

"COMPARISON OF INTRAVENOUS ONDANSETRON AND GRANISETRON IN PREVENTION OF HYPOTENSION AFTER SPINAL ANESTHESIA DURING LSCS", A RANDOMISED DOUBLE BLIND PLACEBO CONTROLLED STUDY

Anaesthesiology

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ABSTRACT

Introduction: Spinal anesthesia is a simple technique with low failure rate, rapid onset, and low drug dose. Spinal anesthesia, because it is a simple medication that has little impact on the fetus, has become a preferred choice for cesarean section. Anaesthesia is given to reduce pain during and after surgeries. Hyperbaric Bupivacaine is the most commonly used agent for spinal anesthesia when performing caesarean section. Its duration of action of 1.5 to 2 hours is perfectly matched to duration of surgery in most cases. **Aim and Objective:** To compare the effect of ondansetron & granisetron in prevention of spinal induced hypotension as primary outcomes & effect on nausea, vomiting & shivering as secondary outcomes. **Material and Methods:** This was an randomized double blind placebo controlled study conducted at Department of Anaesthesia, Jhalawar Medical College, Jhalawar, Rajasthan. This study included Sample size of 90 patients aged between 18-35 years scheduled for elective caesarean section were included in the study after getting ethical clearance. Patients were examined for general physical condition & systemic examination. All the required investigations were done e.g. CBC, BT, CT, RBS, LFT, RFT, ECG, Chest Xray, Urine examination etc. to evaluate thoroughly. **Result:** In our study we recorded data at baseline, at 0 min, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min, 15 min, 25 min, 35 min and at 45 min. Mean arterial pressure was distributed for group A, group B and group C. There was non-significant difference in mean arterial blood pressure at 15 min, at 25 min, at 35 min, at 45 min as p value was >0.05. mephentermine was used majorly (36.6%) at 3 min, 13% patients at 4 min in group B. In group C, 16.6% and 6.6% patients need mephentermine at 5 min and 10 min respectively. **Conclusion:** Incidence of post-spinal hypotension is high in parturients undergoing lower segment caesarean section. Intravenous Ondansetron 4mg & granisetron 1mg administration prior to spinal anesthesia reduces episodes of hypotension. There was less incidence of nausea & vomiting in both groups. besides being an effective antiemetic, can also be used to effectively attenuate hypotension in parturients without any adverse effects on mother and neonate.

KEYWORDS

Intravenous, Ondansetron, Granisetron.

INTRODUCTION

Spinal anesthesia is a simple technique with low failure rate, rapid onset, and low drug dose.1 Spinal anesthesia, because it is a simple medication that has little impact on the fetus, has become a preferred choice for cesarean section. Anaesthesia is given to reduce pain during and after surgeries.2 Hyperbaric Bupivacaine is the most commonly used agent for spinal anesthesia when performing caesarean section. Its duration of action of 1.5 to 2 hours is perfectly matched to duration of surgery in most cases.

On the other hand, the anesthetist is facing certain problems after giving spinal anesthesia like hypotension, bradycardia, and failure of block. But hypotension represents incidence of about 55–100%, so it is the most frequent complication.3 Moreover, hypotension is hazardous for the mother and the baby as it can cause loss of consciousness, aspiration, and even cardiac arrest for the mother and placental hypoperfusion, which can lead to fetal problems.4 There are several methods to minimize maternal hypotension after spinal anesthesia like fluids, medications, and physical methods like positioning, leg bindings, etc.5 Probably, the reduction in vascular resistance by sympathetic nerve blockade is the main reason for hypotension.

Ondansetron and granisetron are selective 5-hydroxytryptamine 3 (5-HT₃) receptor antagonists, and thus may be beneficial for preventing bradycardia and hypotension.6 Ephedrine, an indirectly acting sympathomimetic amine, is probably the vasopressor of choice in obstetric anesthesia. These receptors are present as cardiac chemoreceptors on the cardiac vagal afferent located peripherally and centrally in the chemoreceptor trigger zone that mediate bezold-jarisch reflex.

Ondansetron is a serotonin receptor blocker. It decreases serotonin induced by the Bezold-Jarisch reflex by suppressing venodilatation.7 Ondansetron is an exclusive 5-HT₃ antagonist which is usually recommended for the prevention and treatment of nausea and vomiting during and after surgery which can block the binding of 5-HT from activated platelets to 5-HT₃ receptors then alleviates the BJR triggered by 5-HT and thus suppresses further expansion of peripheral vessels and increases blood return to the heart. Injection of these drugs into the

preoptic hypothalamus in cats resulted in vasodilatation.*

This study is a prospective randomised double blind placebo controlled trial to compare the effect of ondansetron & granisetron in prevention of spinal induced hypotension as primary outcomes & effect on nausea, vomiting & shivering as secondary outcomes.

