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Original Research Article

Contrast the Hemodynamic Parameters, Including Blood Pressure Heart Rate and SpO_2 throughout Spinal Anaesthesia

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Abstract:

Background: The study was undertaken in the Department of Anaesthesiology, BMIMS, Pawapuri, Nalanda. The study included 90 patients (Age 20-35 years) undergoing elective caesarean section under spinal Anaesthesia. It provides satisfactory anaesthesia for lower abdominal, urological and lower limb surgeries and it is often associated with a marked fall in blood pressure during and after anaesthesia due to various factors like diminished cardiac output consequent upon decreased venous return due to blockade ofsympathetic nerves arising from T_1-L_2 leading to dilatation of both resistance and capacitance vessels and lack of propulsive movement on veins.

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

Keywords: Hemodynamic, SpO_2, Heart & Spinal Anaesthesia.

Introduction

Spinal anaesthesia was initially given inadvertently byCorning in 1885 and first planned anaesthesia for surgery in man was performed by August Bier on 16th August 1898. [1]

It provides satisfactory anaesthesia for lower abdominal, urological and lower limb surgeries and it is often associated with a marked fall in blood pressure during and after anaesthesia due to various factors like diminished cardiac output consequent upon decreased venous return due to blockade of sympathetic nerves arising from T_1-L_2 leading to dilatation of both resistance and capacitance vessels and lack of propulsive movement on veins. Secondly paralysis of sympathetic nerve supply of heart and adrenal gland leads to subsequent catecholamine depletion and thirdly ischemia and hypoxia of vital centers leading to depression of circulatory system. Itis desirable to record the blood pressure every 5-10 minutes but there is considerable difference ofopinion as to the extent to which it should be allowedto fall before corrective measure are to be taken. [2]

Continuous spinal anaesthesia (CSA) provides extension of blockage during surgery and versatilepain management during the postoperative periodvia an indwelling catheter allowed intermittent injection of local anaesthetic into the subarachnoid space. Better cardiovascular stability with a smaller dose of local anaesthetic and shorter surgery onset time were reported in CSA. [3]

Material and Method

The study was undertaken in the Department of Anaesthesiology, at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda. Study duration May 2022 To April 2024. The study included 90 patients (age 20-35 years) undergoing elective caesarean section under spinalAnaesthesia. Pre-Anaesthetic check-up was done inall 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.
2. Examination including pulse, blood pressure, cardiovascular examination, respiratory system examination, spinal abnormalities, other systems.
3. Investigations including haemoglobin,

complete blood counts, serum electrolytes, INR, blood sugar, serum urea, serum creatinine, chest X-ray, ECG asand when applicable.

Inclusion criteria

1. Woman of age between 20-35 years
2. ASA grade I or II
3. Undergoing elective caesarean section.

Exclusion criteria

1. Known hypertensive or those with a resting arterial pressure more than 130/90 mmHg.
2. Patient with hypovolemia or hypotension
3. Patients with diabetes, respiratory disease, cardiac disease, epilepsy.
4. Height less than 150 cm
5. Allergic to any drug to be used
6. Any other contraindication for spinal anaesthesia

Results

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 1:

	Group C	Group E	Group P
Baseline MAP	89.73±6.19	89.9±4.97	88.1±4.88
Baseline Pulse	92.8±10.06	94.13±11.83	92.1±12.88

Table 2: Comparison of various groups with respectto baseline MAP

	Group C & E	Group C & P	Group E & P
P value	0.9070	0.0848	0.1623
Significance	Not significant	Not significant	Not significant

Discussion

Ephedrine due to its predominantly β-agonist activity is expected to cause an increase in heart rate. On the other hand, phenylephrine, with predominant α-agonist action, causes a rise in the arterial blood pressure without any direct effect on the heart rate. This leads to activation of baroreceptor reflex and subsequent decrease in the heart rate indirectly. Bradycardia could also be caused by cardiacsympathetic denervation associated with high spinal block.

In our study only 2 patients in the phenylephrine group developed bradycardia for which IV glycopyrolate was given, rest of the patients werestable except transient tachycardia in few patients.

In the study by kohki nishikawa and associates (2002) [4], bradycardia (heart rate< 50bpm) after IM administration of phenylephrine was not observed in any of the groups. Also none of the patients in any group developed bradycardia in the study done by Ayorinde BT et al (2001) [5]. In both of these studies phenylephrine and ephedrine were administered IM prophylactically. Bradycardia was observed in various studies in patients receiving IV bolus or infusion ofphenylephrine either prophylactically ortherapeutically. (Dinesh Sahu et al 2003, Ngan Kee WD et al 2004) [6,7]

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.

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

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