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Original Research Article

TO COMPARE THE HEMODYNAMIC PARAMETERS SUCH AS BLOOD PRESSURE, HEART RATE AND SPO_2 DURING SPINAL ANAESTHESIA IN DIFFERENT GROUPS

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Abstract

Background & Methods: The aim of the study is to compare the hemodynamic parameters such as blood pressure, heart rate and SpO_2 during spinal anaesthesia in different groups.

Results: The patients were monitored for hypotension (decrease in MAP>25% of baseline MAP), bradycardia (heart rate<50 beats/minute).

Conclusion: Vital parameters were monitored and blood pressure & heart rate reading were taken 3 times at 2 minutes interval and lowest MAP and heart rate were taken as baseline for each group respectively. All the patients were preloaded with 500 ml of ringer lactate solution. Test drug was injected IM just after the induction of spinal anaesthesia. All the patients were observed and hemodynamic data recorded for 60 minutes after spinal anaesthesia.

Keywords: hemodynamic, blood pressure, heart rate, and SpO_2 & spinal anaesthesia.

Study Design: Comparative Study.

1. Introduction

The spinal cord lies within the vertebral canal and is covered by three membranes, known as meninges. The outermost layer is the dura mater, a tough fibrous sheath closely applied to the inner layer of bone surrounding the spinal canal. Between the dura and the bone is a potential space, the epidural space, which normally contains a small amount of fat and vertebral veins[1]. The spinal dura mater is continuous with the dura mater lining the skull and continues to the level of the second sacral vertebra[2]. It covers each of the spinal nerves as they leave the spinal canal and forms a tough sheath around the dorsal root ganglion. Beneath the dura mater is a thin and delicate membrane called the arachnoid mater, because of its resemblance to a spider's web. Normally the arachnoid mater is closely applied to the underside of the dura mater, but a potential space exists, the subdural space, which can fill

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with blood or pus under pathologic conditions. Beneath the arachnoid mater and intimately applied to the spinal cord is the pia mater. Both the arachnoid and pia mater are continuous with the arachnoid and pia surrounding the brain, but unlike the arachnoid, which follows the dura mater, the pia essentially ends, with the caudal end of the spinal cord, at the level of the second lumbar vertebra[3].

A rope like extension of the pia mater, the filum terminale attaches the end of the spinal cord to the caudal end of the dura mater. In addition, the pia mater contains lateral projections called denticulate ligaments, which connect the spinal cord to the dura mater by projecting between the dorsal and ventral roots. The space between the arachnoid mater and pia mater is the subarachnoid space. It is normally filled with cerebrospinal fluid, which surrounds the entire brain and spinal cord[4].

Local anaesthetics administered in the subarachnoid space block sensory, autonomic, and motor impulses as the anterior and posterior nerve roots pass through the CSF. The site of action includes the spinal nerve roots and dorsal root ganglion[5].

2. Material and Methods

Study was conducted at Index Medical College Hospital & Research Centre, Indore for 01 Year. The study included 45 patients (age 20-35 years) undergoing elective caesarean section under spinal anaesthesia. Pre-anaesthetic check-up was done in all the patients which included:

1. Elucidating history of diabetes, hypertension, asthma, tuberculosis, previous cardiovascular or central nervous system abnormalities, drug allergy, previous surgery, or any other significant history.

INCLUSION CRITERIA

1. Woman of age between 20-35 years
2. ASA grade I or II

EXCLUSION CRITERIA

1. Known hypertensive or those with a resting arterial pressure more than 130/90 mmHg.
2. Patients with diabetes, respiratory disease, cardiac disease, epilepsy.
3. Height less than 150 cm
4. Patient with hypovolemia or hypotension

Randomization was done by putting 45 paper chits in a box containing 15 chits each of C, E, and P groups. Each patient in the study was asked to randomly pick any chit and was allotted that respective group. Double blinding was done by giving responsibility of observation and drug injection to two different persons.

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3. Result

Table 1: Level of sensory analgesia achieved 15 minutes after spinal anaesthesia

	Group C	Group E	Group P
T_4	00	00	00
T_6	12	11	11
T_8	02	02	03
T_{10}	01	02	01
T_{12}	00	00	00
Total	15	15	15

Mode value- T_6

Table shows that maximum number of patients in each group achieved sensory level between T_6-T_8.

