



FREQUENCY OF SPINAL HYPOTENSION IN PATIENTS UNDERGOING ELECTIVE LOWER SEGMENT CAESAREAN SECTION USING PREOPERATIVE PRELOAD AND INTRAMUSCULAR EPHEDRINE.

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ABSTRACT... Objectives: To observe the frequency of spinal hypotension in patients undergoing Elective Lower Segment Caesarean Section receiving pre-operative preload compared with intramuscular ephedrine. **Study Design:** Cross Sectional study. **Setting:** Department of Anesthesia, Independent Medical College, Faisalabad. **Period:** July 1st 2018 to December 31st 2018. **Material & Methods:** This study included fifty-two female patients, aged 20-35 years, undergoing elective C/section under spinal anesthesia with ASA physical status I & II, pre-operatively preloaded and given prophylactic intramuscular ephedrine. Hemodynamic changes were recorded in both groups after receiving spinal anesthesia. **Results:** Compared with the prophylactic ephedrine group, frequency of Post spinal hypotension was higher significantly in pre-load group ($p=0.019$). **Conclusion:** It has been concluded that there is the use of prophylactic intra muscular ephedrine is associated with low incidence of post spinal hypotension.

Key words: Anesthesia, Cesarean Sections, Obstetric, Postoperative, Post Spinal Hypotension, Spinal.

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INTRODUCTION

Spinal anesthetic technique was introduced in clinical practice by German surgeon August Bier in 1898.^{1,3} It is particularly useful for the surgeries below umbilics. Historically spinal anesthesia has been intermittent use in obstetrics since 1900.² Spinal anesthesia is the most effective and reliable method of regional anesthesia for cesarean section. However, spinal anesthesia is associated with post spinal hypotension especially in the obstetric patients.³

Spinal hypotension is a major complication after spinal anesthesia.^{1,4} It may range from a mild drop in blood pressure to cardiac arrest in its severe form.⁴ Patient may complain of sinking of heart, nausea, restlessness, anxiety and agitation^{3,5} and in severe cases marked drop in blood pressure may lead to a halt in respiration, severe bradycardia and cardiac arrest. If timely resuscitative measures are not taken life may be at risk.

So, considering Post spinal hypotension as a serious complication affecting morbidity in obstetric population, different prophylactic measures were suggested.^{6,7}

It was suggested in 1960 that even with the use of prophylactic volume preloading, hypotension after spinal anesthesia was a major problem faced by the anesthetist in obstetric anesthesia, and use of vasopressors is required to maintain the blood pressure at optimal levels.⁷ In 1992 it has been suggested that the use of prophylactic vasopressor in optimal doses are safe to avoid rapid hemodynamic instability associated with obstetric spinal anesthesia.^{6,7}

Because of these advances in vasopressors pharmacology, the incidence of post spinal hypotension had largely decreased in the past 2 to 3 decades from 37% to approximately 1%.⁸

However, most of the available literature on this issue is from developed countries. In a developing country like Pakistan, many of the anesthesiologists either don't have proper knowledge about the prophylactic use of a vasopressor or if they have knowledge, they are still reluctant to avoid unusual changes in blood pressure intra operatively.

The study was conducted to analyze whether the use of expensive and time-consuming preload with crystalloid fluid was better than simple dose of much cheaper intra muscular ephedrine to prevent post-spinal hypotension.

