International Journal of Research in Medical Sciences
Kumar A et al. Int J Res Med Sci. 2019 May;7(5):1886-1893
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20191695

Original Research Article

A comparative evaluation of effect of intravenous premedication with ondansetron versus granisetron on hemodynamics and sensory-motor blockade produced by intrathecal hyperbaric 0.5% bupivacaine

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Received: 13 March 2019
Revised: 30 March 2019
Accepted: 08 April 2019

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ABSTRACT

Background: Bezold Jarisch reflex is important cause of hypotension and bradycardia which occur after spinal anaesthesia. This reflex is elicited by stimulation of peripheral serotonin receptors 5- hydroxytryptamine (5- HT3 type). These receptors have antinociceptive effect, which is confirmed by many studies. The two most commonly used 5HT3 antagonist are ondansetron and granisetrone. Very few comparative studies of the two drugs on the effect after spinal anaesthesia are available.
Methods: Ninety adulted patients of either sex aged 18-58 years scheduled for elective infraumbilical surgeries were randomly allocated in three groups to receive intravenous ondansetron 4mg, granisetrone 2mg or normal saline in equal volume 5mins before spinal anesthesia. Hemodynamic changes and time to sensory motor onset and regression were evaluated.
Results: There was statistically significant difference in fall of systolic diastolic and mean blood pressure among the three groups. Time to two segment regression of sensory block and time to regression to S1 was faster in ondansentron (76.6±17.2mins, 176±22mins) and granisetrone group (69±17.3mins, 165±19.2mins) in comparision to control group(77.4±24.3mins, 178±21mins) which was statistically significant also p value-0.019, 0.0001 respectively.
Conclusions: The prophylactic therapy with 4mg i.v. ondansetron, given five minutes before spinal anaesthesia appears to be significantly most effective and safe for attenuating haemodynamic response after spinal anaesthesia without affecting the duration of sensory block in patients undergoing infraumbilical surgeries.

Keywords: Granisetron, Hemodynamics, Intrathecal bupivacaine, Intravenous premedication, Ondansetron, Sensory motor block

INTRODUCTION

The most common hemodynamic adverse effects of spinal anesthesia are hypotension and bradycardia. Hypotension results primarily from decreased peripheral vascular resistance, whereas bradycardia can occur from shift in cardiac autonomic balance toward the parasympathetic system, from activation of left ventricular mechanoreceptors from a sudden decrease in left ventricular volume (Bezold-Jarisch reflex) (BJR).[1] Stimulation of cardiac chemoreceptors in the heart is caused by decreased venous return which increases the

parasympathetic activity, and decreases the sympathetic activity resulting in vasodilation and bradycardia.

This reflex is elicited by stimulation of peripheral serotonin receptors 5-hydroxytryptamine (5-HT3 type). The responsible receptors for the BJR are mechanoreceptors located in the heart walls which participate in systemic responses to hyper and hypovolemia. They also include chemoreceptors sensitive to serotonin (5-HT3 receptors).[2-5] Currently there are 14 different 5-HT receptors identified, and with the exception of 5HT3, which is a ligand-gated channel, all other receptors are a G-protein coupled receptor. The 5-HT3 receptors are located in both the peripheral and central nervous system in humans and are found both pre- and postsynaptic ally. It is thought that the stimulation of these peripheral 5-HT3 receptors results in increased parasympathetic activity and decreased sympathetic activity, resulting in bradycardia, vasodilation, and hypotension. The 5HT3 binding sites are abundant at the spinal level.[6] The receptors are located in the superficial laminae and the substantia gelatinosa of the spinal cord.[7] These receptors have antinociceptive effect, which is confirmed by many studies.[8-10] Hence, this could probably be antagonized by selective 5HT3 receptor antagonist. Current studies indicate that 5-HT3 antagonism may abolish the BJR response to spinal anesthesia and also causes faster sensory regression.

