Spinal Hypotension in Women Undergoing Elective Caesarean Section after Spinal Anaesthesia with and without Prophylactic Ondansetron

Umar Iqbal[1], Sidra Batool[2], Ahsan Khan[1], Muhammad Saqib[2], Muhammad Zahid Hanif[2], Fareeha Sheikh[1]

ABSTRACT

Background: Spinal hypotension is a frequent complication of spinal anesthesia in females during caesarean section. It can result in adverse perinatal outcomes such as maternal nausea and vomiting, fetal acidosis and is an important contributory factor in maternal mortality related to regional anesthesia.

Objective: To compare the frequency of spinal hypotension following spinal anaesthesia in women undergoing elective caesarean section with and without prophylactic ondansetron with reference to the baseline characteristics.

Material and Methods: This comparative randomized trail included 100 pregnant women aged between 18-35 years (means 26.50 ± 5 years) undergoing elective cesarean section under spinal anesthesia. These patients were randomly divided into two groups. In Group-A conventional pre-operative treatment whereas to Group-B received additional dose of 4mg prophylactic ondansetron. This research was jointly conducted from February, 2017 toAugust, 2017 at department of Anesthesia,Arif Memorial Teaching Hospital, affiliated with Rashid Latif Medical College and Lahore General Hospital, Lahore.

Results: The BMI of the patients was 27.93±4.45 Kg/m^2. Mean baseline systolic blood pressure of the patients was 119.13±10.57 mmHg. The frequency of hypotension was significantly lower in patients who received prophylactic ondansetron (34.0% vs. 64.0%; p=0.003) as compared to controls. Similar differences were observed regardless of age, BMI and baseline systolic blood pressure groups.

Conclusion: Prophylactic ondansetron significantly reduced the frequency of spinal hypotension in women undergoing elective cesarean section under spinal anesthesia which favors its routine use in future practice.

***Key Words**: Cesarean Section, Spinal Hypotension, Prophylactic Ondansetron*

This article may be cited as: Iqbal U, Batool S, Khan A, Saqib M, Hanif ZM, Sheikh F. Spinal Hypotension in Women Undergoing Elective Caesarean Section after spinal anaesthesia with and without Prophylactic Ondansetron. J Saidu Med Coll Swat 2019;9(2):225-7

INTRODUCTION

Spinal anesthesia is currently gold standard for cesarean section. Main drawback of spinal anesthesia is spinal hypotension. Various interventions like preoperative and intra-operative intravenous fluids as well as vasopressor drugs can minimize the effect of spinal anesthesia induced hypotension. Recently a systematic review has shown that prophylactic ondansetron with spinal anesthesia has better results as compared to vasopressor drugs.[1]

Blockade of sympathetic fibers after spinal anesthesia leads to a drop in systemic vascular resistance which in turn induces hypotension. Bezold-Jarisch reflex is thought to be a contributing factor in spinal-induced bradycardia.[2] Serotonin receptors within the wall of ventricles are stimulated as a result of increased parasympathetic and decreased sympathetic activity leading to bradycardia. This reflex is thought to be blunted by serotonin antagonist ondansetron given prophylactically prior to spinal anesthesia.[3]

A randomized study conducted in Egypt revealed that administration of 4 mg prophylactic ondansetron prior to anesthesia reduces the heart rate as well as chances of nausea and vomiting.[4] Similarly another study documented that 8 mg of ondansetron, 5 minutes prior to subarachnoid block, was found effective in decreasing frequency of hypotension and bradycardia in elderly patient.[5] Whereas another study revealed no significant difference regarding incidence of spinal anesthesia induced hypotension between the prophylactic ondansetron and saline group in patients undergoing elective cesarean section.[6]

The recent studies have shown that overall prophylactic ondansetron is effective but demographic factors are not been addressed in detail. The current study is conducted to determine its effect in subjects of different ages and BMI groups undergoing elective caesarian section.

