



TO COMPARE FALL IN BLOOD PRESSURE POST SPINAL ANAESTHESIA IN PIH PATIENTS VS NORMAL PARTURIENTS

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ABSTRACT

Pre-eclampsia patients are already in a state of volume contractions and more common than not on anti-hypertensives. Added to an increased vasomotor tone due to increased sympathetic activity logically the fall in mean arterial blood pressure (MAP) post spinal should be more than normal parturient leading to increased risk of uteroplacental hypoperfusion. However, contrary to the belief the clinical observations noted were contrary to the logic. The primary aim of this study is to compare the fall in MAP in pregnancy induced hypertension (PIH) patients post sub arachnoid block compared to normal parturient. The secondary aim is to evaluate the cause responsible for the results which were contrary to the logic.

KEYWORDS : PIH, Spinal anaesthesia, Hypotension

INTRODUCTION

The burden of pre-eclampsia/eclampsia makes it the third most leading cause of maternal morbidity and mortality worldwide [1]. The incidence of Preeclampsia and eclampsia in India is around 10.3% [2]. Various clinical publications have already established delivery of the foetus as the definitive treatment of preeclampsia [3]. However, it is recommended to continue the pregnancy till at least 34 weeks so as to gain the maximal chances of fetal viability [4]. There is a widespread belief that sub arachnoid block in patients with preeclampsia might cause severe hypotension and decreased uteroplacental perfusion. However, several studies had shown that the risk of spinal hypotension and subsequent uteroplacental insufficiency seen with spinal anaesthesia in preeclampsia is not as effective as it was believed, especially when a low dose of spinal anaesthetic was used [5], [6]. Over the last decade a paradigm shift has been observed in anaesthetic management of preeclampsia cases where in use of sub-arachnoid block for conducting the caesarean section in such cases has proven itself to be beneficial for the patients with better post operative outcomes and lesser complications [7]. However, the rate of preventable deaths following spinal anaesthesia still remains to be high and is thus a cause of concern [8,9]. Hypotension following sub-arachnoid block is the most frequent complication associated with both increased chances of foeto-maternal mortality during Caesarean section [10]. Since it has already been established in literature that pre-eclampsia is a state of increased vasomotor tone [11] and since administration of sub arachnoid block causes an attenuation of sympathetic overactivity [12] the logical conclusion should be that the fall in BP should be greater in pre eclamptic patients when compared to normal parturient making pre-eclamptic patients at a higher risk of developing hypotension following spinal anaesthesia.

Contrary to the logical conclusion our clinical observation and few clinical publications indicate that the fall in BP% in pre-eclampsia patients is lesser when compared to normal parturient [13][14]. However, hypotension post spinal anaesthesia still remains to be the most common complication in both sets of patients.

METHODS

We conducted a prospective cohort study from Sep 2022 to May 2023 in preeclamptic and normal parturient who were planned for elective as well as emergency caesarean section. 60 patients (30 healthy parturient and 30 pre-eclamptic patients) undergoing a C-Section with spinal anaesthesia were included. We hypothesized pre-eclamptic parturient are

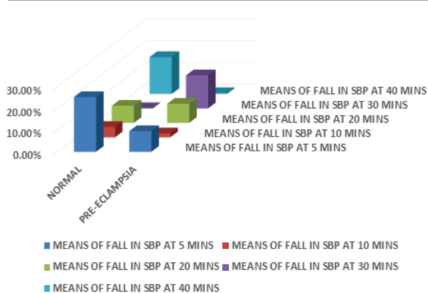
not at a higher risk of spinal anaesthesia induced hypotension when compared to normal parturient. Group A included 30 ASA II normal parturient who were planned for elective/emergency caesarean section. Group B also included 30 patients in ASA II but these were the patients who were diagnosed cases of pre-eclampsia. Parturient with twin pregnancy, chronic hypertension, cardiac disease, diabetes mellitus, gestational hypertension, coagulopathy (platelet count $< 80 \times 10^9/L$), active labour, eclampsia, fetal distress, allergy to local anesthetics, local infection of spinal injection site and refusal of spinal block were excluded from the study. Spinal anaesthesia was performed with 2.0 ml of 0.5% bupivacaine, using a 26 Gauge spinal needle in L3- L4 region in sitting position by a conventionally trained anaesthesiologist in both normal as well as pre-eclampsia cases. Patients in both the groups were co-loaded with 500 ml Ringer's lactate solution during the administration of sub-arachnoid block along with Injection Ondansetron 4mg intravenously 10 mins before administration of block. Blood pressures (BP) SBP, DBP, were recorded non-invasively before performing spinal anaesthesia and at 5,10,20,30 and 40 minutes after a spinal puncture. Patients in both the groups were immediately placed in supine position after administering spinal anaesthesia while placing a wedge under right hip. Hypotension was defined as more than 25% decline in mean arterial blood pressure (MAP) compared to the baseline in both groups (or a systolic blood pressure (SBP) < 100 mmHg and was treated with IV phenylephrine. We used SPSS version 22 statistical software for data analysis. Student t test, Mann Whitney U test and Fisher exact test were used to compare the data. All P values < 0.05 were considered statistically significant. Out of 60 patients, 30 healthy (group A) and 30 preeclamptic parturient (group B) were included in this study.