The two most commonly used 5HT3 antagonist are ondansetron and granisetrone. Though there are a large number of studies available regarding beneficial effects of ondansetron for preventing bradycardia and hypotension following subarachnoid block and effect on sensory and motor blockade duration but much work is not done on granisetron individually and very few comparative studies of the two drugs are available. Therefore, this study was designed as a prospective double blind randomized study to comparatively evaluate the efficacy of different 5HT3 receptor antagonists on hemodynamic responses and duration of sensory and motor block after intrathecal 0.5% hyperbaric bupivacaine.

METHODS

After approval from Institutional Ethical Committee this randomized prospective double blind controlled clinical study was designed to compare the effect of intravenous ondansetron versus granisetrone as premedication on hemodynamics and sensory-motor blockade produced by intrathecal hyperbaric 0.5% bupivacaine on patients undergoing elective infra umbilical surgeries under spinal anaesthesia. Patients of either sex, between 18 and 58 years of age with ASA physical status of grade I or II who gave written informed consent were enrolled for the study.

Patients were randomized into three equal groups of 30 each by card method. A total of 90 cards were prepared by another anesthesiologist who was blinded about the study. After recruitment, every patient was asked to draw one card and grouped accordingly. Group A (n=30)-received ondansetron 4mg diluted into 10 ml NS, 5mins before institution of spinal anaesthesia, Group B(n=30) -received granisetron 2mg diluted in 10ml NS, 5mins before institution of spinal anaesthesia, and Group C (n=30)-received 10ml saline intravenously over 1minute, 5mins before institution of spinal anaesthesia.

Anaesthetic technique

Anaesthesia technique was standardized for all the patients. Patients were given tab alprazolam 0.25mg night before surgery and kept nil oral for 8hrs. All patients were inserted 18G cannula on arrival in preoperative room, baseline heart rate, SBP, DBP, MAP were recorded and patients were preloaded with 15ml/kg RL solution over 20min After preloading, patient was shifted to operation theatre where standard monitoring was applied including non-invasive arterial blood pressure, pulse, oximeter and electrocardiogram.

In all groups, study solution was transfused 5minutes before institution of spinal anaesthesia. The lumber puncture for spinal anaesthesia was performed with patients in the sitting position at L3-L4 space with 25 gauge Quincke's needle by midline approach with full aseptic precautions. After confirmation of CSF through needle, 3.5ml of 0.5% hyperbaric bupivacaine was injected. Patient was immediately placed in supine position on the operation table without any tilt. Time at the completion of intrathecal injection was noted as zero time.

Heart rate, systolic blood pressure, diastolic blood pressure, and Mean blood pressure were recorded by anesthesiologist who was blind about the study drug group. These parameters were recorded at baseline, just after administering spinal anesthesia, at regular interval of 2mins till 10mins, then 5mins till 30mins and then every 10mins till end of surgery (90min). The upper level of sensory blockade was evaluated by pinprick test from caudal to rostral direction in bilateral midclavicular line at 2min interval until T10 sensory block was achieved, at that point spinal anaesthesia was considered successful. Motor block every 2mins until maximal motor blockade, then every 20mins until complete motor recovery according to modified Bromage scale. 0-able to move hip, knee, ankle and toes, 1-unable to move hip, able to move knee, ankle and toe, 2-unable to move hip and knee, able to move ankle and toe, 3-unable to move hip, knee, ankle, able to move toe, 4-unable to move hip, knee, ankle and toes. The following time intervals were assessed, defined as time elapsed from spinal injection to:

- Time to complete sensory block,
- Highest dermatome of sensory block,
- Time to two segment dermatomal regression,
- Time to regression of sensory level to S1,

- Time to complete motor block,
- Time to complete motor block recovery.