MATERIAL & METHODS

This randomized control trial was carried out at the department of Anesthesia and Critical Care, Independent University Hospital Faisalabad from July 2018 to December 2018. Total 52 patients were randomized in two groups 26 in group A and 26 in group B respectively, fulfilling the inclusion criteria. The spinal anesthesia was administered using preoperative preload with crystalloids i.e. ringer lactate in group A and patients were given prophylactic ephedrine 25 mg intramuscular without any pre hydration undergoing elective cesarean section in group B, patient aged group between 20-35 years having ASA status I & II were included in the study. Patients undergoing their emergency cesarean section \bar{e} indication having complicated pregnancy and patients having any contraindication for spinal anesthesia like coagulopathy, infection on the back and neurological deficit were excluded. 52 cases of elective cesarean section were included in the study after taking approval from ethical review committee of the institution. Informed consent and the information like address, name, sex and age was taken. The patients were randomly divided into two groups. Preoperative heart rate, respiratory rate, blood pressure, oxygen was taken. Acid prophylaxis using 30 mg of lansoprazole on the morning of surgery and 0.3 M, 30 ml sodium citrate on arriving in anesthesia room was given. The monitoring parameters like pulse oximetry, ECG and non-invasive blood pressure was observed throughout the procedure. After taking aseptic measures and

skin preparations LP was done in sitting position at midline 90° between L2-L3 or L3-L4 space, by using either 25 gauge whitacre needle. After indication of CSF and aspiration test, 1.5 ml of 0.75% hyperbaric bupivacaine was injected into subarachnoid space through spinal needle by the same anesthetist to both groups. Pinprick method was used for the assessment of level of sensory block while bromage scale was used for motor block assessment. The parameter considered sufficient for surgery was the complete loss of cold sensation to T6 sensory level on both sides. Any intra-operative discomfort was treated by 0.05 mg/kg Midazolam. The parameters like heart rate, noninvasive arterial blood pressure and oxygen saturation were recovered every 5 min during the surgical procedure. Boluses of intravenous ephedrine in 5 mg incremental doses was used for hypotension and intravenous atropine 0.5 mg was used for treatment of bradycardia. Intra operative nausea was treated with 10 mg maxalon IV.

RESULTS

Out of patients mean age was 27.13 ± 05.02 . In preload group out of 26 patients mean age was 27.31 ± 05.07 and in group mean age was 26.96 ± 05.06 .

Out of 52 patients mean ASA status was 01.33 ± 0.47 . In period group out of 26 patients mean of ASA status was 01.31 ± 0.47 and in drug group mean ASA status 01.35 ± 0.49 .

Out of 52 patients the mean of pulse was 82.38 ± 15.40 and in drug group out of 26 patients mean pulse was 82.54 ± 15.14 .

Out of 52 patients mean of height in centimeter was 14.318 ± 1.322 . In preload groups out of 26 patients mean of height in centimeters 14.423 ± 1.581 and in group out of 26 patients mean of height in centimeters was 14.212 ± 1.021 .

Out of 52 patients mean of weight in kg was 70.71 ± 12.67 , in preload group out of 26 patients mean of weight in Kg was 71.27 ± 11.55 and in group it was 70.15 ± 13.91 out of 26 patients.

In preload group mean of systolic blood pressure for 26 patients was 124.88 ± 14.81 and in drug group it was 123.54 ± 15.77 for 26 patients.

Out of 52 patients the mean of diastolic blood pressure was 73.12 ± 12.00 in period group out of 26 patients mean of diastolic blood pressure was 74.65 ± 11.63 and in drug group it was 71.58 ± 12.39 for 26 patients.

Out of 52 patient's hypotension was absent in 46 patients (88.5%) while it was present in 6 patients

(11.5%) only.

In preload group spinal hypotension was absent in 21 patients while it was present in 5 patients only. Similarly, in drug group hypotension affected only 1 person and was absent in 25 patients.

On applying Chi Square test:

Chi Square Value = 3.014

df = 1

p value = 0.0415

	Minimum	Maximum	Mean	Standard Deviation
Age of patient	20	35	27.13	5.02
ASA status	1	2	1.33	.47
Pulse	52	120	82.96	15.12
Height in centimeters	12.0	19.1	14.318	1.322
Weight in kg	42	98	70.71	12.67
Systolic blood pressure	90	150	124.21	15.16
Diastolic blood pressure	50	92	73.12	12.00
Valid N(List Wise)				

Table-I. Results.

