Effect Of Preoprative Ondansetron On Spinal Induced Hypotension In Obstetric And Non-Obstetric Patients

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ABSTRACT:
The aim of the study is to study the effect of preoperative intravenous Ondansetron on spinal induced hypotension in obstetric and non-obstetric patients. Primary objective of this prospective randomized double blind study is to find whether intravenous Ondansetron given prophylactically prevent spinal anaesthesia induced hypotension. Secondary objective is to observe effect of intravenous Ondansetron given prophylactically on pulse, nausea, vomiting and shivering. An observational randomized double blind study was done from 12/2018 to 9/2019 in tertiary care hospital of western Maharashtra after approval of institutional ethical committee (IEC/406). 122 patients ASA –I & ASA-II in age group of 18years to 60 years scheduled to undergo obstetric (caesarean section) and non-obstetric (infraumblical) surgeries under spinal anaestheisa were randomly divided into 4 groups. The study concluded that 4 mg Ondansetron when given intravenous prevent spinal induced hypotension in obstretic patients for caesarean section as well as in patients undergoing infraumblical surgeries which are most common surgeries performed in indian scenario.

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INTRODUCTION

Spinal anaesthesia is most commonly used regional anaesthesia technique for caesarean section as well as infraumblical surgeries because of well known advantages. Hypotension is the most common complication of spinal anaesthesia along with shivering and nausea. With criteria of a 20% drop from baseline blood pressure as spinal hypotension, 70–80% incidence of spinal hypotension is reported[2] in obstetric patients and in non-obstetric population studies have shown incidences of hypotension around 33%[5] . Bezold–Jarisch cardio inhibitory receptors are likely to be involved in maintenance of normal blood pressure and also during hypovolemia.[5] Hypotension in spinal anaesthesia is mainly caused by sympathetic blockade. Increased baroreceptor activity by Bezold Jarisch reflex has little role[9]. Ondansetron is commonly used to prevent nausea and vomiting. Ondansetron is selective antagonist to serotonin 5-HT3 receptor and thus prevent Bezold-Jarisch reflex (BJR). Prevention is always better than cure, and so in this study, whether use of routinely used Ondansetron drug can be used as prophylaxis for spinal hypotension was studied to further add on to available little evidence. It was used for patient which form bulk

of surgical patient in India in terms of surgery and age group[10].

METHODS:

An observational randomized double blind study was done from 12/2018 to 9/2019 in tertiary care hospital of western Maharashtra after approval of institutional ethical committee (IEC/406). 122 patients ASA –I & ASA-II in age group of 18years to 60 years scheduled to undergo obstetric (caesarean section) and non-obstetric (infraumblical) surgeries under spinal anaestheisa were randomly divided into 4 groups: Group CS O: 33 obstetric patient posted for elective caesarean section will receive intravenous Ondansetron 4 mg diluted to 10 ml with normal saline 5 minute prior to spinal anaesthesia. Group CS N: 33 obstetric patient posted for elective caesarean section will receive intravenous 10 ml normal saline 5 minute prior to spinal anaesthesia. Group SX O: 33 non obstetric patient posted for infraumblical surgeries will receive intravenous Ondansetron 4 mg diluted to 10 ml with normal saline 5 minute prior to spinal anaesthesia. Group SX N: 33 non obstetric patient posted for elective infraumblical surgeries intravenous will receive 10 ml normal saline 5 minute prior to spinal anaesthesia. Inclusion criteria: age 18 to 60 years, ASA PS(American society of anaesthesiologist Physical status) grade I& II, posted for elective surgeries under spinal anaesthesia. Exclusion criteria: Patient refusal, Patients with cardiovascular or respiratory disorders, hypertension, diabetes, electrolyte imbalance, hemoglobin concentration less than 10 gm. %, weight more than 80 kg, height < 150 cm, patient with autonomic neuropathy, on medication with direct cardiac effects as beta blockers, coagulopathy, hypersensitivity to drugs used and patients on antidepressants in the form of serotonin antagonists were not included in the study.