The surgical anaesthesia was considered to be achieved when at least T10 dermatome level was anaesthetized. A 20% decrease in mean arterial pressure below baseline or systolic pressure below 90mmHg was considered as hypotension and treated with Inj. Mephentermine IV bolus 6mg IV bolus and decrease in heart rate below 50 bpm was treated with 0.2mg to 0.5mg atropine sulphate. Pain was treated with 50mcg fentanyl IV. Intraoperative requirement of any analgesic medication, respiratory depression, shivering nausea vomiting or any other drug induced side effects were recorded.

Statistical analysis

Preliminary sample size was decided in consultation with statisticians and based on previous studies, which indicated that approximately 26 patients were required per group to detect a 6mmHg difference in MAP between the groups with 80% power and 5% probability of type 1 error. Assuming a 10% drop out rate, a total of 90 patients (30 patients in each group) were taken.

The data obtained in study was presented in tabulated manner and results were statistically analysed using Stat graphics Centurion Version 17.1.12 software. For categorical data, the Chi-Square test was applied, for intergroup comparison one-way ANOVA test and for two group comparison Student t-test. A p-value of <0.05 was considered statistically significant and that of <0.001 was considered statistically highly significant.

RESULTS

All the three groups were comparable in terms of age, weight, gender ratio and ASA physical status (Table 1). All the three groups had almost similar number of patients for different type of procedures.

Table 1: Demographic profile.

	Group A (Ondesetron)	Group B (Granisetron)	Group C (Normal saline)	P value
Age (years)	37.69±14.91	41.50±10.65	40.23±14.23	0.585
Weight (kg)	65.19±6.08	66.73±7.6	66.43±6.1	0.218
Height(cm)	164.71±8.7	163.12±7.6	159.14±5.2	0.923
Gender (M/F)	22/8	20/10	21/9	0.648
ASA (I/II)	25/5	24/6	26/4	0.076

Data are presented in Mean ±SD or absolute numbers. *P value <0.05 is statistically significant and **P value<0.001 is highly significant statistically

Table 2: Comparison of mean heart rate (beats/min) among the groups.

Heart Rate(bpm)	Group A (Ondansetron)	Group B (Granisetron)	Group C (Normal Saline)	p value
	Mean ±SD	Mean ±SD	Mean ±SD	
Baseline Heart Rate	84.87±5.987	85.4±6.891	84.07±5.494	0.928
Justafter spinal block	84.53±5.894	84.93±6.721	83.93±5.589	0.815
2 Minute	84.33±5.827	84.27±6.74	83.43±5.589	0.811
4 Minute	84.07±5.953	83.93±6.797	83.13±5.164	0.81
6 Minute	82.2±5.904	82.2±5.904	80.6±4.818	0.168
8 Minute	81.8±4.619	80.2±5.88	79.6±2.253	0.066
10 Minute	81.53±4.659	79.07±4.54	77.6±2.191	0.060
15 Minute	80.53±3.401	77.93±3.3	76.87±2.403	0.058
20 Minute	78.93±2.504	76.4±2.799	75.93±1.78	0.072
25 Minute	77.67±2.171	75.67±2.171	75.6±1.754	0.085
30 Minute	75.33±2.94	73.33±2.187	72.93±3.172	0.095
40 Minute	73.73±2.912	71.27±1.929	71.13±2.03	0.128
50 Minute	71.33±2.368	69.6±1.923	69.67±1.668	0.170
60 Minute	73.73±1.799	72.33±1.184	71.27±2.333	0.229
70 Minutes	76.67±2.309	76.2±2.538	75.2±2.074	0.218
80 Minutes	77.93±2.377	77.4±3.286	76.87±2.501	0.329
90 Minutes	82.93±1.552	81.2±4.999	81.07±2.149	0.053

Data are presented in Mean ±SD. P value <0.05 is statistically significant and P value <0.001 is highly significant statistically

