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ORIGINAL ARTICLE

Prophylactic Use of Ondansetron for Hypotension Prevention in Cases Undergoing Cesarean Section Post-Spinal Anesthesia

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ABSTRACT

Background: Ondansetron is being administrated to prevent post spinal hypotension and its affects are promising. Globally, researches being conducted to identify the prophylactic effects of ondansetron.
Aim: To determine the frequency of maternal hypotension with or without intravenous administration of ondansetron in cases undergoing cesarean section post-spinal anesthesia.
Study design: Randomized controlled trial
Place and duration of study: Jinnah Postgraduate Medical Centre, Karachi from 1st February 2017 to 1st August 2017.
Methodology: Eighty four pregnant females between 18-35 years of age enrolled for cesarean-section under spinal anesthesia were included. Patients having a history of cardiorespiratory or renal disorders, as well as bradycardia or tachycardia, hypo/hypertension and or hyperglycemia were excluded. The patients were randomly divided into Group A (ondansetron) and Group B (control) by using codes placed in sealed, sequentially numbered envelopes. The mean value of arterial blood pressure and of the heart rate was documented at 3 min interval for 10 minutes and then every 5 minutes till 30 minutes after spinal anesthesia.
Results: The mean age of patients in group A was 26.57±5.28 years and in group B was 26.88±4.62 years. Thirty two (38.10%) were ASA I and 52 (61.90%) were ASA II. The mean age of patients in group A was 39.36±1.65 weeks and in group B was 39.79±1.47 weeks. Mean arterial pressure was 138.44±13.59mmHg. Frequency of maternal hypotension in Group A was seen in 08 (19.05%) while in Group B was seen in 22 (52.38%) patients (p=0.001).
Conclusion: There is less maternal hypotension with intravenous administration of ondansetron in patients undergoing cesarean section under spinal anesthesia.
Keywords: Spinal anesthesia, Hypotension, Ondansetrone

INTRODUCTION

There is a raise in the incidence of cesarean section because of the increase in the maternal and fetal complications[1]. It is estimated that approximately 33% of all births in the United States in 2009 and 15% globally in 2007 were by cesarean sections. Spinal anesthesia is the most selective choice opted by anesthesiologists in majority of elective-cesarean sections (CS)[2]. It is used commonly for CS because of its reliability, safety, easiness to perform, and preventing the side effects of the anesthetic agents by keeping the patients awake intra and post operatively[3,4].

In comparison to the spinal anesthesia, general anesthesia is associated with a high incidence of hemorrhage. Moreover, the rate of failure to intubate is eight to ten times more (1:250 to 1:300) in general population[5,6]. Both of the above problems contribute to a higher rate of maternal death. The popularity of spinal anesthesia has increased, yet it has some complications including maternal hypotension, bradycardia, and postdural puncture headache[7-9].

Maternal hypotension is a common complication and its incidence reported as higher as 80% in several studies[10,11]. Furthermore, it is also associated with other adverse effects such as bradycardia, nausea and vomiting. Maternal hypotension may also result in harmful consequences to both mother and fetus including dyspnea, aspiration, loss of consciousness, cardiac arrest, and fetal acidosis as a result of uteroplacental hypoperfusion[12,13]. The results of ondansetron in preventing spinal hypotension are promising. In a study where the prophylactic effects of ondansetron in preventing spinal hypotension showed that in the interventional group, 16% patients developed hypotension compared to the control group where the frequency was 45%[14,15].

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This study also aimed to find out the frequency of maternal hypotension with or without intravenous administration of ondansetron in patients undertaking cesarean section through spinal anesthesia. Additionally, we hypothesized that, there is less maternal hypotension with intravenous administration of ondansetron in cesarean section patients having spinal anesthesia.

MATERIALS AND METHODS

This randomized-controlled trial approach was used to find out the frequency of maternal hypotension with or without intravenous administration of ondansetron in patients undergoing cesarean section under spinal anesthesia. This study was carried out from 1st February 2017 to 1st August 2017 at the Department of Anesthesiology, Pain and Intensive Care Medicine, Jinnah Postgraduate Medical Centre, Karachi which is one of the largest tertiary care facilities in the country. The calculated sample size was 84 which make 42 in each group by taking Alpha error as 0.05, power of 90%, and taking the previous prevalence of hypotension of 16% in interventional group while 45% in placebo group from the previous study.[15] A Non-probability, consecutive sampling method was used to enroll the participants in this study. Randomization was done through randomly allocating the participants once they showed their agreement for this study. All pregnant females age 18 to 35 years electively admitted for cesarean section under spinal anesthesia, had confirmed Singleton pregnancy on ultrasound, had Gestational age 37 to 42 weeks according to dating scan and scored ASA I or II according to the ASA which is American society of Anesthesiologists, the level as per their history and medical record, and voluntarily consented were enrolled in this study. On the other hand, those patients who had a history of cardiorespiratory and or of renal disorders had preoperative bradycardia, or tachycardia, hypo/hypertension and hyperglycemia reported in their history and

medical record were excluded. Patients were randomly divided into Group A (ondansetron) and Group B (control) by using codes placed in sealed, sequentially numbered envelopes after receiving written informed consent from the patients. The standard monitoring parameters such as baseline noninvasive-systolic, diastolic and heart rate were recorded in the operation theater. A peripheral 18-gauge IV cannula was inserted. All patients were preloaded with Ringer's solution 10 mL/kg over 30min.

