



COMPARISON OF INTRAVENOUS PHENYLEPHRINE WITH INTRAVENOUS MEPHENTERMINE FOR MANAGEMENT OF POST SPINAL HYPOTENSION IN CASES OF CAESAREAN SECTION AND EFFECTS OF THESE TWO DRUGS ON NEONATE

Anesthesiology

Dr. Rajan Kumar*	M.B.B.S., M.D. (Anaes.), Ex. Senior Resident, G. B. Pant Hospital .new Delhi, Associate Consultant, Department Of Neuro Anaesthesia, B. L. Kapoor Superspeciality Hospital , New Delhi. *Corresponding Author
Dr. Chhaya. M Suryawanshi	M.D (anaesthesia), Professor, Dr. D. Y. Patil Medical College Hospital And Research Centre, Pimpri, Pune, Maharashtra 411018, India.
Dr. Debarshi Jana	Young Scientist (DST), Department of Gynecology and Obstetrics, Institute of Post-Graduate Medical Education and Research, A. J. C. Bose Road, Kolkata-700020, West Bengal, India

ABSTRACT

INTRODUCTION: Hypotension following spinal anaesthesia forCaesarean section is one of the common problem encounteredby an anaesthesiologist. This study was aimed at comparingthe efficacy of IV bolus Phenylephrine andMephentermine for management of fall in arterial blood pressure more than 20 % of baseline following spinal anaesthesia in caesarean section.

AIMS AND OBJECTIVE: This study was done to compare the effectiveness of bolus doses of intravenousmephentermine 6 mg and intravenous phenylephrine 100 mcg , for the management of post spinal hypotension in cases of caesarean section and their effects on neonate.

MATERIALS AND METHODS: This study was done on 60 patients undergoing elective as well as emergency caesarean sections under spinal anaesthesia, after taking Institutional Ethics Committee approval ,and informed written consent . The protocol was explained to all patients in detail in their own language. All patients under ASA grade I or II Ages between 20 to 35 and weighing between 55 to 70 kg , having uncomplicated singleton pregnancy having Baseline systolic blood pressure between 100-140 mmHg and diastolic blood pressure between 70-89 mmHg ,developing hypotension after subarachnoid block (SAB) were included. Hypotension is defined as fall in systolic pressure >20% from the baseline value or a value less than 90 mmHg.

All the patients were divided into two groups, namely, Group P & Group M..

Patients were randomly allocated to one of the two groups by Double Blind method, according to the drug to be used :

Group P: Phenylephrine 100 microgram (0.1 mg) in 1 ml as IV bolus.

Group M: Mephentermine 6 mg in 1 ml as IV bolus.

Adequate preloading was done, pulse rate, systolic and diastolic arterial pressure were recorded thrice when middle value Was taken as a base line values. Hyperbaric bupivacaine 0.5% (1.8 to 2 ml) in volume was used for establishing spinal Anaesthesia under all aseptic precaution. After subarachnoid block ,following parameters . pulse rate , blood pressure monitoring (S.B.P, D.B.P, Mean B.P), ECG monitoring, Oxygen Saturation, Respiratory Rate -were recorded at every 1 min for 20 min and thereafter every 5 min till the end of surgery

Whenever hypotension occurs the study drug Was given IV.

The bradycardia i.e. a pulse rate of 50/min or less Was treated with Atropine 0.3 mg iv.

OBSERVATION AND RESULT: In the study group fall in blood pressure was 20 to 25 % of baseline. Correction of fall in blood pressure was within 1 minute in the Phenylephrine group and 2 to 3 minute in Mephenterminegroup.Fall in pulse rate was 15 to 17 % of baseline in Phenylephrine group but not seen in Mephenterminegroup.Six cases had to be given Atropine 0.3 mg to manage bradycardia.There was no significant effect of vasopressors on fetus in terms of APGAR Score.

KEYWORDS

INTRODUCTION

Hypotension following spinal anaesthesia forCaesarean section is one of the common problem encounteredby an anaesthesiologist.

This study was aimed at comparingthe efficacy of IV bolus Phenylephrine andMephentermine for management of fall in arterial blood pressure more than 20 % of baseline following spinal anesthesia in caesarean section

This study was done to compare the effectiveness of bolus doses of intravenousmephentermine 6 mg and intravenous phenylephrine 100 mcg , for the management of post spinal hypotension in cases of caesarean section.

And to study their effects on neonate.

This comparative study was done on parturients coming for elective as well as emergency lower segment Caesarean section conducted under spinal anaesthesia .