Hemodynamics

All the groups 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 (Table 2). All the groups showed decrease in systolic blood pressure after spinal anaesthesia difference in fall of SBP was highly significant 8minutes after spinal anaesthesia till 70minutes (Table 3). All the groups showed decrease in mean diastolic pressure just after spinal anaesthesia which was nonsignificant till 4minutes. There was statistically highly significant difference in mean diastolic blood pressure after 6min (p=0.001) till 60minutes (Table 4). The mean diastolic blood pressure was statistically significantly lower in control group as compared to ondansetron and granisetrone group 6mins after block. There was statistically significant difference in mean blood pressure at 4min (p=0.01) which became statistically highly significant after 4mins till 70minutes. The mean blood pressure was statistically significantly lower in control group as compared to ondansetron and granisetrone group 4min post spinal block (Table 5).

Table 3: Comparison of mean systolic blood pressure (mmHg) among the groups.

SBP (mmHg)	Group A (Ondansetron)	Group B (Granisetron)	Group C (Normal saline)	p value
	Mean ±SD	Mean ±SD	Mean ±SD	
Baseline	126.27±9.392	126.6±10.036	127.93±11.356	0.803
Justafter spinal block	124.67±8.474	125.53±9.864	126.47±10.342	0.768
2 Minute	124.2±8.735	123.07±7.565	125.2±9.535	0.669
4 Minute	123.93±8.03	122.33±7.884	122.2±7.208	0.847
6 Minute	120.73±5.741	119.87±5.847	118.73±6.179	0.541
8 Minute	121.2±3.727	120.07±4.152	117.6±4.438	0.026*
10 Minute	120.93±3.423	119.73±3.886	116.93±4.025	0.004*
15 Minute	120.6±3.42	118.87±3.702	115.93±3.581	<0.001**
20 Minute	119.67±3.209	118.13±3.401	114.07±2.947	<0.001**
25 Minute	118.33±2.468	117.33±2.845	112.07±2.258	<0.001**
30 Minute	115.2±2.265	115.93±2.703	110.07±2.318	<0.001**
40 Minute	115.8±2.369	114.33±2.294	109.8±2.31	<0.001**
50 Minute	115.6±1.976	113.27±1.929	107.93±0.828	<0.001**
60 Minute	114.93±1.552	112.13±1.737	106.93±1.015	<0.001**
70 Minutes	112.33±2.233	111.4±2.044	111.13±1.871	0.065
80 Minutes	116.07±1.856	115.47±1.889	114.93±2.504	0.119
90 Minutes	117.87±2.03	116.93±1.552	116.27±3.591	0.055

Data are presented in Mean ±SD or absolute numbers. *p value <0.05 is statistically significant and ** p value <0.001 is highly significant statistically

Table 4: Comparison of mean Diastolic blood pressure (mmHg) among the groups.

DBP (mmHg)	Group A (Ondansetron)	Group B (Granisetron)	Group C (Normal saline)	p value
	Mean ±SD	Mean ±SD	Mean ±SD	
Baseline	81.6±3.081	80.2±4.405	79.87±4.455	0.216
Justafter spinal block	79.53±4.023	79.33±4.011	78.67±3.871	0.677
2 Minute	78.13±3.277	77.8±3.253	77.73±3.814	0.891
4 Minute	77.4±2.884	76.53±2.825	76.2±2.894	0.252
6 Minute	76.8±2.858	76.07±2.993	72.93±2.016	<0.001**
8 Minute	75.73±2.815	75.53±2.27	71.93±1.78	<0.001**
10 Minute	75.07±2.716	74.27±2.273	70.27±1.946	<0.001**
15 Minute	74.8±2.657	73.67±2.412	68.47±2.501	<0.001**
20 Minute	73.67±2.412	72.73±2.067	66.6±3.328	<0.001**
25 Minute	72.8±2.14	71.93±2.318	64.47±2.27	<0.001**
30 Minute	71.07±1.799	70.4±2.99	62.8±1.349	<0.001**
40 Minute	70.2±2.31	69.33±1.918	61.13±1.137	<0.001**
50 Minute	69.67±2.294	68.07±0.64	60.07±1.437	<0.001**
60 Minute	68.53±2.097	67.93±0.64	66.6±3.328	0.005*
70 Minutes	72.67±2.644	71.53±2.33	71.73±2.449	0.173
80 Minutes	78.6±3.069	77.4±4.492	77.73±3.814	0.461
90 Minutes	80.6±4.239	80.47±4.508	79.27±3.619	0.393