Baseline MAP and pulse observations

MAP (mean arterial pressure) = (SBP+2DBP)/3= DBP+1/3PP

Mean of baseline MAP and Pulse in all the groups

Table 2:

	Group C	Group E	Group P
Baseline MAP	88.73±6.19	88.9±4.97	87.1±4.88
Baseline Pulse	91.8±10.06	93.13±11.83	91.1±12.88

Table 3: Comparison of various groups with respect to baseline MAP

	Group C & E	Group C & P	Group E & P
P value	0.9670	0.0648	0.1923
Significance	Not significant	Not significant	Not significant

Table 4: Comparison of various groups with respect to baseline pulse

	Group C & E	Group C & P	Group E & P
P value	0.5408	0.7153	0.4274
Significance	Not significant	Not significant	Not significant

4. Discussion

The usual approach to the use of vasopressors in this clinical setting is reactive rather than proactive; spinal anaesthesia induced hypotension is allowed to develop and is then treated accordingly. Given the frequency with which it occurs, a more logical approach to its prevention may be the administration of pre-emptive vasopressors[6].

In this randomised double blinded, controlled study, patients (20-35 years) undergoing elective caesarean section were evaluated for incidence of hypotension and its side effects (nausea, vomiting) after administration of spinal anaesthesia. They were divided in three

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groups namely, group C, group E, group P[7]. Each group received, prophylactic intramuscular saline 0.9 %(group C), ephedrine 45 mg (group E) and phenylephrine 2mg (group P). All the patients were given preloading with ringer lactate 500 ml. Spinal anaesthesia was given in sitting position following which respective drugs were given IM. The vital parameters were recorded for 1 hours post spinal administration. The intraoperative episodes of hypotension, nausea and vomiting were treated with ephedrine 6 mg IV bolus (rescue ephedrine) [8].

Neuraxial blocks typically produce variable decrease in blood pressure that may be accompanied by a decrease in heart and contractility. Vasomotor tone is primarily determined by sympathetic fibres arising from T_5 to L_1, blocking of which causes vasodilatation of the capacitance vessels, pooling of blood, and decreased venous return to the heart; in some instances arterial vasodilatation may decrease systemic vascular resistance[9]. A high sympathetic block prevents compensatory vasoconstriction and may also block sympathetic cardiac accelerator fibres arising from T_1-T_4. Profound hypotension may result from vasodilatation combined with bradycardia and decreased contractility.

5. Conclusion

Vital parameters were monitored and blood pressure & heart rate reading were taken 3 times at 2 minutes interval and lowest MAP and heart rate were taken as baseline for each group respectively. All the patients were preloaded with 500 ml of ringer lactate solution. Test drug was injected IM just after the induction of spinal anaesthesia. All the patients were observed and hemodynamic data recorded for 60 minutes after spinal anaesthesia.

6. References

1. Warwick D, Ngan Kee, MB ChB, MD, FANZCA, Kim S. Khaw, MBBS, FRCA et al. A dose response study of prophylactic intravenous ephedrine for the prevention of hypotension during spinal anaesthesia for caesarean delivery. Anesth Analg 2000; 90:1390-1395
2. Warwick J, Ngan Kee, Lau TK, Khaw KS, Lee BB. A comparison of metaraminol and ephedrine infusions for maintaining arterial pressure during spinal anaesthesia for elective caesarean section. Anaesthesiology 2001; 95:307-13
3. Mercier FJ, Riley ET, Frederickson WL, Roger Christoph S. Phenylephrine added to prophylactic ephedrine infusion during spinal anaesthesia for elective caesarean section. Anaesthesiology 2001; 95:668-674
4. Cooper DW, Carpenter M, Mobray P, Derisa WR, Ryall DM, Kokri MS. Fetal and maternal effects of phenylephrine and ephedrine during spinal anaesthesia for caesarean delivery. Anaesthesiology 2002; 97:1582-1590
5. Kohki Nishikawa, MD, Michiaki Yamakage, MD PhD, Keiichi Omote, MD PhD, and Akiyoshi Namiki, MD PhD. Prophylactic IM small dose phenylephrine blunts spinal

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anaesthesia induced hypotensive response during surgical repair of hip fracture in the elderly. Anesth Analg 2002; 95:751-756

6. Dr. Dinesh Sahu, Dr.Dilip Kothari, Dr. Amrita Mehrotra. Comparison of bolus phenylephrine, ephedrine, mephentermine for maintenance of arterial pressure during spinal anaesthesia in caesarean section – a clinical study. Indian J Anaesth 2003; 47 (2):125-128
7. Ngan Kee WD, Lee A. Multivariate analysis of factors associated with umbilical arterial pH and standard base excess after caesarean section under spinal anaesthesia. Anaesthesia 2003; 58:125-130
8. Ngan Kee WD, Khaw KS, Ng FF, Lee BB. Prophylactic phenylephrine infusion for preventing hypotension during spinal anaesthesia for caesarean delivery. Anesth Analg 2004; 98:815-821
9. J.P.R.Lougrey, N.Yao, S.Datta, S.Segal, M.Pian-Smith, L.C.Tsen. hemodynamic effects of spinal anaesthesia and simultaneous intravenous bolus of combined phenylephrine and ephedrine versus ephedrine for caesarean delivery. International Journal of Obstetric Anesthesia 2005; 14:43-47