METHOD:

Sixty adult patients aged between 20 and 35 years and weighing between 55 to 70 kg in American Society of Anaesthesiologists (ASA) physical status I and II , undergoing elective as well as emergency caesarean section at term with availability of an Informed consentwere included in this prospective ,randomized ,controlled study after obtaining the Institutional Ethics Committee approval prior to commencement of study.

Patients having uncomplicated singleton pregnancy were included in this study.

Patients having Baseline systolic blood pressure between 100-140 mmHg and diastolic blood pressure between 70-89 mmHg ,developing hypotension after subarachnoid block (SAB) were included. Hypotension is defined as fall in systolic pressure >20% from the baseline value or a value less than 90 mmHg Haemodynamically stable patients with all routine investigations within normal limits were only included in this study.

EXCLUSION CRITERIA

- Patients with medical complications like diabetes mellitus, cardiovascular diseases, severe anaemia, and cerebrovascular diseases
- Patients wt more than 70 kg.
- Patients with obstetrical complications like antepartum haemorrhage, pregnancy induced hypertension, cord complications (nuchal cord or cord prolapse), foetal malformations.
- Patients with autonomic neuropathy, spinal deformities, other neurological diseases, infections in the lumbar area, coagulation abnormalities and hypovolemia due to any cause.

Material Required

- Standard anaesthesia machine (boyle apparatus)
- Intravenous cannula 18 G

- Intravenous fluids – Crystalloids Colloids
- Bain's circuit with appropriate face mask size
- Monitoring equipments like pulse oximeter, ECG monitor, non invasive blood pressure
- Drugs like Hyperbaric bupivacaine 0.5% ,Mephentermine , Phenylephrine, oxygen , drugs and equipments for General Anaesthesia kept ready.
- Macintosh type of laryngoscope and endotracheal tubes of PVC material (no 6.5, 7 and 7.5).
- Disposable syringes
- Drugs and equipments necessary for resuscitation

PLAN OF STUDY

- Institutional Ethics Committee approval was taken prior to commencement of study.
- 60 patients undergoing elective as well as emergency caesarean sections under spinal anaesthesia were selected randomly.
- The protocol was explained to all patients in detail in their own language
- and informed written consent was taken.
- All the patients were divided into two groups, namely, Group P & Group M..
- Patients were randomly allocated to one of the two groups by Double Blind method, according to the drug to be used :
- Group P: Phenylephrine 100 microgram (0.1 mg) in 1 ml as IV bolus.
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PRE OPERATIVE EVALUATION AND INTRAOPERATIVE MONITORING :

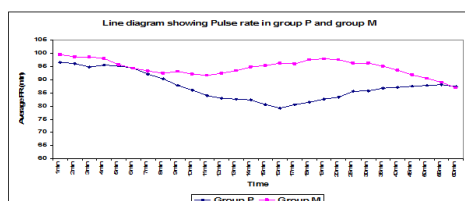
- All patients were thoroughly evaluated pre-operatively. All the necessary and relevant laboratory and other investigations were carried out.
- Ranitidine 50 mg and Metaclopramide 10 mg were given intravenously .
- Adequate preloading with crystalloids (ringer lactate – 10 to 15 ml / kg) was done, pulse rate, systolic and diastolic arterial pressure were recorded thrice when middle value Was taken as a base line values. Hyperbaric bupivacaine 0.5% (1.8 to 2 ml) in volume was used for establishing spinal Anaesthesia under all aseptic precaution. After subarachnoid block ,following parameters were recorded at every 1 min for 20 min and thereafter every 5 min till the end of surgery.
- pulse rate monitoring
- blood pressure monitoring(S.B.P, D.B.P, Mean B.P)
- ECG monitoring
- Oxygen Saturation
- Respiratory Rate
- Whenever hypotension occurs the study drug Was given IV.
- The bradycardia i.e. a pulse rate of 50/min or less Was treated with Atropine 0.3 mg iv.

OBSERVATION AND RESULTS

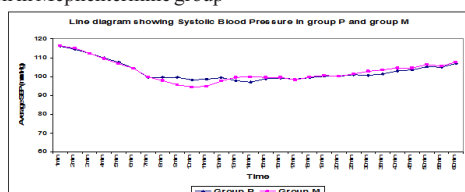
In the study group fall in blood pressure was 20 to 25 % of baseline.

Correction of fall in blood pressure was within 1 minute in the Phenylephrine group and 2 to 3 minute in Mephentermine group.

Fall in pulse rate was 15 to 17 % of baseline in Phenylephrine group but not seen in Mephentermine group. Six cases had to be given Atropine 0.3 mg to manage bradycardia. There was no significant effect of vasopressors on fetus in terms of APGAR Score .