Data are presented in Mean ±SD or absolute numbers. *p value <0.05 is statistically significant and ** p value <0.001 is highly significant statistically

Table 5: Comparison of average mean arterial pressure (mmHg) among the groups.

MAP (mmHg)	Group A (Ondansetron)	Group B (Granisetron)	Group C (Normal saline)	p value
	Mean ±SD	Mean ±SD	Mean ±SD	
Baseline	81.6±3.081	80.27±4.417	79.73±4.51	0.191
Justafter spinal block	79.53±4.023	79.4±4.005	78.6±3.9	0.618
2 Minute	78.13±3.277	78.07±3.3	77.67±3.827	0.854
4 Minute	77.93±2.545	77.2±2.605	76.2±2.894	0.048*
6 Minute	77.07±2.559	76.13±3.014	72.73±1.929	<0.001**
8 Minute	76.27±2.716	75.8±2.31	71.87±1.737	<0.001**
10 Minute	75.13±2.713	74.4±2.313	70.33±1.971	<0.001**
15 Minute	75.07±2.766	73.73±2.392	68.33±2.523	<0.001**
20 Minute	74.13±2.675	72.8±2.007	66.4±3.169	<0.001**
25 Minute	73.07±2.149	72.07±2.318	64.53±2.285	<0.001**
30 Minute	71.73±2.016	70.13±2.825	62.73±1.23	<0.001**
40 Minute	70.33±2.171	69.4±1.905	61.2±1.126	<0.001**
50 Minute	69.8±2.188	68.2±0.61	59.93±1.53	<0.001**
60 Minute	68.67±2.057	68.07±0.828	66.73±3.216	0.004*
70 Minutes	73.87±2.46	72.93±2.083	72.27±2.449	0.033*
80 Minutes	78.8±2.441	77.47±4.516	77.8±3.8	0.35
90 Minutes	81.67±2.928	80.6±4.613	79.4±3.568	0.072

p value <0.05 is statistically significant and ** p value <0.001 is highly significant statistically

Table 6: Comparison of characteristics of subarachnoid blockade in all the groups.

Characteristics of subarachnoid block	Group A (Ondan) MEAN ±SD	Group B (Graniset) MEAN ±SD	Group C (Control) MEAN ±SD	p value
Time to complete sensory block (mins)	12.4±2.1	12.1±2.3	12.5±1.9	0.76
Time to complete motor block (mins)	10.1±1.3	9.5±2.1	10.21±1.9	0.88
Highest dermatome level of sensory block (T6:T8:T10)	8:16:6	9:15:6	9:16:5	0.432
Time to two segment dermatomal regression (mins)	76.6±17.2	69±17.3	77.4±24.3	0.019*
Time to regression of sensory block to S1 (mins)	176±22	165±19.2	178±21	0.0001**
Time to complete motor block recovery (mins)	169±15.5	168±18.1	170±14.3	0.55

p value <0.05 is statistically significant and ** p value <0.001 is highly significant statistically

Table 7: Intraoperative complications in all the groups.