1. Rashid Latif Medical College Lahore
2. Department of Anaesthesia, Lahore General Hospital, Lahore.

Correspondence: Dr Umar Iqbal
Associate Professor of Anaesthesiology,
Rashid Latif Medical College Lahore
Email: umer8808@gmail.com

Received: June 12, ,2019, Accepted: November 01, 2019

MATERIAL AND METHODS

The randomized controlled trial was conducted at Department of Anesthesia, Arif Memorial Teaching Hospital affiliated with Rashid Latif Medical College and Lahore General Hospital, Lahore. 100 patients were randomly selected. 50 patients were randomly allocated to study group who were administered prophylactic ondansetron 4mg, five minutes prior to anesthesia and 50 patients were included in the control group which received no prophylaxis. Patients with age in the range of 18-35 years, at 37-42 weeks of gestation as per obstetric ultrasound and undergoing elective cesarean section were included in the study. All patients belonged to American Society of Anesthesiology (ASA) status-1 whereas Patients having heart disease, lung disease, bilirubin =1.2 mg/dl, renal (serum creatinine >1.5mg/dl) disorders, history of hypertension (B.P =140/95 mm Hg) or taking anti-hypertensive medications as per history and clinical record, and bleeding disorder (INR=1.5) as per history and clinical record were not included in the study. Hypotension was defined as a 20% drop in systolic blood pressure from baseline. Baseline blood pressure was checked prior to ondansetron injection in the preoperative area. Intraoperatively, monitoring was done at five minutes interval and then every fifteen minutes for one hour post operatively.

RESULTS

Baseline characteristics of both groups were comparable. Mean age of the patients was 26.50±5.06 years. Most of the patients were aged between 26-35 years (53.0%) followed by 18-25 years (47.0%). The mean BMI of the patients was 20.3 27.93±4.45 Kg/m^2. BMI of 35.0% was 20-25Kg/m^2 (Normal BMI), 24.0% was 25-30Kg/m^2(Overweight) and 41% was 30-35 Kg/m^2 (Obese) while the baseline systolic blood pressure was 119.13±10.57 mmHg.

Table 1: Comparison of hypotension between control and ondansetron group

Variables	Categories	No ondansetron 50 (50.0%)	Ondansetron 50 (50.0%)	p-value
Spinal hypotension	**Absent**	32 (64%.0%)	17 (34.0%)	**0.003***
	Present	18 (36.0%)	33 (66.%)	

*p-value significant at 0.050

Table 2: Comparison of hypotension between Study Groups across Age and BMI Groups

	Group	Spinal Hypotension	Ondansetron n=50	Controls n=50	P value
Age	**18-25 years (n=47)**	**Yes**	8 (33.3%)	15 (65.2%)	0.029*
		No	16 (66.7%)	8 (34.8%)	
		Total	24 (100%)	23 (100%)	
	26-35 years (n=53)	**Yes**	9 (34.6%)	17 (63.0%)	0.039*
		No	17 (65.4%)	10 (37.0%)	
		Total	26 (100%)	27 (100%)	
BMI	**20-25 Kg/m^2 (n=35)**	**Yes**	6 (31.6%)	10 (62.5%)	0.067
		No	13 (68.4%)	6 (37.5%)	
		Total	19 (100%)	16 (100%)	
	25-30 Kg/m^2 (n=24)	**Yes**	4 (33.3%)	8 (66.7%)	0.102
		No	8 (66.7%)	4 (33.3%)	
		Total	12 (100%)	12 (100%)	
	30-35 Kg/m^2 (n=41)	**Yes**	7 (36.8%)	14 (63.6%)	0.087
		No	12 (63.2%)	8 (36.4%)	
		Total	19 (100%)	22 (100%)	

*p-value significant at 0.050

DISCUSSION

In the present study, we observed that prophylactic ondansetron significantly reduced the frequency of spinal hypotension (34.0% vs. 64.0%; p=0.003) as compared to controls. Abbas et al in an identical study also reported similar difference in the frequency of spinal hypotension with and without ondansetron (42.0% vs. 72.0%; p=0.009) in pregnant women undergoing cesarean section under spinal anesthesia in our population.[7]