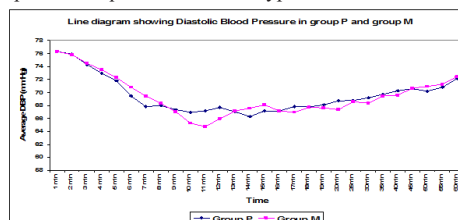


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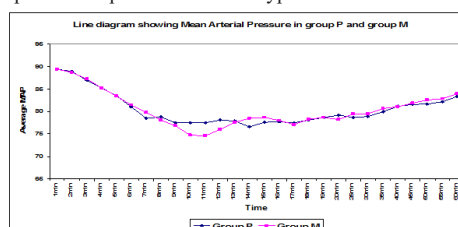
Fall in blood pressure seen in both group

Phenylephrine has quicker control of hypotension



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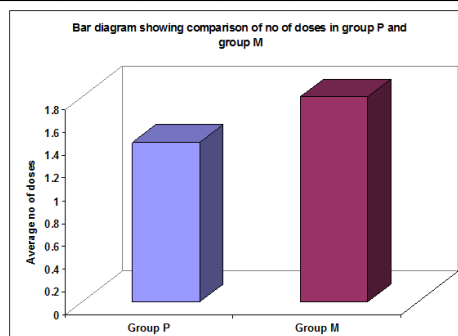


Fall in blood pressure seen in both group.

Phenylephrine has quicker control of hypotension .

Comparison of no of doses in Group P & Group M

Parameter	Group P (n=30)		Group M (n=30)		Z Value	P Value
	Mean	SD	Mean	SD		
No of doses	1.4	0.5	1.8	0.41	3.4	<0.001



In Phenylephrine group most of the patients required less no. of bolus dose.

DISCUSSION

- Regional techniques are most commonly used in obstetric anaesthesia.
- Subarachnoid block is the most commonly administered regional techniques for caesarian delivery because of its simplicity, speed of onset, and reliability.
- Hypotension resulting from sympathetic blockade is the most frequent complication endangering both mother and child. This high incidence and severity of maternal hypotension following spinal anaesthesia could be attributed to various factors like the amount of local anaesthetic injected , sympathetic blockade, uterus impairing venous return from extremities in supine position.
- Therefore maternal blood pressure should be monitored at regular intervals, and hypotension should be corrected as early as possible.
- In this study vasopressors like phenylephrine and mephentermine are used and compared.
- Phenylephrine being a synthetic noncatecholamine primarily stimulating alpha 1-adrenergic receptors by a direct action, while Mephentermine is an indirect acting synthetic non-catecholamine that stimulates alpha and beta adrenergic receptors.
- Both the vasopressor effectively maintained arterial pressure within 20 % limit of baseline value, though peak effect of action of Phenylephrine was within 1 minute of bolus dose while it was 2 to 3 minutes for Mephentermine.
- After this time both the drugs were comparable in their control of

blood pressure.

- In Phenylephrine group most of the patients , did not require further bolus dose.
- Phenylephrine caused significant reduction in heart rate , which is not seen in Mephentermine .
- Current study also did not find any significant effect of vassopressor on foetus in terms of Apgar score at 1 and 5 mins.

CONCLUSION

- At the doses of Phenylephrine and Mephentermine administered in this trial the ability of these drugs to manage hypotension during caesarian section proved to be similar.
- Phenylephrine has quicker control of hypotension and less number of bolus dose are required to manage hypotension than Mephentermine.
- Phenylephrine causes reduction in heart rate which may be advantageous in cardiac patients and in whom tachycardia is undesirable.

FUTURE PROSPECTIVES

APGAR Score is a gross indicator of foetal outcome, so in our future studies we are going to compare the effect of Phenylephrine and Mephentermine , on foetal outcome on the basis of Blood Gas Analysis of cord blood.

REFERENCES

1. AnilkumarGaneshnavar, AmbiUday S, Adarsh E.S. Comparison of Bolus Phenylephrine, Ephedrine and Mephentermine for Maintenance of Arterial Pressure during Spinal Anaesthesia in Caesarean Section; Journal of Clinical and Diagnostic Research. 2011 October, Vol-5(5): 948-952.
2. M.Mohta, S.SaiJanani, A.K.Sethi.Comparison of phenylephrine hydrochloride and mephenterminesulphate for prevention of post spinal hypotension; Journal of the Association of Anaesthetists of Great Britain and Ireland.2010,65,pages 1200-1205.
3. R. Sharma, N. Maitra, M. Niyogi: A Comparative Study of Bolus Phenylephrine and Mephentermine for Treatment of Hypotension during Spinal Anesthesia for Cesarean Section ;The Internet Journal of Anesthesiology. 2009 Volume 19 Number 2.