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To Evaluate the Effect of Prophylactic Intravenous 8 MG Ondansetron for Attenuation of Hypotension and Bradycardia in Caesarean Section under Spinal Anaesthesia

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Abstract

Aim: This prospective, randomized, double blinded study was conducted to evaluate the effect of prophylactic intravenous 8 mg ondansetron for attenuation of hypotension and bradycardia in caesarean section under spinal anaesthesia. *Materials & Methods*: After obtaining the approval from the ethical committee of IGMC Shimla 60 patients of ASA I and II aged 20-40 years undergoing elective caesarean section were included in the study. Group 1 received preloading with ringer lactate (500ml) thirty minutes before surgery and Ondansetron 8 mg in 5 ml NS, 5 minutes before spinal anaesthesia.Group 2 received preloading with ringer lactate (500ml) thirty minutes before surgery and 5 ml NS, 5 minutes before spinal anaesthesia. *Results*: Both the groups were comparable in demographic variables like age, ASA status and duration of surgery ($p>0.05$). The baseline haemodynamic parameters were comparable in both the groups ($p>0.05$). The oxyhaemoglobin saturation was comparable and there was no significant difference in both the study groups ($p>0.05$). The time for fixation of sensory and motor block was similar in both the groups. The heart rate at all the time intervals was comparable in both the groups with higher mean heart rate in Group 1 at 14 minutes and 16 minutes of time interval. The fall in MAP was significantly more ($p=0.018$) in Group 2 than in Group 1 and was seen at 2 minutes onwards whereas it was observed at 10 minutes to 25 minutes in Group 1. The mean phenylephrine consumption was more in Group 2 than in Group 1, 50µgms vs. 23±50µgms respectively, although the p value remained insignificant. ($p=0.091$). In our study we had significant fall in blood pressure at 2 minutes in Group 2 and the vasopressors were used more during the first 10 minutes after subarachnoid block in Group 2 as compared to Group 1. After 10 minutes, 3 patients required them to maintain BP in both the groups. In intra group comparison of blood pressure significant fall in BP from base line was observed at 10 min interval in group 1 ($p=0.002$). Whereas this fall was seen at 2 minutes of subarachnoid block in Group 2 ($p=0.04$). There were no statistically significant untoward effects observed in any of the study groups. Conclusion:- Ondansetron seems to prevent the initial fall in BP during first 10 minutes after subarachnoid block. Though Ondansetron had attenuated hypotension in the first 10 minutes with lower vasopressor usage (13% in Group 1 vs. 40% in Group 2) after spinal anaesthesia in elective caesarean section in our study but since we did not get statistically significant results in vasopressors use after 10 minutes we recommend further studies with bigger sample size to prove the hypothesis that Ondansetron use obtunds the fall in blood pressure in spinal anaesthesia in cesarean section.

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Introduction

Spinal anaesthesia has emerged as the method of choice for majority of elective caesarean section worldwide [1,2]. It is easy to perform, reliable, safe and avoids the depressant effects of anaesthetic drugs and risks involved in managing the airway of the parturient and has the added significant benefit of mother being awake for the birth of her child and this has led to a significant drop in anaesthesia related maternal morbidity and mortality [1,3,4]. Most common side effects are hypotension and bradycardia. It is associated with a decrease in cardiac output and uteroplacental flow which may induce fetal morbidity. It is therefore crucial to prevent and treat it quickly and effectively [5].

Various strategies including physical interventions, intravenous fluids (crystalloids/ colloids) and vasopressor drugs have been used to minimize or prevent spinal anaesthesia induced hypotension. However, many studies showed that they were inefficient and no intervention reliably prevents hypotension during spinal anaesthesia for caesarean section. Pharmacological and animal studies suggest that 5-HT3 (serotonin) may be an important factor associated with inducing the BJR and this effect can be blocked at the 5-HT3 receptor [6]. Ondansetron, a widely used antiemetic and serotonin antagonist has been safely used to blunt the BJR resulting in less bradycardia and hypotension first in animals and later in humans undergoing spinal anaesthesia with varying results.