MATERIALS & METHODS

This was an randomized double blind placebo controlled study conducted at Department of Anaesthesia, Jhalawar Medical College, Jhalawar, Rajasthan. This study included Sample size of 90 patients aged between 18-35 years scheduled for elective caesarean section will be included in the study after getting ethical clearance. Preanesthetic evaluation was done on the day before surgery. Preanesthetic evaluation was done by taking through H/O present & past illness. Patients were advised of nil by mouth for eight hours before surgery. Patients were examined for general physical condition & systemic examination. All the required investigations were done e.g. CBC, BT, CT, RBS, LFT, RFT, ECG, Chest Xray, Urine examination etc. to evaluate thoroughly, who went through inclusion and exclusion criteria were included in this study. Inclusion criteria:- 1. Term singleton parturients of >38 weeks 2. ASA Grade I & II 3. Elective caesarean section. Exclusion criteria:- 1. Pregnancy with comorbidities 2. Allergy to ondansetron and granisetron 3. Bleeding diathesis & coagulopathy 4. Infection of skin over spine.

Results

Mean age for group A was 24.73 years, for group B was 25.9 years and for group C was 25.43 years. The p value was 0.24. Mean height for group A was 168 cm, for group B was 167.4 cm and for group C it was 168.1 cm. The p value was 0.58. There was no significant difference found between these groups as p value was >0.05. Here we distributed various diagnosis found in our patients. The majority of patients were present in previous LSCS followed by oligohydramnios.

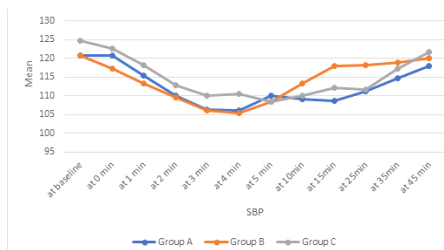
Table 1: HEART RATE CHANGES

Heart Rate	Group A		Group B		Group C		P-Value
	Mean	SD	Mean	SD	Mean	SD	

at baseline	83.26	10.18	80.53	6.05	84.33	10.75	0.26
at 0 min	87.6	9.41	81.1	5.29	86.7	10.59	0.009
at 1 min	88	9.82	82.9	5.15	86.3	11.35	0.09
at 2 min	90.43	10.67	84.3	5.4	90.33	13.31	0.03
at 3 min	93.26	13.09	88.26	6.74	91.96	13.49	0.22
at 4 min	95.63	15.51	90.86	8.35	91.63	15.42	0.29
at 5 min	90.93	11.03	90.83	6.87	90.06	15.07	0.98
at 10min	91.96	10.37	91.06	5.61	94.03	11.49	0.46
at 15min	90.96	8.93	92.1	5.51	93.23	12.07	0.63
at 25min	92.4	10.18	87.8	5.3	94.73	11.94	0.02
at 35min	90.83	8.35	84.33	5.74	92.56	10.86	0.0008
at 45 min	90.93	7.83	81.8	6.03	92.3	9.84	0.7

Here we recorded data at baseline, at 0 min, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min, 15 min, 25 min, 35 min and at 45 min. Mean heart rate was distributed for group A, group B and group C. There was significant difference in mean heart rate at 0 min, at 2 min, at 25 min, at 35 min as p value was <0.05.

Table 2 : SYSTOLIC BPC HANGES



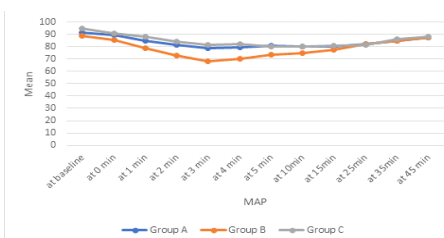
In our study we recorded data at baseline, at 0 min, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min, 15 min, 25 min, 35 min and at 45 min. Mean Systolic blood pressure was distributed for group A, group B and group C. There was significant difference in mean Systolic blood pressure at 0 min, at 1 min, at 15 min, at 25 min as p value was <0.05.

Table 3: DIASTOLIC BPC HANGES

DBP	Group A		Group B		Group C		P-Value
	Mean	SD	Mean	SD	Mean	SD	
at baseline	76.93	6.16	76.7	7.17	76.83	6.42	0.99
at 0 min	73.3	4.48	73.73	6.65	75.13	5.27	0.41
at 1 min	69.56	4.5	69.16	5.21	71.46	4.95	0.15
at 2 min	67.03	4.56	65	4.22	68.36	5.78	0.03
at 3 min	64.8	4.65	60.9	3.28	66.33	5.41	<0.001
at 4 min	65.9	4.64	61.33	4.45	66.53	6	0.0002
at 5 min	66.5	5.17	64.73	4.2	66.3	7.34	0.42
at 10min	66.96	6.22	65.73	3.75	65.43	6.45	0.53
at 15min	66.8	5.14	67.9	4.85	66.43	5.81	0.53
at 25min	68.4	6.78	71.83	4.98	67.2	7.36	0.0188
at 35min	71.16	6.15	74.46	6.1	71.6	7.26	0.11
at 45 min	72.56	7.18	75.86	6.61	72.23	5.58	0.06

In our study we recorded data at baseline, at 0 min, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min, 15 min, 25 min, 35 min and at 45 min. Mean diastolic blood pressure was distributed for group A, group B and group C. There was significant difference in mean diastolic blood pressure at 2 min, at 3 min, at 4 min, at 25 min as p value was <0.05.