RESULTS

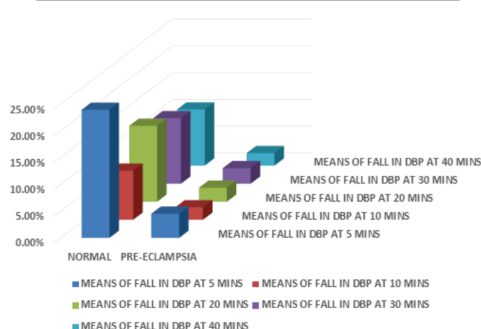
	MEAN VALUES OF % FALL IN SBP 05 MINS POST SPINAL	MEAN VALUES OF % FALL IN SBP 10 MINS POST SPINAL	MEAN VALUES OF % FALL IN SBP 20 MINS POST SPINAL	MEAN VALUES OF % FALL IN SBP 30 MINS POST SPINAL	MEAN VALUES OF % FALL IN SBP 40 MINS POST SPINAL
NORMAL PARTURI- ENTS	25.19 %	4.79%	7.89%	0.15%	17%
PRE ECLAM- PSIA	9.51%	1.83%	8.79%	15.23%	0.47%

	MEAN VALUES OF % FALL IN DBP 05 MINS POST SPINAL	MEAN VALUES OF % FALL IN DBP 10 MINS POST SPINAL	MEAN VALUES OF % FALL IN DBP 20 MINS POST SPINAL	MEAN VALUES OF % FALL IN DBP 30 MINS POST SPINAL	MEAN VALUES OF % FALL IN DBP 40 MINS POST SPINAL
NORMAL PARTURIENTS	23.92 %	9.19%	14.19%	12.23%	10.48 %
PRE ECLAMPSIA	4.51%	2.34%	2.62%	2.91%	2.34%

MEANS OF SBP IN NORMAL VS PRE ECLAMPSIA PATIENTS



MEANS OF DBP IN NORMAL VS PRE ECLAMPSIA PATIENTS



DISCUSSION

Preeclampsia (PE), a multisystem disease during pregnancy, is of concern to both anaesthesiologists and gynaecologists. This is because preeclamptic patients are susceptible to cerebrovascular, cardiopulmonary, renal, and haematological events, and foetal outcomes might be compromised because of the associated poor placental function[15][16]

Various clinical publications have already established the existence of an increased vasomotor tone in pre-eclampsia. The attenuation of sympathetic tone post spinal anaesthesia leading to severe hypotension have also been published in literature. When compounded by the fact that various pre-eclampsia patients are already on anti-hypertensives including sympatholytic viz. Labetalol, methyl dopa, MGSo4 it is natural to assume that the fall in Blood pressure will be marked post spinal in the patients of pre-eclampsia. Further the presence of aorto-caval compression by the gravid uterus leading to a decreased pre load has also remained to be a cause of concern for various anaesthesiologists.

The idea of conducting and following safe technique has always been of vital importance in the field of medicine. Considering the pre-existing difficult airway and the possibility of atonic uterus following the use of inhalational anaesthesia technique has led various anaesthesiologists and researchers to test the possibility of sub-arachnoid block for conducting safe anaesthesia technique in obstetric cases

[17]. Multiple clinical publications have been able to establish that unlike the logical conclusion as described previously the fall in blood pressure is not significant in pre-eclampsia patients when compared to the normal parturient [7][18]. The results that we found in our study are also similar to that conducted by Aya et al. in which it was established that the risk of developing severe hypotension following spinal anaesthesia was significantly lower in preeclamptic patients when compared to healthy-term parturient (17% vs 53% in healthy parturient) [8]. Similar to the study by Aya et al., Nikooseresht M. et al., also reported similar findings (55% vs 89%)[19].

The reasons attributable for a decreased fall in blood pressure post spinal anaesthesia in pre-eclamptic patients may be as follows

- The pre-eclampsia patients generally do not complete the 37 weeks of pregnancy and are delivered anytime post 34 weeks. A smaller foetus would apply lesser pressor effect and thus risk of aorto-caval compression is lesser[8].
- Similarly the smaller foetus would also not cause exaggerated epidural plexus dilation thus preventing unwanted cephalic spread of the local anaesthetic agent[8].
- The altered response of endothelial dependent relaxation of small resistant vessels in pre-eclampsia leads to maintenance of a higher vascular tone which is independent of spinal anaesthesia induced sympathetic blockade[18].
- The circulation of preeclamptic patients contains an increased production of potent vasopressor factors, which keeps the BP at a higher level. There is also an increased sensitivity of small resistant vessels to the exogenous vasopressor stimulation, this explains the lower vasopressor dose needed to correct the spinal-hypotension in pre-eclamptics [20]

Our study shows that the percent change in systolic as well as diastolic Blood pressure is significantly higher in normal parturient when compared to the pre-eclampsia patients. Spinal-induced hypotension was short-lived (1.2 min) and was easily treated with a low dose of vasopressors.

Regardless of the previous reasons, we consider that the incidence of spinal anaesthesia induced-hypotension might be related and to the local anaesthetic dose, so a low dose concept should provide a lower incidence of hypotension, but not at the expense of unsatisfactory surgical analgesia [15], [21].

CONCLUSION

In conclusion, this study showed that the incidence and severity of spinal-induced hypotension associated with patients undergoing C-Section are less in pre-eclamptic patients than in healthy parturient. Like healthy patients, however, pre-eclamptic may also experience some degree of spinal hypotension, but it is short-lived and easily treated with significantly lower ephedrine dose than in healthy parturient.

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