A study conducted by M. Oofuwong and colleagues found that a weight-based dose of prophylactic ondansetron did not influence the incidence the incidence of maternal hypotension.[8] Similarly, this effect was uniformly seen in all age groups and across all BMI subgroups. There was no statistically significant difference due to weight changes or baseline blood pressure on the effect of ondansteron in reduction of hypotension. Thus the results of the our study support the existing research evidence in favor of prophylactic ondansetron and establish that prophylactic ondansetron (4mg) significantly reduces the occurrence of spinal hypotension in pregnant women undergoing cesarean section under spinal anesthesia.

There has been a lot of research and consensus in prophylactic use of ondansetron to prevent post-operative nausea and vomiting.[9] These actions alongwith avoidance of spinal hypotension are desirable and can improve the recovery of the patient. However, ondansetron prevents vomiting or the need for rescue medication more effectively when administered nears the end of surgery, probably because of its short half life.[10] The commonest side effects of ondansetron include headache (8-42%), transaminitis (17%), diarrhea (2-5%), xerostomia (5-17%), dizziness (5%) and constipation. Extrapyramidal reactions have been observed at < 1% in adults while two cases were reported in children. So whether a pre-operative dose of prophylactic ondansetron to avoid spinal hypotension can avoid post-operative nausea and vomiting or will an extra dose close to the end of surgery will be required as well is a matter of further investigation. Also in the present study we did not considered the side effects of this pre-operative administration of ondansetron which should also be evaluated before adopting it in routine practice. Such a study is highly recommended in future research.

CONCLUSION

Prophylactic ondansetron significantly reduced the frequency of spinal hypotension in women undergoing elective cesarean section under spinal anesthesia which favors its routine use in future practice.

REFERENCES

1. Gao L, Zheng G, Han J, Wang Y, Zheng J. Effects of prophylactic ondansetron on spinal anesthesia-induced hypotension: a meta-analysis. *International Journal of Obstetric Anesthesia.* 2015; 24(4): 335-43
2. Campagna JA, Cartner C.. Clinical relevance of BezoldJarisch reflex. *J Am Soc Anesthesiol*. 2003;98(5): 1250-1260
3. Lahsaei SM, Amini A, Tabatabei SM, Mehrabani G.. A comparison between cetirizine and ondansetron in preventing postoperative nausea and vomiting in adults. *J Res Med Sci*. 2012; 17(8): 760-763
4. Shabana A, Elkholy N, Mohamed A, Abdel Hamid M. Effect of ondansetron on hypotension and bradycardia associated with spinal anesthesia during cesarean section. *Menoufia Medical Journal*. 2018; 31(1): 12-7
5. Syed Ali Raza Ali Shah, Syeda Sarah Naqvi, Abbas MA. Efficacy of prophylactic intravenous administration of ondansetron for prevention of spinal anesthesia induced hypotension in elderly patients. *Anaesthesia, Pain & Intensive Care*. 2019; 17(20): 4
6. Karacaer F, Biricik E, Ünal İ, Büyükkurt S, Ünlügenç H.. Does prophylactic ondansetron reduce norepinephrine consumption in patients undergoing cesarean section with spinal anesthesia?. *Journal of Anesthesia*.2018;e.g. 32(1): 90-7
7. Naseem A, Syed Ali Raza S, Syeda Sara N. Role of prophylactic ondansetron for prevention of spinal anesthesia induced hypotension in lower segment caesarean section. Pak Armed Forces Med J 2016;66:790-4.
8. Oofuvong. BMC Anesthesiology (2018) 18:105
9. Tramer MR, Reynolds DJM, Moore RA. Efficacy, dose-response, and safety of ondansetron in prevention of postoperative nausea and vomiting: a qualitative systematic review of randomized placebo-controlled trials. Anesthesiology 1997;87:1277-89.
10. Cruz NI, Portila P, Vela RE. Timing of ondansetron administration to prevent postoperative nausea and vomiting. Clin Pharmacol Ther 2008;27:43-7.