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A RANDOMIZED DOUBLE BLINDING PROSPECTIVE CONTROLLED STUDY TO COMPARE INTRAVENOUS ONDANSETRON V/S GRANISETRON IN PREVENTION OF HYPOTENSION IN SUBARACHNOID BLOCK DURING ELECTIVE LOWER SEGMENT CAESAREAN SECTION

Anaesthesiology

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ABSTRACT

Background and Aim: To compare the effect of Intravenous Ondansetron v/s intravenous Granisetron in prevention of hypotension in Subarachnoid block during elective lower segment caesarean section . **Methods:** A randomized double blinding prospective controlled study to compare intravenous ondansetron v/s granisetron in prevention of hypotension. All patients received spinal block at the level of L3-L4 or L4-L5 vertebra. various haemodynamic changes (Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure), analyse adverse drug events, if any between various groups. **Results:** Haemodynamic parameters including SBP, DBP, MAP in ondansetron group were stastically more stable as compared to Granisetron and Normal saline most of the time intraoperatively. Also, Nausea vomiting and requirement of inotropes were more in saline group than other two. **Conclusion:** Adminstration of intravenous Ondansetron prior to spinal anaesthesia in LSCS patients reduces the episodes of hypotension, bradycardia and vasopressor requirement.

KEYWORDS

Spinal Anesthesia, Hypotension, ondansetron, Granisetron

INTRODUCTION

Caesarean section can be performed both in general anaesthesia and regional anaesthesia (combined spinal and epidural, single shot spinal, single shot epidural). Now a days caesarean sections mostly being performed under regional anaesthesia given at the level of L3/4 or L4/5 interspace.[1][2][3] It is simple to perform, convenient, economical and produces rapid onset of anaesthesia with a lower respiratory impact, produces better pain relief, favouring a rapid recovery,has good patient and surgeons acceptability and patient is awake to see her baby just after birth.[4][5][6]

Limitations of spinal anaesthesia are fixed duration of anaesthesia, post-dural puncture headache[7] in few patients, hypotension and lesser control of block height.[8] Hypotension is also one of most frequent complication. The Bezold-Jarisch reflex (BJR), is one of the mechanisms that explains occurrence of hypotension after spinal anaesthesia through serotonin mediated vasodilation and decreased venous return This increases parasympathetic activity while decreasing sympathetic activity, which causes hypotension and bradycardia.[9] Also When a patient adopts a supine position, the pregnant uterus causes aortocaval compression due to larger size which decreases venous return hence causes hypotension.

Fluid loading is one of the fundamental elements in the treatment of post-spinal hypotension. Vasopressor Drugs and positioning guidelines to be followed secondly. Phenylephrine, Ephedrine are most commonly used drugs in management of hypotension in caesareans section but they also have side-effects, therefore it is important to manage hypotenion so that intraoprtative and post operative complications can be minimised and avoided.[10]

Aim of our study was to compare the two serotonin receptor antagonists Ondansetron and Granisetron to prevent maternal hypotension and bradycardia after spinal anaesthesia during LSCS.

METHODS

After institutional ethics committee approval, this hospital based, prospective, randomized, comparative, double blinded, Study was carried on 120 patients of ASA grade II, age group 20-40 years included who were to have elective caesarean section and who met inclusion were included in the study.

Patients with emergency caesarean section (APH, PPH, Gastational diabetes mellitus, hypertensive disorders of pregnancy), with multiple parities (twins/triplets), with expected blood loss more than 1000 ml, with cardiac disease history (coronary artery disease, myocardial infarction, congestive heart failure, murmur, mitral valve prolapsed/ regurgitation, Arrhythmias, aortic stenosis / regurgitation), with allergy to study drugs ,were excluded from study.

A sample size of 40 for each group was required at 95% confidence interval, 80% power and 0.05 alpha error to verify expected minimum 2.1 mm Hg difference with SD 3mm Hg in mean of SBP in patients at 40 minutes after receiving 4mg ondansetron, 1mg granisetron and 10 ml of normal saline intravenously, 5 min before spinal anaesthesia as per seed article. Randomization was done by chit in box method. Patients were divided into 3 groups group A (n=40) received intravenous 4 mg Ondansetron diluted in normal saline (up to 10 ml), group B (n=40) received intravenous 1 mg Granisetron diluted in normal saline (up to 10 ml) and group C (n=40) received 10 ml intravenous normal saline 5 minutes before subarachnoid Block.[11]

An resident doctor who was unaware about the study, administered drug to patients. Neither patient nor the observer was aware of the type of drug given to patient.