Based on these considerations, this study was performed to investigate the use of intravenous Ondansetron for prophylaxis of hypotension and bradycardia after spinal anaesthesia in parturient scheduled for an elective caesarean section.

Material and Methods

After obtaining the approval from the ethical committee of IGMC Shimla 60 patients of ASA I and II aged 20-40 years undergoing elective caesarean section were included in the study. Patients were randomized into two groups using random allocation software and blind randomized study was done in which one of the co-guide prepared and delivered the drugs to the patient and maintained the record in the computer. The student in the presence of consultant anaesthesia performed the subarachnoid block. The drugs given to the patient were disclosed at the end of the study. Group 1 received preloading with ringer lactate (500ml) thirty minutes before surgery and Ondansetron 8 mg in 5 ml NS, 5 minutes before spinal anaesthesia. Group 2 received preloading with ringer lactate (500ml) thirty minutes before surgery and 5 ml NS, 5 minutes before spinal anaesthesia.

Patients who had Known hypersensitivity to Ondansetron, anemia in pregnancy, bleeding diathesis, antepartum Hemorrhage, Multiple pregnancy, Chronic Hypertension, Hypertensive disorder in Pregnancy, Patient with renal disease, endocrinopathies, Heart disease in Pregnancy, Existing neurological deficits, prior stroke, neuropathy were excluded from the study.

Patients were assessed a night before the surgery. The GPE was carried out and routine investigations were noted. Informed consent for the participation in the study was taken and all the patients were assigned into two groups using random allocation software. All the patients were explained about the procedure adopted during the operation. Then patients in both study groups were given 0.5 mg tab. alprazolam at bed time prior to the day of surgery. Next day one hour before surgery patients were given ranitidine 50 mg and metoclopramide 10 mg i.v.

On arrival in the operation theatre all non-invasive monitoring was applied and baseline measurements of SBP, DBP, MAP, HR and SpO_2 was recorded. A 500ml of ringer lactate infusion was given over 30 minutes. In Group 1, patients received Ondansetron 8 mg diluted in NS to a total of 10ml given over 1 minute and Group 2 received 10ml saline in the same way and at the same timing. With patient in lateral position sub-arachanoid block was performed at L3-L4 or L2-L3 level and patients received 2ml of hyperbaric (0.5%) bupivacaine and 25µgms of fentanyl intrathecally. Patients were placed in supine position immediately after spinal anaesthesia. Left lateral tilt of 15 degrees was applied by default to all parturients. A sensory block level was assessed by a 25G hypodermic needle by pin prick method in midclavicular line every 2 minutes till the fixation of sensory level at two consecutive times and this was taken as the maximum sensory level. Patients were excluded from the study if the level was found below T6 or higher than T4. Also motor block was assessed every two minutes by the modified Bromage score till score 2 or 1 was achieved and the time was noted and the surgery started.

All haemodynamic parameters were recorded every two minutes till twenty minutes and then every five minutes till the end of the surgery.

Hypotension, defined as a decrease in baseline value of more than or equal to 20% or SBP ≤ 80mm Hg or if MAP < 60mm Hg at consecutive readings, was treated by 100µgms of phenylephrine. The total doses of phenylephrine were recorded during the study period. Bradycardia, defined as HR < 45 b/m, was treated with atropine 0.6 mg i.v. until its resolution. Total doses of atropine used in every patient were noted.

Clinical manifestations of nausea, vomiting, shivering or any other untoward effects were noted. Inj. Tramadol [50mg] i.v was used as analgesic after delivery of the baby and was given only if the parturient so desired and it was recorded. Appropriate statistical analysis was done at the end of the study.