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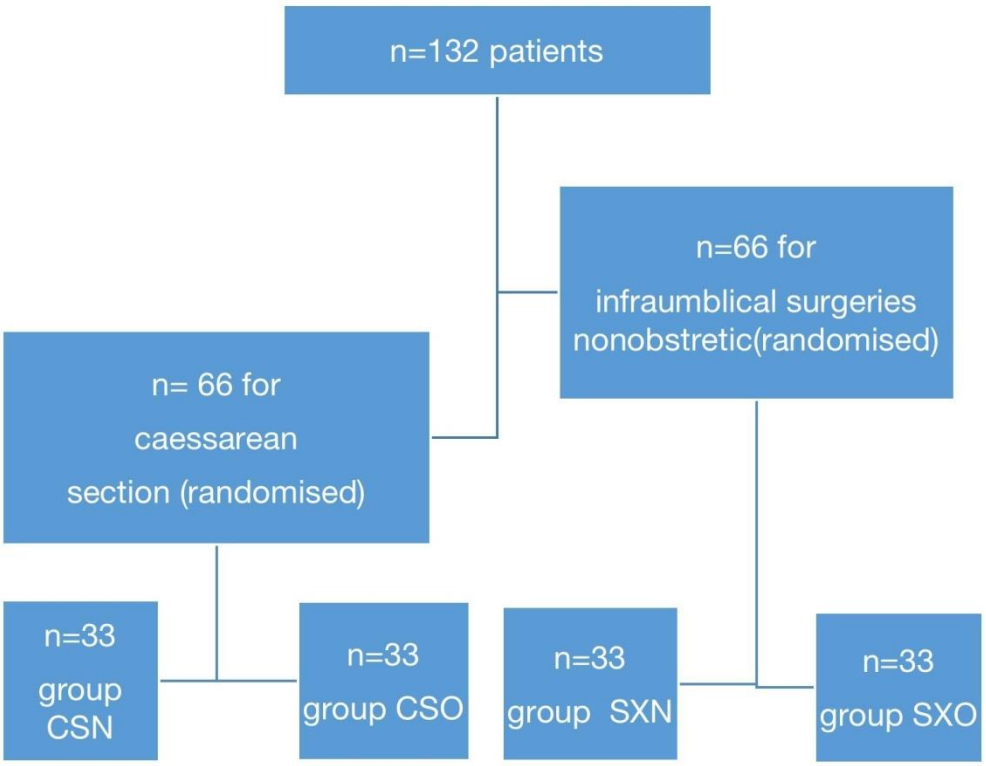

Figure 1 flowchart of participant

Patients will be informed about the procedure and written informed consent is obtained.

Preoperative parameters such as pulse rate, ECG, noninvasive blood pressure, oxygen saturation measured. Patients were given intravenous Ondansetron diluted to 10 ml with normal saline5 minute prior to spinal anaesthesia for group CS O&SX O While patients in group CS N&SX N will receive 10 ml normal saline 5 minutes prior to spinal anaesthesia. Subarachnoid block was given using a 26 gauge spinal needle at L3-4 interspace in sitting position, 2-3 ml of 0.5% hyperbaric bupivacaine injected intrathecally according to type of surgery. Sensory level of T6 was checked by pinprick and then surgery was started. All patients were coloaded with10ml/kg crystalloid Ringer lactate. After spinal anaesthesia pulse rate, ECG, systolic blood pressure (sbp), diastolic blood pressure (dbp), mean arterial pressure (map) were recorded every 5 minute for 60 minutes. Note of any incidence of shivering, nausea and total dose of Ephedrine and Atropine needed was made. Patient were given 6 mg of ephedrine if MAP fall below 65 mmHg as absolute value as it is more objective. Both absolute (MAP <65) and relative (reduction >20%) are used to define intraoperative hypotension and study have shown that both have comparable power of discrimination for end organ injuries [3] Patients were given intravenous atropine 0.6 mg if heart rate fall below 50 beats per minute (bpm) and were given inj tramadol 50 mg intravenous for shivering and inj metoclopramide intravenous 10 mg for persistent nausea.

STATISTICS

As per previous studies (ref T. Sahoo) [1] mean arterial pressure (map) observed in groups O 88 +/-11.7 and group S82.5 +/-10.5 at 5 min .considering above information at Type I error of alpha =0.05 and Type II error beta =20% that is power of test is 80% with 5% effect size, estimated sample size is 33 patients in each group total 122 patients. Statistical analysis was performed with Microsoft excel. Mean, Median, standard deviation and t test were used. Statistical t test was used for hypotension i.e. MAP less than 65 mmHg. Data are presented as mean (SD) and $P<0.05$ considered as statistically significant.

RESULTS

Total hundred and twenty two patients were involved in the study n=33 in each of four group .Demographic data of patients in each group are shown in table 1are comparable.

	SX O	SX N
Age , mean (SD)(YR)	36.181(11.90)	35.908(10.22)
Weight , mean (SD) (cm)	66.575(5.35)	69.935(4.40)
Height , mean (SD)(kg)	166.727(3.84)	168.356(3.17)

Table 1

	CS O	CS N
Age , mean (SD) (YR)	26.090(3.34)	25.787(3.47)
Weight , mean (SD)(cm)	66.272(3.21)	68.788(3.069)
Height , mean (SD)(kg)	165.575(3.02)	165.0303(3.91)

Table 2

Hypotension was observed in surgical (SXN) and caesarean group (CSN) where Ondansetron was not used .Maximum difference was observed at 25 to 35 minute from spinal anaesthesia and then it was not that much .Difference was significant when compared to surgical (SXO) and caesarean (CSO) group where Ondansetron was used.