Table 4 : MEAN ARTERIAL PRESSURE CHANGES



In our study we recorded data at baseline, at 0 min, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min, 15 min, 25 min, 35 min and at 45 min. Mean arterial pressure was distributed for group A, group B and group C.

There was non-significant difference in mean arterial blood pressure at 15 min, at 25 min, at 35 min, at 45 min as p value was >0.05.

Mephentermine was used majorly (36.6%) at 3 min, 13% patients at 4 min in group B. In group C, 16.6% and 6.6% patients need mephentermine at 5 min and 10 min respectively. There was significant difference at 3 min as p value was <0.05. we analysed dermatome level of sensory effect in our study group. We did not found any significant difference at 0 min. At 5 min and 10 min we found significant difference at t6 and at t8 as p value was 0.002.

Bromage scale grading at 0 min, 5 min and 10 min. We found non-significant difference at 0 min, 5 min and 10 min as p value was >0.05. APGAR Score at 0 min and at 5 min. There was no difference was found in our group. 10% patients in group A and group B and 13.3% patients in group C faced shivering. Only 3.3% patient had head ache in group B. Nausea and vomiting was seen in 33.3% patient in group A, 6.6% patients in group B and 10% patients in group C. The p value was 0.41.

DISCUSSION

Hypotension is the physiological consequence of spinal anaesthesia and can have potential deleterious maternal and foetal impact. Several methods are therefore being followed to treat hypotension after SAB like IV fluids, pharmacological agents, and physical methods like positioning. With the introduction of 5-HT₃ receptor antagonist in clinical practice, different authors started exploring these agents and since then the treatment options for spinal induced hypotension has been widened. Numerous articles have been published showing the efficacy of both ondansetron and granisetron for the purpose of management of post-spinal hypotension.

We recorded data at baseline, at 0 min, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min, 15 min, 25 min, 35 min and at 45 min. Mean heart rate was distributed for group A, group B and group C. There was significant difference in mean heart rate at 0 min, at 2 min, at 25 min, at 35 min as p value was <0.05.

Kumar A et al⁹ observed that all the groups (ondansetron, granisetron & saline) showed decrease in heart rate after spinal anaesthesia. The difference in fall in heart rate was non significant among the groups till end of surgery.

Nivatpumin P et al¹⁰ (2016) concluded that there were no significant differences in MAP in both groups (Ondansetron and Normal Saline) (P>0.05) which was contrary to our results.

Shrestha et al¹¹ (2014) concluded that decrease in heart rate and systolic blood pressure in both groups (normal saline & granisetron) after Subarachnoid Block was not statistically significant.

In our study we recorded data at baseline, at 0 min, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min, 15 min, 25 min, 35 min and at 45 min. Mean Systolic blood pressure was distributed for group A, group B and group C. There was significant difference in mean Systolic blood pressure at 0 min, at 1 min, at 15 min, at 25 min as p value was <0.05. Mean diastolic blood pressure was distributed for group A, group B and group C. There was significant difference in mean diastolic blood pressure at 2 min, at 3 min, at 4 min, at 25 min as p value was <0.05.

But a study done by Tatikonda CM et al (2019)¹² results are contrast which showed that there was no significant difference in SBP, DBP and MAP between ondansetron and normal saline at any point of 3 min interval in span of 30 min.

Different authors studied the onset and duration of post-spinal hypotension and they observed incidence of hypotension after three minutes of SAB¹³ and this hypotension persisted during the intraoperative period.⁹ On comparing both the above findings, the present study showed fall in SBP was greater in the saline group until 30 minutes after SAB and granisetron had a beneficial effect against fall in SBP after SAB.

CONCLUSION

Subarachnoid block is still the most commonly performed anaesthesia technique for lower segment caesarean section. Incidence of post-spinal hypotension is high in parturients undergoing lower segment caesarean section. Intravenous Ondansetron 4mg & granisetron 1mg

administration prior to spinal anesthesia reduces episodes of hypotension. There was less incidence of nausea & vomiting in both groups. Besides being an effective antiemetic, can also be used to effectively attenuate hypotension in parturients without any adverse effects on mother and neonate.

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