Observations and Results

Table 1: Age distribution of patients between the groups

Groups	N	Mean	Std. Deviation	P-value
Group-I	30	28.67	5.833	0.584
Group-2	30	28.00	3.129	

Table 2: Duration of surgery between the two groups

Groups	N	Mean	Std. Deviation	P-value
Group-I	30	36.50	7.895	0.256
Group-2	30	38.57	6.687	

Haemodynamic Parameters

Heart Rate [table 3, 4, 5]

Table 3: Intergroup comparison of heart rate between group 1 and group 2

	Group	N	Mean	Std. Deviation	P value
Heart rate at 0'	Group 1	30	91.90	15.284	.250
	Group 2	30	87.80	11.822	
Heart rate at 2'	Group 1	30	97.43	18.522	.175
	Group 2	30	91.47	14.982	
Heart rate at 4'	Group 1	30	91.43	18.448	.479
	Group 2	30	88.03	18.485	
Heart rate at 6'	Group 1	30	91.73	15.259	.589
	Group 2	30	89.47	17.031	
Heart rate at 8'	Group 1	30	92.60	14.117	.520
	Group 2	30	90.20	14.616	
Heart rate at 10'	Group 1	30	94.37	15.210	.269
	Group 2	30	90.27	13.149	
Heart rate at 12'	Group 1	30	93.97	14.279	.362
	Group 2	30	90.53	14.663	
Heart rate at 14'	Group 1	30	94.13	11.991	.017
	Group 2	30	86.53	11.916	

Heart rate at 16'	Group 1	30	93.70	11.201	.019
	Group 2	30	86.63	11.556	
Heart rate at 18'	Group 1	30	93.23	11.581	.305
	Group 2	30	90.20	11.115	
Heart rate at 20'	Group 1	30	93.93	11.216	.189
	Group 2	30	89.77	12.977	
Heart rate at 25'	Group 1	30	94.13	13.638	.280
	Group 2	30	90.43	12.607	
Heart rate at 30'	Group 1	28	93.93	12.664	.366
	Group 2	29	90.83	13.011	
Heart rate at 35'	Group 1	20	94.40	12.613	.392
	Group 2	26	90.92	14.159	
Heart rate at 40'	Group 1	13	90.15	7.548	.398
	Group 2	16	86.19	15.140	
Heart rate at 45'	Group 1	3	91.67	15.373	.258
	Group 2	7	77.71	16.978	
Heart rate at 50'	Group 1	2	86.50	13.435	.395
	Group 2	2	73.50	10.607	
Heart rate at 55'	Group 1	1	73.00	00.00	.725
	Group 2	2	77.00	7.071	

Table 4: Intragroup comparison of heart rate in group 1

Group	(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Group 1	0′	2′	-5.533	2.000	.643	-13.059	1.993
		4′	.467	2.411	1.000	-8.607	9.540
		6′	.167	2.755	1.000	-10.202	10.535
		8′	-.700	3.051	1.000	-12.183	10.783
		10′	-2.467	2.688	1.000	-12.584	7.650
		12′	-2.067	3.339	1.000	-14.633	10.499
		14′	-2.233	2.907	1.000	-13.173	8.706
		16′	-1.800	2.847	1.000	-12.514	8.914
		18′	-1.333	2.154	1.000	-9.440	6.773
		20′	-2.033	2.354	1.000	-10.892	6.826
		25′	-2.233	2.370	1.000	-11.153	6.686

Table 5: Intragroup comparison of heart rate in group 2

Group	(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Group 2	0′	2′	-3.667	2.359	1.000	-12.546	5.212
		4′	-.233	3.043	1.000	-11.685	11.218
		6′	-1.667	2.720	1.000	-11.905	8.571
		8′	-2.400	2.430	1.000	-11.545	6.745
		10′	-2.467	2.361	1.000	-11.352	6.418
		12′	-2.733	2.543	1.000	-12.303	6.837
		14′	1.267	2.596	1.000	-8.504	11.037
		16′	1.167	2.001	1.000	-6.365	8.698
		18′	-2.400	2.499	1.000	-11.805	7.005
		20′	-1.967	2.612	1.000	-11.798	7.864
		25′	-2.633	2.692	1.000	-12.766	7.499

