

Pre-operative Anxiety Compounding Intra-operative Hypotension in Parturient women undergoing Cesarean Deliveries under Spinal Anesthesia

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Abstract

Objective: To assess the relation of intra-operative hypotension with the severity of pre-operative anxiety in patients undergoing caesarean section under spinal anesthesia.

Study Design: Prospective observational study.

Place and Duration of Study: This study was carried out from June 2017 to May 2018 at the Anesthesia Department of Combined Military Hospital Lahore.

Materials and Methods: One hundred and twenty patients belonging to American Society of Anesthesiology class I and II, undergoing caesarean section under spinal anesthesia were selected. Verbal Analogue Scale for anxiety (VASA) and State-Trait Anxiety Inventory (STAI) questionnaire were used to measure pre-operative anxiety.

Results: Seventeen (14.17%) patients had mild pre-operative anxiety; out of which four (23.53%) developed hypotension. Seventy-three (60.83%) patients had moderate anxiety; out of which twenty-seven (36.99%) developed hypotension. Thirty (25%) patients had severe anxiety; out of which twenty-two (73.33%) developed hypotension. P-value (0.001) was quite significant.

Conclusion: It was concluded in our study that the severity of pre-operative anxiety has a significant effect on intra-operative hypotension in cases of caesarian section done under spinal anesthesia.

Keywords: Cesarean section, hypotension, pre-operative anxiety, spinal anesthesia.

Introduction

Pre-operative anxiety is a known entity in patients before any surgical procedure.¹⁻² Cesarean sections are no exception to this. Pregnant patients scheduled for the caesarian section experience the highest level of anxiety peri-operatively.³ Pregnant ladies are often emotionally charged because of personal and fetus safety concerns and various other social reasons.

Obstetric surgery is now mostly performed under spinal anesthesia all over the world. The higher risk of maternal complications associated with general anesthesia compared with regional anesthesia has led to the increased popularity of the latter in the anesthetic community. Intra-operative hypotension is a common phenomenon in cesarean sections done under spinal anesthesia and it is the main cause of morbidity and mortality.⁴⁻⁵ In severe cases it can have detrimental effects on both mother and neonate. Multiple factors contribute to this hypotension such as blood loss, supine hypotension, overdosage of an anesthetic drug, high spinal anesthesia, and vasovagal phenomenon.⁶ The principal mechanism by which spinal anesthesia causes maternal hypotension is the blockade of sympathetic efferent neurons.⁷

Pre-operative anxiety leads to increased sympathetic discharge leading to raised systemic vascular resistance.⁸⁻⁹ It is hypothesized that the higher the baseline sympathetic activation the more dramatic will be the hemodynamic effect of spinal anesthesia. Together these findings provide the rationale basis for the hypothesis that patients with higher preoperative anxiety would experience more marked hypotension after the induction of spinal anesthesia.

Most of the patients included in this study were army families and residents of central Punjab of Pakistan. Majority of them comprised of low socio-economic strata, low education status, and socially stressed families of actively engaged military men. Regional circumstances and peculiar army environment intensify this anxiety level potentially leading to increased morbidity and mortality in such patients.

This prospective observational study was designed to assess the effect of pre-operative anxiety on mean arterial pressure changes after neuraxial anesthesia. Preoperative assessment of the anxiety might provide an opportunity to detect and treat patients who are vulnerable to the exaggerated hypotensive response to spinal anesthesia. This is an overlooked research topic with no local studies carried out in the past. Thus, it will help us formulate better protocols for counseling and treating pre-operative anxiety in such patients.

Materials and Methods

Prior approval for the study was obtained from the ethical review committee of the hospital. One hundred and twenty healthy pregnant patients scheduled for the elective caesarian section under spinal anesthesia were selected for this study. Inclusion criteria for the selection of patients consisted of age range from 18 to 35 years, American Society of Anesthesiologists (ASA) class I and II, and patients willing to participate in the study. Patients in active labor, having placenta previa, pre-eclampsia, eclampsia, valvular heart disease, cardiomyopathy, essential hypertension were excluded from the study. Patients unwilling for spinal anesthesia or having contraindication to neuraxial anesthesia were also excluded from the study.

The level of anxiety was rated based on direct assessments of patients with a verbal analogue scale for anxiety (VASA). VASA is a subjective description by the patient herself (0 stands for no anxiety and 10 was the worst possible). State-Trait Anxiety Inventory (STAI) questionnaire testing was also followed for the anxiety measurement. It is based on multiple subjective questions from the patients which represent the anxiety state. The questions included in STAI were verbally asked by one of the researchers in the language patient could easily understand. VASA data was transformed into three ordinal groups for low (<3), medium (4-6), and high (7-10) anxiety. State-Trait Anxiety Inventory questionnaire in the same way was rated as low (<40), medium (40-55), and high (>55) anxiety state. Patients were divided into three groups depending upon their anxiety levels (low, medium, and high).

Anticipating the blood loss due to surgery and sympathetic blockade because of spinal anesthesia, all patients were preloaded with 1000 ml of ringer's lactate. After taking antiseptic precautions, 12 mg of hyperbaric bupivacaine was given in subarachnoid space at L3-L4 or L4-L5 intervertebral space in sitting position. Patients were immediately placed in a supine position with a wedge placed under the right hip. Surgery was allowed to begin when sensory blockade up to T4 dermatome level was achieved for optimum anesthesia.