	Bradycardia (%)	Hypotension (%)	Mephentermine use (%)	Nausea (%)	Shivering (%)
Group A (ondan)	0	3(10)	3(10)	0	2(6.66)
Group B (graniset)	0	4(13.33)	4(13.33)	2(6.66)	1(3.33)
Group C (control)	2(6.66)	12(40)	12(40)	10(33.33)	15(50)
p Value	0.3	0.006	0.008	0.02	0.001

Data are presented in Mean ±SD. p value <0.05 is statistically significant and p value <0.001 is highly significant statistically

Characteristics of subarachnoid blockade

There was statistically significantly less mean time required for two segment dermatomal regression in granisetrone group as compared to ondansetron group and control group (P=0.019). There was statistically significantly less mean time required for regression of sensory block to S1 in group granisetron as compared to group ondansetron and control group (P=0.0001) (Table 6).

Intraoperative complications

There was statistically significant difference in episodes of hypotension, nausea, shivering and use of iv mephentermine among the groups (Table 7).

DISCUSSION

Ondansetron is a selective antagonist at 5 HT 3 receptors. So, it can antagonize effects produces by 5HT3 antgonism by serotonin. Ondansetron may act at cardiac level (enhancing contractility and efficiency) and also at vascular level (stable SVR) via vascular and/or medullar specific receptors.[11] Owczuk R et al, in their study concluded that ondansetron given intravenously attenuates the fall of systolic and mean blood pressure.[12] Granisetron, a 5-HT3 antagonist, was chosen in this study for following reasons: first, animal studies showed the effectiveness of granisetron in the prevention of the Bezold Jarisch reflex which also occurs following spinal anaesthesia due to severe decrease in preload.[13] Second, Tsikouris et al found the role of granisetron for the prevention of neurally mediated hypotension upon head upright tilt testing associated with systemic vasodilatation.[14]

The 5-HT3 binding sites are abundant at the spinal level.[6] These receptors are located in the superficial laminae and substantia gelatinosa of the spinal cord.[7] Although the spinal serotonergic mechanisms in pain modulation are complex, several studies have confirmed the role of 5-HT3 receptors in antinociception and electrophysiologic and behavioral studies in animals have clarified the antinociceptive mechanisms of the descending serotonergic system at the spinal cord level. It directly hyperpolarizes the membrane of substantia gelatinosa neurons, inhibits the excitatory transmitter, glutamate, release from Aδ and C afferent fibers presynaptically and increases the inhibitory transmitters release including γ-aminobutyric acid and glycine from the interneurons. In humans, the cerebrospinal fluid serotonin levels increased three-fold after spinal bupivacaine administration. So, this effect can be antagonized by the selective 5-HT3 receptor antagonists. Granisetron, in contrast to ondansetron, which acts on mixed receptors, strongly and selectively binds to the 5-HT3 receptors with minimal or no affinity for other 5-HT receptors, or dopaminergic, adrenergic, histaminic, and opioid receptors and hence has faster regression of sensory effect in comparison to ondansetron.[15]

The mechanism for 5-HT3- receptor antagonists for prevention of shivering is still unclear but is thought to be related to inhibition of serotonin reuptake on the preoptic anterior hypothalamic region and also serotonin (5-HT) is a critical thermoregulatory neurotransmitter, it decreases core temperature attenuation that triggers shivering.[16]

In present study intravenous ondansetron 4mg, given five minutes before spinal anaesthesia effectively attenuated the fall in systolic blood pressure, diastolic blood pressure, and mean arterial pressure after spinal anaesthesia. Change in heart rate was non-significant when compared to granisetron and normal saline. Intravenous granisetron 2mg, given 5minutes before spinal anaesthesia also significantly attenuates the fall in systolic blood pressure, diastolic blood pressure, mean arterial pressure after spinal anaesthesia. Change in heart rate was non-significant when compared to ondansetron and normal saline. Ondansetron was found to be more effective than granisetron in attenuating the fall in SBP, DBP and MAP after spinal anaesthesia. Faster recovery of sensory block was noticed with granisetron compared to both the ondansetron and saline groups, with no significant differences between the latter two groups. Motor recovery time was similar in all the three groups. Ondansetron was found to be more effective than granisetron in attenuating the fall in SBP, DBP and MAP after spinal anaesthesia. Faster recovery of sensory block was noticed with granisetron compared to both the ondansetron and saline groups, with no significant differences between the latter two groups. Motor recovery time was similar in all the three groups. Lesser incidence of hypotension in ondansetron and granisetron group hence lesser usage of vasopressor (Inj mephentermine) in ondansetron and granisetron group i.e. more hemodynamic stability.