Mean Arterial Pressure (Table 6, 7 & 8)

Table 6: Intergroup comparison of map in group 1 and group 2

	Group	N	Mean	Std. Deviation	P value
MAP at 0'	Group 1	30	95.30	11.493	.282
	Group 2	30	92.20	10.607	
MAP at 2'	Group 1	30	89.73	13.901	.009
	Group 2	30	78.93	16.920	
MAP at 4'	Group 1	30	86.53	20.407	.131
	Group 2	30	79.33	15.718	
MAP at 6'	Group 1	30	86.87	13.380	.061
	Group 2	30	80.37	12.997	
MAP at 8'	Group 1	30	85.07	13.501	.076
	Group 2	30	78.40	15.014	
MAP at 10'	Group 1	30	80.67	13.971	.514
	Group 2	30	78.27	14.345	
MAP at 12'	Group 1	30	76.00	12.578	.368
	Group 2	30	78.77	11.001	
MAP at 14'	Group 1	30	75.13	12.950	.749
	Group 2	30	76.03	8.189	
MAP at 16'	Group 1	30	74.87	9.435	.627
	Group 2	30	73.50	12.085	
MAP at 18'	Group 1	30	75.50	10.517	.330
	Group 2	30	72.53	12.752	
MAP at 20'	Group 1	30	74.63	10.611	.508
	Group 2	30	72.73	11.492	
MAP at 25'	Group 1	30	74.27	10.926	.662
	Group 2	30	72.90	13.058	
MAP at 30'	Group 1	28	100.18	122.407	.217
	Group 2	29	71.72	9.691	
MAP at 35'	Group 1	20	77.40	11.119	.131
	Group 2	26	72.69	9.616	
MAP at 40'	Group 1	13	79.46	6.591	.487
	Group 2	16	77.19	9.995	
MAP at 45'	Group 1	3	74.67	3.512	.417
	Group 2	7	81.14	12.496	
MAP at 50'	Group 1	2	78.50	4.950	.423
	Group 2	2	75.00	0.000	
MAP at 55'	Group 1	1	82.00	00.00	.272
	Group 2	2	72.50	3.536	

Table 7: Intragroup comparison of map from base line in group 1

Group	(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Group 1	0′	2′	5.567	2.559	1.000	-4.062	15.196
		4′	8.767	3.697	1.000	-5.148	22.681
		6′	8.433	2.586	.187	-1.300	18.167
		8′	10.233	3.639	.577	-3.463	23.930
		10′	14.633*	3.566	.020	1.215	28.052
		12′	19.300*	3.174	.000	7.357	31.243
		14′	20.167*	3.475	.000	7.089	33.245
		16′	20.433*	2.546	.000	10.852	30.015
		18′	19.800*	2.610	.000	9.979	29.621
		20′	20.667*	2.655	.000	10.673	30.660
		25′	21.033*	2.753	.000	10.672	31.395

Table 8: Intragroup comparison of map from baseline in group 2

Group	(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Group 2	0′	2′	13.267*	2.669	.002	3.222	23.311
		4′	12.867*	2.993	.012	1.604	24.129
		6′	11.833*	2.647	.007	1.871	21.795
		8′	13.800*	2.901	.003	2.882	24.718
		10′	13.933*	3.179	.009	1.968	25.898
		12′	13.433*	2.585	.001	3.703	23.163
		14′	16.167*	2.104	.000	8.248	24.086
		16′	18.700*	2.522	.000	9.208	28.192
		18′	19.667*	2.680	.000	9.579	29.754
		20′	19.467*	2.583	.000	9.747	29.187
		25′	19.300*	2.367	.000	10.392	28.208

Oxyhaemoglobin Saturation (Table 9)

