

RISK OF HYPOTENSION IN PREGNANT LADIES UNDERGOING SPINAL ANESTHESIA INDUCED CESAREAN SECTION DELIVERIES.

DR. AMBER IRFAN, MBBS

Department of Obstetrics and Gynecology,
Sheikh Zayed Medical College, Rahim Yar Khan, Pakistan.

DR. SADAF IQBAL, MBBS

Department of Obstetrics and Gynecology,
Sheikh Zayed Medical College, Rahim Yar Khan, Pakistan.

DR. UROOJ IRFAN, MBBS

Department of Obstetrics and Gynecology,
Nishtar Medical University, Multan, Pakistan.

ABSTRACT

Background; Cesarean section, one of most commonly performed surgical procedure, is associated with significant increase in maternal morbidities as well as mortalities. **Objective:** To determine frequency of hypotension in normotensive and preeclampsia patients undergoing spinal anaesthesia induced cesarean section. **Material and Methods;** Spinal anaesthesia was employed following standard technique after aspiration of free flow of CSF from needle in all four quadrants. After induction of spinal anaesthesia continuous monitoring of heart rate, oxygen saturation and blood pressure was done immediately and at regular intervals of 5,10,15,20,25 and 30 minutes to diagnose hypotension. **Results;** Mean gestational age of our study cases was noted to be 39.23 ± 2.16 weeks and 101 (69.2%) had gestational age more than 38 weeks. Mean age of our study cases was 27.49 ± 2.93 years. Diabetes was presented in 19 (13 %) of our study cases. Status of blood pressure in pregnancy was also noted, 73 (50%) were normotensive and 73 (50%) were pre-eclamptic patients. Mean body mass index of our study cases was 26.23 ± 1.92 kg/m² and obesity was present in 43 (29.5 %) of our study cases. Of these 146 study cases, 44 (30.1 %) had elective cesarean section and 102 (69.9%) had emergency cesarean section. Hypotension was noted in 74 (50.7%) of our study cases. Hypotension was 35.6 % in normotensive cases while 65.8% among pre-eclamptic patients. **Conclusion;** Frequency of hypotension among women undergoing cesarean section with spinal anaesthesia was high and hypotension was significantly more prevalent among women with the history of pre-eclampsia. Hypotension was significantly associated with age, residential status, monthly family income, diabetes, obesity and type of Cesarean section.

Keywords; cesarean section, hypotension, spinal anaesthesia

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INTRODUCTION:

Spinal anaesthesia is a safe and effective alternative to general anaesthesia when the surgical site is located on the lower extremities, perineum (eg, surgery on the genitalia or anus), or lower body wall^{1,2}. The Greek philosopher "Dioscoride" first used the term Anaesthesia in the 1st century AD to describe the Narcotic like effects of the plant "Mandragora" The present use of term to denote the sleep like state that makes painless surgery possible is

credited to “Oliver Wendell Holmes” in 1846. In the United States use of the term “Anaesthesiology” to denote the practice or study of anaesthesia was first proposed in the 2nd decade of the 20th century to emphasize growing scientific basis of the specialty.

Anaesthesia is basically divided into two categories i.e. General Anaesthesia & Regional Anaesthesia (spinal anaesthesia, epidural anaesthesia, caudal anaesthesia, and Nerve blocks).

Spinal anaesthesia is a popular and widely used anaesthetic technique for lower abdominal, pelvic and lower limb surgery. It has proven to be convenient, economical and easily motivated technique which provides excellent anaesthesia and post operative analgesia.

Spinal anaesthesia causes hypotension due to blockade of sympathetic out flow. Neuroaxial blocks typically produce variably decreases in blood pressure that may be accompanied by decrease in heart rate and cardiac contractility which can be prevented either by pre-loading the patients or by using vaso-pressor and inotropic drugs³. Allergy to local anesthetics may also be a contraindication, but true allergies are usually found with ester-based local anesthetics (eg, tetracaine), not the amide-based local anesthetics (eg, bupivacaine), so finding a suitable local anesthetic is not challenging^{4,5}.