Baseline arterial pressure was measured before initiating spinal anesthesia and every two minutes after spinal anesthesia until delivery of the baby. Hypotension was defined when mean arterial pressure (MAP) dropped more than 20% of the baseline reading. Hypotension was treated with either

ephedrine 5mg or phenylephrine 100 ug depending on the heart rate of the patient.

Data Analysis: Data was analyzed using SPSS version 24. Descriptive statistics were used to describe the data. A Chi-square test was used to describe the association of pre-operative anxiety with post-spinal hypotension. A P-value of less than 0.05 was considered significant.

standard deviation of 27.73 ± 3.35 . Based on psychometric analysis patients were divided into low, medium, and high anxiety groups. Seventeen (14.17%) patients had mild pre-operative anxiety; out of which, four (23.53%) developed hypotension. Seventy-three (60.83%) patients had moderate anxiety; out of which 27 (36.99%) developed hypotension. Thirty (25%) patients had severe anxiety; out of which twenty-two (73.33 %) developed hypotension. P-value (0.001) is quite significant (Table 1 & Figure 1).

Results

The age range of the patients selected for the study was from 19 years to 35 years with a mean and

Table 1: Percentage of hypotension in different grades of anxiety

Anxiety Levels	Number of patients in Groups	Number Of Patients who developed Hypotension	% of Patients who Developed Hypotension	Chi-Square (P- Value)
Mild VASA (0-3) STAI(≤ 40)	17	4	23.53%	0.001
Moderate VASA (4-6) STAI(40-55)	73	27	36.99%	
Severe VASA(7-10) STAI (≥ 55)	30	22	73.33 %	

VASA= Verbal Analogue Scale for Anxiety
STAI= State-Trait Anxiety Inventory

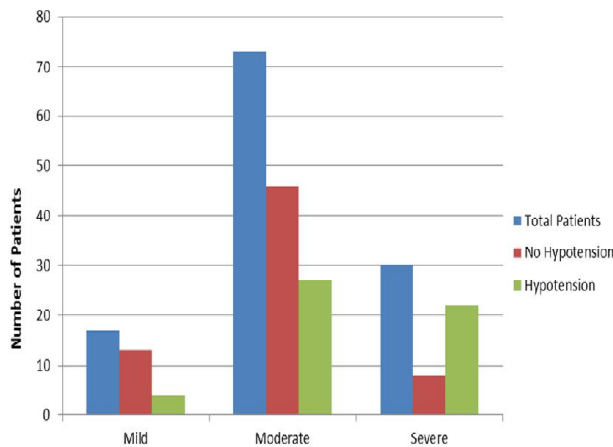


Figure 1: Hypotension in different grades of anxiety

Discussion

Most of the parturient women who undergo cesarean deliveries suffer some degree of anxiety. However, the severity of this anxiety varies considerably depending upon multiple factors. In our society poverty, low

education status and spouses usually not accompanying the patient intensify the level of anxiety. Out of 120 subjects in our study, 30 patients (25%) were having severe anxiety. A study by Wyatt et al. also reported high pre-operative anxiety levels in women before an elective caesarian section under regional anesthesia.¹⁰

Psychological testing by STAI and VASA can be used as a tool for the quantification of anxiety. This method has been previously used in several studies.¹¹⁻¹² STAI are more reliable and frequently used. Measurement of salivary amylase is an indirect measurement of anxiety which is less reliable and facilities for this test are not available in our setup.¹³⁻¹⁴

Spinal anesthesia in cesarean deliveries results in some degree of hypotension in almost all cases as represented in many international studies.¹⁵⁻¹⁶ In this study we demonstrated that increased pre-operative anxiety was associated with a greater reduction in MAP after spinal anesthesia for cesarean delivery. In our study twenty-two out of thirty patients with severe anxiety suffered from hypotension, six of them required the use of drugs. There was a significant

correlation between anxiety severity and continuous variation and fall in MAP. This difference was clinically relevant and statistically significant for both relative and absolute change from baseline. The greater hypotension seen in the high anxiety group was observed, despite a tendency to use vasopressors in those patients.

Our results suggest that a simple subjective pre-operative anxiety score may predict hypotension after spinal anesthesia. This has been demonstrated in a variety of studies using different endpoint measurements as surrogate indicators of sympathetic activation, including fetal baseline heart rate and maternal heart rate variability. Orbach-Zinger S et al. in a prospective observational study analyzed the effects of intensity of preoperative anxiety on the subsequent development of hypotension in caesarian deliveries. They concluded that pre-operative anxiety had a significant effect on hypotensive effects on caesarian deliveries.¹⁷ Soxhuku A et al. in a prospective study on 164 patients, who underwent caesarian deliveries, determined that about 70% of patients had moderate to severe anxiety and there was a strong correlation of severity of pre-operative anxiety and intra-operative hypotension.¹⁸ On the other hand Abdalla KA in his master's thesis observed contradictory results to our study.¹⁹

Moon E et al. published a case report while studying the hypotensive effects of pre-operative anxiety in caesarian deliveries. They reported that one patient developed generalized convulsions which were attributable to pre-operative anxiety.²⁰

Pre-operative anxiety is a very common phenomenon and has very distressing effects on patients. It can potentially lead to various intra-operative and post-operative complications. It is therefore emphasized that patients with pre-operative anxiety should be identified and appropriate measures should be taken to lower their anxiety levels which include but are not limited to, pre-operative counseling and anxiolytic medication.

Conclusion

It was concluded in our study that the severity of pre-operative anxiety has a significant effect on intra-operative hypotension in cases of caesarian section done under spinal anesthesia.

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