephedrine in a dose of 30 mg administered 30 minutes before spinal anaesthesia effectively reduces the incidence of significant hypotension and reduces the need for intravenous supplemental use of ephedrine for the management of hypotension following spinal anaesthesia.

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