After written informed consent and pre-anesthetic checkup patient was taken in the OT. All Baseline parameters (blood pressure, heart rate, oxygen saturation) recorded. IV line secured with 18G cannula and co-loading started with 500 ml ringers lactate. Study drug injected intravenously 5 minutes prior to spinal anaesthesia. After all aseptic precautions spinal anaesthesia was given at L3-L4 or L4-L5 interspace in midline approach via 25G Quincke needle and 2 ml hyperbaric bupivacaine 0.5% was injected intrathecally. Patient turned supine immediately. Vitals were recorded every 1 min interval till 5 min, every 2 min interval till 15 minutes and every 5 min interval till 40 minutes after surgery. Bradycardia defined as pulse rate < 50 beats/min or < 20% of baseline heart rate or a rate that is too slow to be physiologically appropriate for the person and/or activity. Vomiting was treated by injection metoclopramide 10mg intravenous. Shivering was treated by injection tramadol 100 mg intravenously.

RESULT

In the current study 120 patients were studied for the effect of prophylactic intravenous Ondansetron, Granisetron and normal saline on fall in SBP, DBP and MAP, heart rate, use of ephedrine, incidence of nause, pain and bradycardia.

Cases are distributed according to the level of sensory height, block and duration of surgery was not significantly different in each groups.

Table 1: Demographic variables

Age	ondansetron	Granisetron	Normal saline	Result (p value)	Significance

	Mean	SD	Mean	SD	Mean	SD		
Mean± SD	26.90	±4.49	27.20	±4.69	27.65	±4.67	0.866	Non significant

Table 1 shows that the mean age of the patients in all three groups were statistically comparable (p > 0.05).

Table 2: Baseline clinical variables

	Ondasetron		Granisetron		Normal saline		Result (p value)	Significance
	Mean	SD	Mean	SD	Mean	SD		
SBP	125.45	7.91	123.43	9.54	122.43	9.76	0.321**	Non significant
DBP	82.60	8.37	79.48	10.93	77.95	6.63	0.059**	Non significant
MAP	95.13	8.30	90.98	10.50	93.30	7.82	0.120**	Non significant
HR	95.43	12.03	97.53	13.94	95.88	14.55	0.766**	Non significant
SPO2	99.25	0.84	99.55	0.60	99.48	1.20	0.313**	Non significant

Table3: Complication

Complication	Ondansetron	Granisetron	Normal Saline
Shivering	1(2.5%)	1(2.5%)	4(10%)
Nausea & Vomiting	1(2.5%)	1(2.5%)	4(10%)
Epinephrine	4(10%)	4(10%)	10(25%)

Table 2 shows the Baseline Clinical Variables like systolic blood pressure, diastolic blood pressure, heart rate were statistically was non-significant.

Table 3 shows that shivering, Nausea with Vomiting and requirement of epinephrine in study groups.

Figure 1 explains that the baseline SBP in three study group are stastisally comparable as P>0.05. SBP was significantly less in most of the time except 2 min, 11 min, and 15 min in Granisetron and Nasal saline as compared to ondansetron. Ondansetron SBP is stable and less fall in Systolic blood pressure was seen as explained.

Figure 2 The DBP reading was taken preoperatively and it was non-significant (P=0.059). DBP was significantally more in ondansetron group as compared to Granisetron and Nasal saline at most of the time after drug administration.

Figure 3 shows that baseline MAP was non-significant in basline parammetrs but during surgery MAP was significantly lower in both Graninsetron and Saline group as compared to Ondansetron group at most of the times after drug administration.

Figure 4 P value calculated by ANOVA test with post hoc Bonferroni analysis. Above table shows that the three groups were comparable in relation to baseline heart rate (P>0.05). HR was insignificant in all the 3 study groups.