Table 9: Intergroup comparison of spo2 in group 1 and group 2

	Group	N	Mean	Std. Deviation	P value
SPo2 at 0'	Group 1	30	97.13	2.047	.311
	Group 2	30	97.63	1.732	
SPo2 at 2'	Group 1	30	97.53	2.177	.283
	Group 2	30	98.10	1.863	
SPo2 at 4'	Group 1	30	97.90	1.989	.209
	Group 2	30	98.50	1.656	
SPo2 at 6'	Group 1	30	98.33	2.106	.103
	Group 2	30	99.07	1.202	
SPo2 at 8'	Group 1	30	98.27	1.507	.010
	Group 2	30	99.27	1.388	
SPo2 at 10'	Group 1	30	98.43	1.675	.182
	Group 2	30	99.00	1.576	
SPo2 at 12'	Group 1	30	98.43	1.813	.147
	Group 2	30	99.07	1.507	
SPo2 at 14'	Group 1	30	98.30	2.231	.474
	Group 2	30	98.67	1.668	
SPo2 at 16'	Group 1	30	98.63	1.426	.584
	Group 2	30	98.40	1.831	
SPo2 at 18'	Group 1	30	98.40	1.632	.474
	Group 2	30	97.97	2.859	
SPo2 at 20'	Group 1	30	98.17	1.967	.472
	Group 2	30	97.67	3.231	
SPo2 at 25'	Group 1	30	97.60	2.253	.932
	Group 2	30	97.53	3.589	
SPo2 at 30'	Group 1	28	97.14	2.460	.911
	Group 2	30	97.23	3.549	
SPo2 at 35'	Group 1	20	96.40	2.583	.539
	Group 2	27	96.96	3.402	
SPo2 at 40'	Group 1	12	96.50	2.939	.714
	Group 2	17	96.94	3.307	
SPo2 at 45'	Group 1	3	99.33	.577	.741
	Group 2	6	98.83	2.401	
SPo2 at 50'	Group 1	2	98.50	2.121	.860
	Group 2	2	98.00	2.828	
SPo2 at 55'	Group 1	1	100.00	0.000	.667
	Group 2	2	97.50	3.536	

Sensory Assessment

Table 10: Time for fixation sensory block in group 1 and group 2

Group		Level of sensory Block T5	Level of sensory Block T6	N	Mean	Std. Deviation	P value
Time for fixation of sensory Block at 2'	Group 1	17	13	30	5.43	.504	.799
	Group 2	17	13	30	5.47	.507	
Time for Fixation of Sensory Block at 4'	Group 1	20	10	30	5.23	.430	.567
	Group 2	22	08	30	5.30	.466	
Time for Fixation of Sensory Block at 6'	Group 1	21	09	30	5.20	.407	.549
	Group 2	23	07	30	5.27	.450	

Motor Assessment

Table 11: Time for fixation of motor block in group 1 and group 2

	Group	Level of Motor Block 1	Level of Motor Block 2	N	Mean	Std. Deviation	P value
Time for fixation of motor block at 2'	Group 1	17	13	30	1.57	.504	.434
	Group 2	10	20	30	1.67	.479	
Time for fixation of motor block at 4'	Group 1	26	04	30	1.13	.346	.497
	Group 2	24	06	30	1.20	.407	
Time for Fixation of Motor Block at 6'	Group 1	29	01	30	1.03	.183	1.000
	Group 2	29	01	30	1.03	.183	

Untoward effects of itching, pain epigastium and shivering in group 1 and group 2

Table 12:

			Group		Total
			Group 1	Group 2	
Untoward Effect	No	Count	29	28	57
		% within Untoward Effect	50.9%	49.1%	100.0%
		% within group	96.7%	93.3%	95.0%
	Yes	Count	1	2	3
		% within Untoward Effect	33.3%	66.7%	100.0%
		% within group	3.3%	6.7%	5.0%
Untoward Effect	ITCHING	Count	0	1	1
		% within Untoward Effect	.0%	100.0%	100.0%
		% within group	.0%	3.3%	1.7%
	Pain epigastrium	Count	0	1	1
		% within Untoward Effect	.0%	100.0%	100.0%
		% within group	.0%	3.3%	1.7%
	Shivering	Count	1	0	1
		% within Untoward Effect	100.0%	.0%	100.0%
		% within group	3.3%	.0%	1.7%
Total		Count	30	30	60
		% within Untoward Effect	50.0%	50.0%	100.0%
		% within group	100.0%	100.0%	100.0%

Phenylephrine Requirement in Group 1 and Group 2

Table 13:

			Group		Total	P value
			Group 1	Group 2		
Phenylephrine Required	No	Count	24	18	42	
		% within Phenylephrine Required	57.1%	42.9%	100.0%	0.091
		% within group	80.0%	60.0%	70.0%	
	Yes	Count	6	12	18	
		% within Phenylephrine Required	33.3%	66.7%	100.0%	
		% within group	20.0%	40.0%	30.0%	
Total		Count	30	30	60	
		% within Phenylephrine Required	50.0%	50.0%	100.0%	
		% within group	100.0%	100.0%	100.0%	

Mean Dose of Phenylephrine Consumption during First 10 and After 10 Minutes in Group 1 and Group 2

Table 14:

	Group 1		Group 2	
	<10 minutes	>10 minutes	<10 minutes	>10 minutes
No. of patients	4	3	12	3
Mean dose of Phenylephrine	23 ± 50.4 µgms		50 ± 68.2 µgms	

Consumption of Atropine and Tramadol in Group 1 and Group 2

Table 15:

			Group		Total	P value
			Group 1	Group 2		
Tramadol	1	Count	1	1	2	
		% within Tramadol	50.0%	50.0%	100.0%	1.00
		% within group	3.3%	3.3%	3.3%	
Atropine	1	Count	1	1	2	
		% within Atropine	50.0%	50.0%	100.0%	
		% within group	3.3%	3.3%	3.3%	

The results are given in the tabulated form.

Discussion

Use of regional anaesthesia in any kind of procedural pain has become a nearly universal phenomenon. With careful patient selection and supervision, the risk of serious complications from regional anaesthesia is far outweighed by its benefits in high-risk patients undergoing caesarean section.

Spinal anaesthesia is one of the regional techniques commonly used in caesarean section parturients to avoid most of the risks which can happen with general anaesthesia. Side effects of spinal anaesthesia include arterial hypotension and bradycardia [7,8]. Both of them may be induced by sympathetic nerve blockade as well as by the Bezold-Jarisch reflex which may be mediated by peripheral serotonin receptor 5-HT3 type by stimulation of 5-HT3 receptors in vagal nerve endings. Sympathetic blockade from spinal anaesthesia decreases systemic vascular resistance and induces peripheral pooling of blood leading to hypotension. BJR participates in systemic responses to hyper- and hypovolemia. In response to hypovolemia stimulation of cardiac sensory receptors in the left ventricle induces the BJR and results in reflex bradycardia, vasodilatation and hypotension [9,10]. Chemoreceptors are activated in response to decreased blood volume by serotonin

[16] which is released from activated thrombocytes [11]. Activation of 5-HT3 receptors which are G protein coupled, ligand gated fast-ion channels, results in increased efferent vagal nerve activity, frequently producing bradycardia. However bradycardia occurs less frequently than hypotension following spinal anaesthesia [6] ranging from 2.1-4.9% vs. 36.8-52% respectively .

Thus spinal anaesthesia causes vasodilatation, hypotension and bradycardia by sympathetic blockade, the BJR and stimulation of 5-HT3 receptors in vagal nerve endings [11].

Ondansetron, a 5-HT3 receptor antagonist by intravenous administration is one of the methods currently used to treat nausea and vomiting caused by spinal, epidural anaesthesia or general anaesthesia. It also blocks binding of 5-HT from activated platelets to 5-HT3 receptors and alleviates the BJR triggered by 5-HT and thus suppresses further expansion of peripheral vessels and increases blood return to the heart [12].