	Minimum	Maximum	Mean	Standard Deviation
Preload Age of patient	20	35	27.13	5.02
ASA status	1	2	1.33	.47
Pulse	52	120	82.96	15.12
Height in centimeters	12.0	19.1	14.318	1.322
Weight in kg	42	98	70.71	12.67
Systolic blood pressure	90	150	124.21	15.16
Diastolic blood pressure	50	92	73.12	12.00
Valid N(List Wise)				

Table-II. Descriptive Statistics.

Preload Age of patient	20	35	26.96	5.06
ASA status	1	2	1.35	.49
Pulse	54	120	82.54	15.14
Height in centimeters	12.7	16.1	14.212	1.021
Weight in kg	42	98	70.15	13.91
Systolic blood pressure	95	145	123.54	15.77
Diastolic blood pressure	50	91	71.58	12.39
Valid N(List Wise)				

Table-III. Hypotension.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	11.5	11.5	11.5
	No	46	88.5	88.5	100.0
Total		52	100.0	100.0	

Table-IV. Hypotension* group cross tabulation.

Count		Group		Total
		Preload	Drug	
Hypotension	Yes	5	1	6
	No	21	25	4
Total		26	26	52

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-square	3.014 ^b				
Continuity Correction ^a	1.696	1	.083		
Likelihood Ratio	3.259	1	.193		
Fisher's Exact Test		1	.071	.191	.95
N of Valid Cases	52				

DISCUSSION

Dura arachnoid puncture for spinal anesthesia is associated with several complications. Among these, SPINAL HYPOTENSION is the most common and significant complication is obstetrics.^{9,10,11} Although, the ideal prophylactic drug has not been identified, but ephedrine is the most commonly used drug for the treatment of spinal hypotension.¹⁰ Drugs like phenylephrine and angiotension II have been tried successfully but these drugs associated with higher mean fetal umbilical artery ph. Desalu and khuimo compared 30 mg of intravenous ephedrine with traditional pre hydration in 60 patients. They concluded that prophylactic ephedrine was more effective for prevention of spinal hypotension in patients undergoing Elective Lower Segment Caesarean Section.¹² Webb and Siphon assessed the safety and efficacy of 37.5 intramuscular ephedrine in preventing spinal hypotension for cesarean section. They found that 37.5 mg ephedrine intramuscular ephedrine intramuscular provides more sustained CVS. Support and is not associated with reactive or rebound hypertension. Abdul hameed et al. Have found that even lowering the dose of ephedrine to 25 mg intramuscular has been associated with same satisfactory results in preventing spinal hypotension. A study conducted by Kee et al. concluded that 30 mg intramuscular ephedrine was the lowest effective dose in preventing post spinal hypotension when given prophylactically. In another study conducted by Cooper and

colleagues found that after using intramuscular ephedrine there was increase in difference between umbilical artery Pco₂ – venous Pco₂. It has been established that the most effective and safe method of preventing hypotension is fluid preloading for cesarean section under spinal anesthesia.^{13,14} This is time consuming and potentially dangerous to pregnant mother cause significant hemodilution and potential over distension of bladder dysfunction later.¹⁵⁻¹⁸ Kang, Abouleish and Caritis conducted a study using 15 ml/kg preload followed by an infusion of ephedrine. The number of patients requiring additional ephedrine bolus was reduced from 80% in the control group to 10% in study group by using this regime.¹⁹ It is believed that the informed consent explaining the all possible complications including spinal hypotension, combined with method of monitoring, may have discovered a high incidence a post spinal hypotension seems appropriate. In our study 6 patients developed spinal hypotension. Four were mild in nature, other two were severe. All hypotension patients responded to I.V ephedrine bolus, second line vasopressors and hydrations. These findings were consistent with that of Rout and colleagues.

CONCLUSION




We concluded that preoperative intramuscular ephedrine is more effective than preoperative preload to control spinal hypotension.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Shumyala Maqbool	Idea introduction, Methodology.	
2	Mohsin Riaz Askri	Abstract, Data collection, conclusion.	
3	Sahir Shafique	Proof reading and analysis.	
4	Kausar Abbas Shah	Literature review and referencing.	