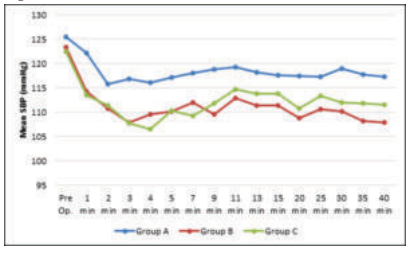

Figure 1: Mean SBP in Group A, Group B, Group C

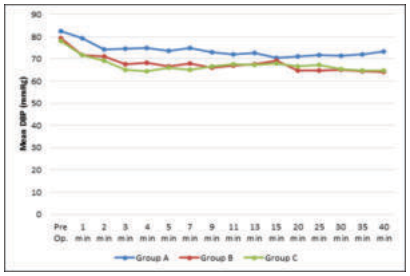

Figure 2: Mean DBP in Group A, Group B, Group C

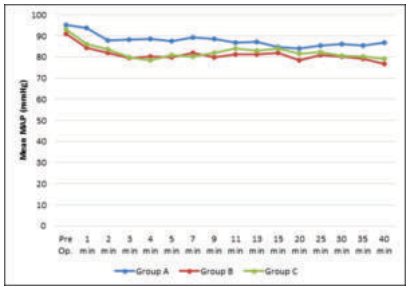

Figure 3: Mean MAP in Group A, Group B, Group C

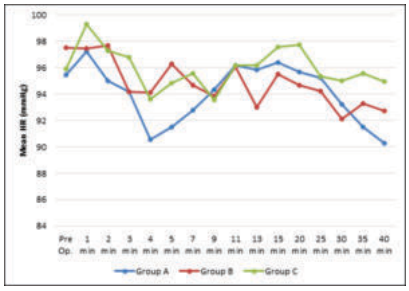

Figure 4: Mean HR in Group A, Group B, Group C

DISCUSSION

Spinal anaesthesia is a most commonly used method of Caesarean section and Maternal hypotension is one of the important complications that occur during intraoperative period with an incidence rate of 50-80%. Various methods are used to reduce the incidence of hypotension and bradycardia like preloading with intravenous fluids, positioning the patients so that it facilitates venous return and administration of vasopressors. Prophylactic administration of antiemetics like Ondansetron, which may be more effective than hydration is done. However, studies related to our topic are limited. We tried to explore this caveat.

Studies also showed Ondansetron significantly reduced the need of vasopressors and adverse effets on uterine blood flow of these drugs can be avoided.

Anisha, shiv Narayan in 2020, studied different doses of prophylactic intravenous ondansetron for attenuation of hypotension during caesarean section in spinal anaesthesia. He found that 4 mg prophylactic ondansetron was the optimal dose during cesarean delivery.[11] Various studies done by khalifa OS, Menia Wang et al. and Sahoo T et al.[12][13][14] showed that prophylactic intravenous Ondansetron 4 mg given before subarachnoid block reduced hypotension and vasopressor requirement in parturients undergoing elective caesarean section. Therefore, we also used 4mg dose of ondansetron in study group.

Our study shows that baseline variables and haemodynamic parameters (SBP, DBP, MAP, HR) were stastically comparable in all three groups AND Application of ANOVA test with post hoc Bonferroni test shows that SBP was significantly lower in both Granisetron and Saline group as compared to Ondansetron group at most of the times after drug administration.

Patients in the ondansetron group had considerably more stable blood pressure compared to those in the granisetron and saline groups, and episodes of hypotension were less frequent. According to the findings of Meenoti P Potdar, Laxmi L Kamat, Tanya R Jha, et al. (2017) [15], the incidence of hypotension in patients was statistically lower in the ondansetron group but equivalent between different ondansetron dosages. But according to Arivumani, Arul Anne Rose, Usha Devi, and colleagues[16] (2015), intravenous ondansetron 4 mg significantly lessens spinal-induced hypotension. Additionally, they discovered that the Ondansetron group required lesser vasopressors and reported fewer bradycardia episodes.Study revealed that the mean blood pressure was comparable among the three groups at baseline as shown by ANOVA test (P>0.05). Mean arterial pressure decreased in all groups after administration of respective drug, but MAP was significantly lower in Granisetron and saline group as compared to Ondansetron group at all times till 40 minutes follow up.

This table showed that shivering was seen in (2.5%) of subjects in

Ondansetron and Granisetron group and (10%) subjects in saline group, however application of Chi square test showed that this difference was not statistically significant (P>0.05). The three groups also did not differ significantly in occurrence of pain and bradycardia as complication (P>0.05). Nausea and vomiting was seen in significantly more subjects in saline group (10%)as compared to Granisetron (2.5%) and Ondansetron group (2.5%). Ephedrine use was also required in significantly more subject in saline group (25%) and Granisetron group (10%) as compared to Ondansetron group (10%).

In contrast to our findings, Ahmed A Eldaba and Yasser M. Amr (2015)[17] evaluated the use of intravenous Granisetron to avoid bradycardia and hypotension after spinal anaesthesia in caesarean deliveries. They noticed that the normal saline group had statistically lower mean blood pressure and heart rate (P 0.0001). During spinal anaesthesia, 64% of patients in the normal saline group and 3% of those receiving granisetron developed hypotension (P 0.00001). Contrasting the granisetron group to the normal saline group, the total dosages of ephedrine and atropine were decreased substantially.

CONCLUSION

The current study comes to the conclusion that administration of preoperative intravenous ondansetron to LSCS patients before spinal anaesthesia lowers instances of hypotension, bradycardia, and the need for vasopressors. Additionally, it decreases badycardia, hypotension, and the adverse effects of vasopresor administration in both the mother and the child while having no impact on the Apgar score. Granisetron was ineffective and had no impact on any haemodynamic variables. No group reported any major side effects, either.

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Conflict of interest: None

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