Like normotensive patients, however, preeclampsics may also experience hypotension after spinal anesthesia for cesarean delivery. The following variables were independently associated with the development of early hypotension: age, female sex, body mass index >30 kg m⁻², history of preeclampsia, diabetes mellitus, anaemia, baseline heart rate, systolic and diastolic blood pressure, pulse pressure, rate pressure product, vascular overload index, sensory level of blockade higher than or equal to T₆⁶. Bills et al suggest that circulating VEGF-A levels in preeclampsia are biologically active because of a loss of repression of VEGF-receptor 1 signaling by PlGF-1, and VEGF₁₆₅ b may be involved in the increased vascular permeability of preeclampsia⁷. Maternal hypotension is the most frequent complication of a spinal anaesthetic for caesarean section with an incidence approaching 100%. The incidence of hypotension (systolic arterial blood pressure, SAP < or =100 mm Hg) was more frequent in the spinal group than in the epidural group (51% versus 23%).

Systemic hypotension is the most common complication of spinal anaesthesia, with an incidence of 25-82%^{8,9}. The frequency of hypotension was lower in normotensive than preeclamptic group. Hypotension occurred in 9 out of 25 patients (36 %) in normotensive patient while 15 out of 25 patients (60 %) of preeclamptic group developed hypotension¹⁰.

MATERIAL AND METHODS:

Pregnant ladies undergoing Cesarean section under spinal anaesthesia for normotensive and preeclamptic women aged 20 – 35 years having gestational age more than 37 weeks were included in our study. Patients having allergy to local anaesthetics, in shock, having co-morbid conditions like bleeding disorder, infection at site of injection, valvular heart diseases and spinal deformity were excluded from our study. Consecutive 146 pregnant ladies (both normotensive and pre-eclamptic) meeting inclusion criteria undergoing spinal anaesthesia induced cesarean section were included. This cohort study was conducted at Department of Obstetrics and Gynecology, Sheikh Zayed Medical College, Rahim Yar Khan. Two trolleys were prepared one containing equipment for spinal anaesthesia and other will contain emergency drugs i.e. Atropine, Adrenaline, Ephedrine, hydro-cortisone and air way management kit. Baseline readings were taken for blood pressure & pulse. Patients were pre-loaded with 10-20 ml per Kg with colloids and crystalloids respectively. Spinal anaesthesia was employed following standard technique after aspiration of free flow of CSF from needle in all four quadrants. After induction of spinal anaesthesia continuous monitoring of heart rate, oxygen saturation and blood pressure was done immediately and at regular intervals of 5,10,15,20,25 and 30 minutes to diagnose hypotension. All the data was entered and analyzed using computer program SPSS version 20 to find out frequencies and percentages of categorical study variables like parity and hypotension, type of c. section, status of PIH (normotensive/pre-eclamptic), residential status BMI, and age groups. Descriptive statistics were used to calculate the mean and standard deviation for age and gestational age. Both groups will be compared by applying chi-square test at level of significance of 0.05.

RESULTS;

Our study comprised of a total of 146 patients meeting inclusion criteria of our study. Mean gestational age of our study cases was noted to be 39.23 ± 2.16 weeks and 101 (69.2%) had gestational age more than 38 weeks. Mean age of our study cases was 27.49 ± 2.93 years (with minimum age of our study cases was 22 years while maximum age was 35 years). Our study results have indicated that majority of our study cases i.e. 120 (82.2 %) were aged up to 30 years. Of these 146 study cases, 57 (39.0 %) belonged to rural areas and 89 (61.0 %) belonged to urban areas. Monthly family income up to Rs. 35000 was noted in 51 (34.9%) and 95 (65.1%) had monthly family income more than Rs. 35000. Diabetes was presented in 19 (13 %) of our study cases. Status of blood pressure in pregnancy was also noted, 73 (50%) were normotensive and 73 (50%) were pre-eclamptic patients. Mean body mass index of our study cases was 26.23 ± 1.92 kg/m² and obesity was present in 43 (29.5 %) of our study cases. Of these 146 study cases, 44 (30.1 %) had elective cesarean section and 102 (69.9%) had emergency cesarean section. Hypotension was noted in 74 (50.7%) of our study cases. Hypotension was 35.6 % in normotensive cases while 65.8% among pre-eclamptic patients.