Sayed AEDM et al, in there study of 75 patients who received 4mg Ondansetron, 1mg granisetrone and normal saline 5mins before spinal anesthesia concluded that prophylactic intravenous administration of 4mg ondansetron or 1 mg granisetron 5min before induction of spinal anesthesia in cesarean section can significantly reduces the severity of spinal-induced hypotension, reduce the incidence of nausea, vomiting and shivering. Regression of sensory block was faster with granisetron more than ondansetron and normal saline.[17]

Megahed MAB et al, in their study compared 4mg ondansetron with 1mg granisetron along with control group in 60 patients 5mins before spinal anaesthesia and concluded that there was no significant difference among the three groups in regard of heart rate but there was significant decrease in MAP in control group compared with both ondansetron and granisetron groups. There was significant difference in time to two segment regression and regression to T10, and S1 which were faster in group granisetron than ondansetron and control group but time to motor regression was similar all the three groups. Also, there was significant decrease in incidence of nausea and vomiting and shivering in both ondansetron and granisetron groups compared to control group. While there was no significant difference between group ondansetron and group granisetron. There was significantly higher incidence of shivering in control group compared to both ondansetron and granisetron.[18]

Khalifa OSM et al, in their study compared 1mg granisetron and 4mg ondansetron with traditionally used vasopressor ephedrine along with control group in reducing hypotension following spinal anaesthesia in 80 patients. They concluded that there were significant differences among control group, ondansetron, granisetron, and ephedrine groups, with the least reduction in MAP detected in ondansetron group and the

greatest in control group. They also found significantly reduced usage of phenylephrine as vasopressor in three study drug groups i.e. ondansetron, granisetron and ephedrine. Their results are similar to results of present study.[19]

Rashad M et al, studied the effects of ondansetron and granisetron on sensory regression and motor block of subarachnoid anesthesia and found that there were no significant differences among the three groups in the time to maximum motor block, time to motor recovery by one level, and the time to complete motor recovery. On the other hand, time to two segments sensory block regression in group granisetron was faster than both control group and group ondansetron. Also, regression to T10, T12, and S1 was faster in group granisetron than ondansetron and control group, but no significant differences found between ondansetron and control group. These results are similar to results of present study.[13]

Soltani MS et al, in their study on patients undergoing cystoscopy under spinal anesthesia, found that systemic granisetron had no effect on the duration of sensory and motor block produced by spinal anesthesia with hyperbaric bupivacaine. The difference in the results is probably due to fact that they had given study drug 15min before spinal anesthesia.[20]

CONCLUSION

The present study concluded that intravenous ondansetron (4mg), and granisetron (2mg) were effective agents in attenuating the hemodynamic response of spinal anaesthesia with potential benefit of reduced incidence of nausea shivering hypotension, bradycardia and markedly reduced usage of vasopressor without any other drug related complication, when used prophylactically. The prophylactic therapy with 4mg i.v. ondansetron, given five minutes before spinal anaesthesia appears to be significantly most effective and safe for attenuating haemodynamic response after spinal anaesthesia without affecting the duration of sensory block in patients undergoing infraumbilical surgeries.

ACKNOWLEDGEMENTS

Authors would like to thank All the technical staff and patients of the surgical operating theatres.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kumar A, Inayat U, Rastogi B, Gupta K, Jain M, Tayal A. A comparative evaluation of effect of intravenous premedication with ondansetron versus granisetron on hemodynamics and sensory-motor blockade produced by intrathecal hyperbaric 0.5% bupivacaine. Int J Res Med Sci 2019;7:1886-93.