In group A, ondansetron (8mg/4ml) was administered intravenously five min before spinal anesthesia. In group B, four ml normal saline was administered intravenously five minutes before spinal anaesthesia. Spinal anesthesia was delivered in the patient in a sitting position within the L3-4 or L4-5 intervertebral-space. A percentage of 0.5% hyperbaric-bupivacaine (2.5 ml) was given post cerebrospinal fluid confirmation through application of25 gauge Quincke spinal-needle. Patients were proximately positioned supine with ten degree head down position. Also, fifteen degree wedge was placed under right hip. Mean arterial blood pressure and heart rate were recorded at three min interval for ten minutes and then after every five minutes till thirty minutes after then induction of spinal anesthesia. All information was recorded. The data was entered and analyzed through SPSS-25.0. Chi-square test was functional to see the significance between the intervention and control group. A p value of less than 0.05 was considered as significant.

RESULTS

The mean age of the cases was 26.73±4.93 years with a limit between 18-35 years .Group wise mean value for group A was calculated as 26.57±5.28 years while for group B it was calculated as 26.88±4.62 years. Maximum number of patients (55.95%) was within the age limit of 26 to 35 years of age. There were 17(40.47) females belonged to ASA I and 25(59.53%) females belonged to ASA II in group A while in group B, 15(35.71%) females belonged to ASA I and 27(64.29%) females belonged to ASA II. The mean gestational age of patients in group A was 39.36±1.65 weeks and in group B was 39.79±1.47 weeks (Table 1).

Frequency of maternal hypotension in Group A was seen in 8(19.05%) while in Group B was seen in 22(52.38%) patients with significant (P=0.001) difference between maternal hypotension in both groups (Table 2).

Table 1: Demographic information of females within groups (n=84)

Variable	Group A (n=42)		Group B (n=42)	
	No.	%	No.	%
Age (years)				
18 – 25	19	45.24	18	42.86
26 – 35	23	54.76	24	57.14
ASA Status				
ASA I	17	40.47	15	35.71
ASA II	25	59.53	27	64.29
Gestational age (weeks)				
37 – 39	23	54.76	21	50.0
40 – 42	19	45.24	21	50.0

Table 2: Comparison of maternal hypotension in both groups

Maternal hypotension	Group A (n=42)		Group B (n=42)	
	No.	%	No.	%
Yes	8	19.05	22	52.38
No	34	80.95	20	47.62

P<0.001 (Significant)

DISCUSSION

Maternal-hypotension is considered as one of the common intraoperative complications found in cases of post spinal-anesthesia during cesarean delivery. It has an incidence value as 50-80%.[16,17] It has been demonstrated that ondansetron treatment preloading with crystalloid infusion reduces maternal hypotension in parturient women undergoing cesarean delivery[18,19].

Recently ondansetron is studied to prevent post spinal hypotension and its results are promising. Prophylactic effects of ondansetron were studied for the hypotension prevention post spinal anesthesia. Its results showed that hypotension occurred in 16% of cases in ondansetron group while in placebo group 45% patients developed hypotension[15].

It was observed through a meta-analysis that intravenous administration of ondansetron decreases the hypotension incidence in both groups (RR, 0.64; CI, 0.45-0.90) as well as in the group of cesarean deliveries (RR, 0.63; CI, 0.45-0.88). In cases of bradycardia, or intravenous ondansetron there was a decreased overall risk found with a RR as 0.31; CI, 0.19-0.50.[20] Various other randomized trials have documented hypotension incidence in elective cesarean cases to be significantly reduced in cases of hypotension when compared with those cases receiving placebo. Other research trials presented ondansetron intravenous to attenuate maternal hypotension (RR, 0.63; CI, 0.45-0.88).[21-24] Heterogeneity was subordinated in cases as compared with the all-meta-analysis protocols (I^2 =68% vs I^2 =73%). There were however some cases in the "O" group experiencing hypotension in comparison with those presented in C group with a percentage as 37.5% and 77.5% respectively[21].

Wang et al[25] related the prophylactic-efficacy of variant ondansetron doses (2, 4, 6 and 8 mg) to the normal saline as placebo in order to cause prevention of hypotension in cases undergoing cesarean section with administration of spinal anesthesia. It was found that dosage 4 and 6 mg of ondansetron were considered as optimal dosage for maternal-hypotension prevention. Similarly, Marashi et al[26] initiated a research in which two unlike dosage of ondansetron as, 6 and 12 mg, were administered intravenously. These doses suggestively reduced spinal-induced hypotension as well as bradycardia in comparison to control saline group. Sahoo et al[27] determined that intravenous ondansetron in a dose of 4mg delivered prophylactically can decreases levels of blood pressure post spinal anesthesia. Similarly, Demirhan et al[28] elaborated in his research that 8 mg intravenous ondansetron weakens systolic decrease as well as that of mean blood pressure without having any effect on diastolic blood pressure/heart rate.

Other twenty-one various randomized control trials presented data where during cesarean section under spinal anesthesiathe ondansetron administered groups had a reduced nausea and vomiting risks as well as of bradycardia in patients compared to the placebo group. Pruritus, hypotension, or shivering incidence remained insignificantly changed during cesarean section under spinal anesthesia[29].

CONCLUSION

There is less maternal hypotension with intravenous administration of ondansetron in patients who underwent cesarean section under spinal anesthesia.

We recommend that intravenous administration of ondansetron in patients who underwent cesarean section under spinal anesthesiashould be applied routinely in general practice for preventing maternal hypotension and managing patients undergoing spinal anesthesia.

Conflict of interest: Nil

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