Ondansetron was shown to attenuate arterial blood pressure drop due to spinal anaesthesia in general study population in a study by Owczuk et al. [34] and in obstetric population by Sahoo et al. [13]. However it was not shown to decrease this risk in obstetric population in a study conducted by Oritz-Gomez et al. [85] and Hajian et al. [15].

We found in our study that there was no difference in the heart rate among the two groups. Our study was in accordance with the study conducted by Marciniak et al. [16] and Hadab et al. [17],who also didn't find any difference between the two groups. Rashad et al. [4] who also found no variation in heart rate between the normal saline and Ondansetron group in their respective studies.

This is in contrast to the study conducted by Palmese et al. [18], Marashi et al. [19] and Trabelsi et al. [20].

In our study the MAP fell from baseline at all the time intervals. At 2 minutes time interval the fall of MAP from baseline was significant and was observed to be in 6% of baseline in Group 1 and 14% of baseline in Group 2 (p=0.009). In intragroup comparison the MAP decreased significantly from baseline at 10 minutes onwards in Group 1 while this decrease was significant much earlier at 2 minutes onwards in Group 2.

Our study was in accordance with the study conducted by Rashad and Farmawy [3], Sahoo et al. [13], Trabelsi et al. [20], Jarineshin et al. [21], Omyma and Khalifa. [22].

In our study vasopressors (Phenylephrine) use was in 6 (20%) patients in Group 1 and 12 patients (40%) in Group 2. The mean dose of phenylephrine was 23 µgms in Group 1 and 50 µgms in Group 2 with p value 0.091. It was also observed that more patients in Group 2 required phenylephrine in first ten minutes of administration of SAB than in Group 1.

Our study was in accordance with the study conducted by Terkawi et al. [23], Oritz-Gomez et al. [19] and Marcinaik et al. [16].

Our study was in accordance with the study conducted by Hajian et al. [15] Marciniak et al. [16] and Terkawi et al. [23], with respect to zero incidence of nausea and vomiting but they observed increased incidence of pruritis in their patients though not significant but unlike our study, they used morphine intrathecally.

In Group 1 of our study one patient (3.3%) was observed with shivering that required administration of 50 mg of tramadol whereas itching and pain epigastrium was observed in one patient each in Group 2 (3.3%). Pain epigastrium was treated with a single 50 mg dose of ranitidine and itching however did not require any treatment. No other untoward effect was found in rest of the patients.

In our study onset of motor block was assessed at 2 minutes, 4 minutes and 6 minutes according to the modified Bromage score and the p value at the entire mentioned time interval remained more than 0.05 which was not significant similar to the study conducted by Owczuk et al. [6] and also Rashad and Farmawy [3]. Thus Ondansetron is not associated with change in the onset of motor blockade.

In our study there was no difference in fixation of sensory block in both the study groups in our study, in accordance with the study conducted by Sahoo et al. [13], Omyma and Khalifa [22], Oritz Gomez et al. [14], Rashad and Farmawy , Eldaba et al. [24] who also observed the time to fixation of sensory level as insignificant between the groups (p>0.05). Further, Samra et al. [25] also concluded that i.v. Ondansetron does not have any effect on the duration of sensory or motor blockade after spinal anaesthesia with hyperbaric bupivacaine.

In contrast, Fassoulaki et al. [26] reported that Ondansetron antagonizes the sensory block, but they used hyperbaric lidocaine in their study.

Conclusion

Ondansetron attenuates hypotension in the first 10 minutes with lower vaspressor usage (13% in Group 1 vs. 40% in Group 2) after spinal anaesthesia in elective caesarean section but we

recommend further studies with bigger sample size to prove the hypothesis that Ondansetron use prevents the fall in blood pressure in spinal anaesthesia in cesarean.

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