Table No. 1

Cross-tabulation of status of blood pressure in pregnancy with regards to hypotension.

(n = 146)

Status of BP	Hypotension		P – value	Relative Risk
	Yes (n=74)	No (n = 72)		
Normotensive (n=50)	26	47	0.000	0.542
Pre-eclamptic (n=50)	48	25		
Total	146			

DISCUSSION;

Spinal anesthesia is considered to be safe as compared to general anaesthesia for caesarean section. Hypotension after spinal anaesthesia for caesarean delivery remains the major clinical problem. The hypotension is caused by an increase in venous capacitance and a reduction in systemic vascular resistance¹¹⁻¹⁴.

Mean age of our study cases was 27.49 ± 2.93 years (with minimum age of our study cases was 22 years while maximum age was 35 years). Our study results have indicated that majority of our study cases i.e. 120 (82.2 %) were aged up to 30 years. A study conducted by Hashim et al¹⁵ from Karachi reported 28.5 ± 5 years mean age of the women undergoing cesarean section which is close to our study results. Another study conducted by Sheikh et al¹⁶ from Karachi also reported 28 ± 4.3 years mean age of women undergoing cesarean section which is close to our study results. A study conducted by Saha et al¹⁷ from Bangladesh also reported similar results. A study conducted in USA by Boyle et al¹⁸ also reported 25 – 35 years of age was predominating among women undergoing cesarean section which is close to our study results.

Of these 146 study cases, 57 (39.0 %) belonged to rural areas and 89 (61.0 %) belonged to urban areas. Monthly family income up to Rs. 35000 was noted in 51 (34.9%) and 95 (65.1%) had monthly family income more than Rs. 35000. Diabetes was presented in 19 (13 %) of our study cases. Status of blood pressure in pregnancy was also noted, 73 (50%) were normotensive and 73 (50%) were pre-eclamptic patients. Mean body mass index of our study cases was 26.23 ± 1.92 kg/m² and obesity was present in 43 (29.5 %) of our study cases. A study conducted in USA by Boyle et al¹⁸ also reported 11% diabetes which is in compliance with our study results. However Boyle et al¹⁸ high proportion of obesity which may be due to the high prevalence of obesity in United States.

Of these 146 study cases, 44 (30.1 %) had elective cesarean section and 102 (69.9%) had emergency cesarean section. A study conducted by Sheikh et al ¹⁶ from Karachi also reported 80 % emergency cesarean section deliveries which is in compliance with our study results. A study conducted by Saha et al ¹⁷ from Bangladesh also reported 70 % emergency cesarean section which is close to our study results. A study conducted in USA by Boyle et al ¹⁸ also reported 82 % emergency cesarean section among multiparous women which is in compliance with our study results.

Hypotension was noted in 74 (50.7%) of our study cases. Hypotension was 35.6 % in normotensive cases while 65.8% among pre-eclamptic patients. Hypotension occurred in 9 out of 25 patients (36 %) in normotensive patient while 15 out of 25 patients (60 %) of preeclamptic group developed hypotension¹⁰. These findings are close to our study results. A study conducted by Munir et al ¹¹ has also reported similar results.

CONCLUSION;

Frequency of hypotension among women undergoing cesarean section with spinal anesthesia was high and hypotension was significantly more prevalent among women with the history of pre-eclampsia. Hypotension was significantly associated with age, residential status, monthly family income, diabetes, obesity and type of Cesarean section.

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