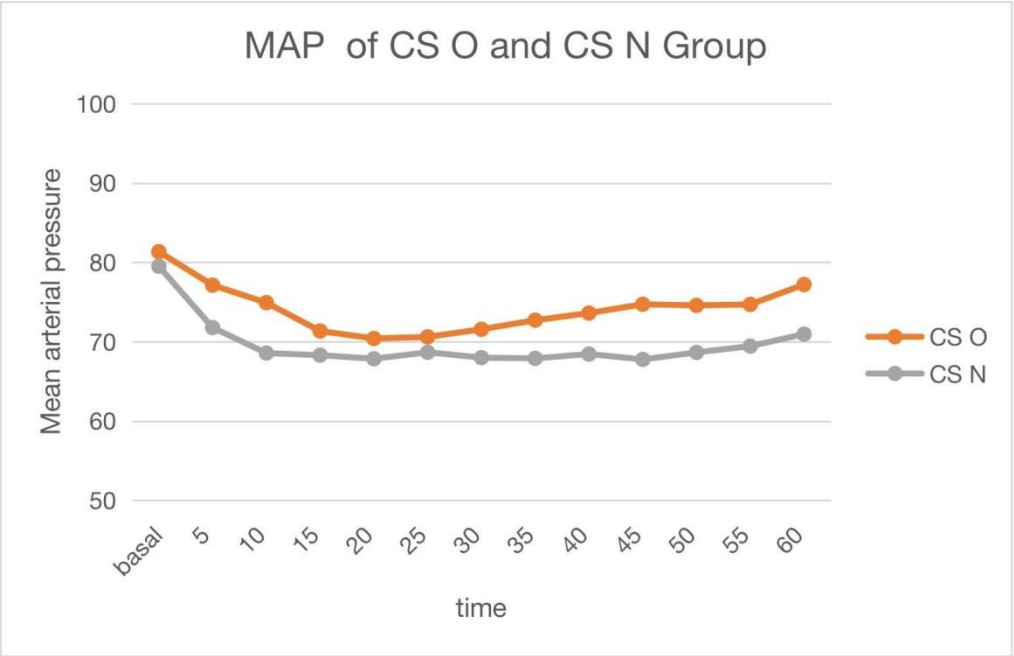

Figure2

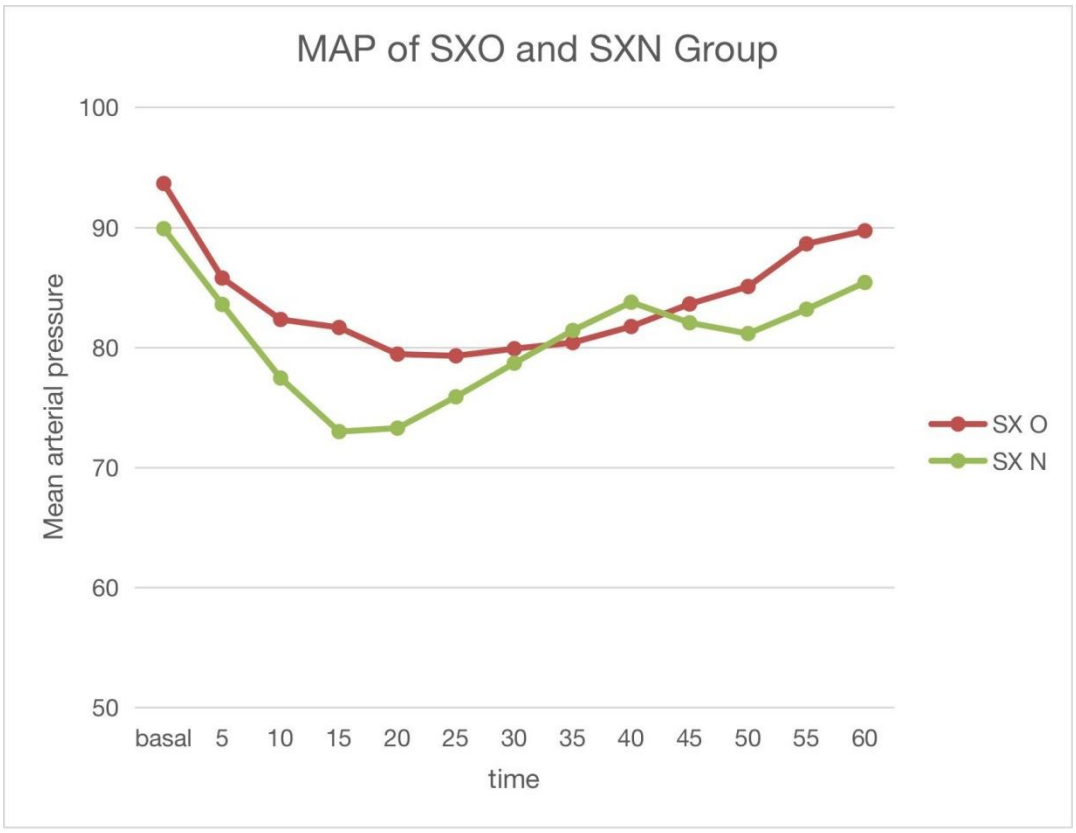

Figure3

It was also observed that vasopressor (ephedrine) was used 81 times in CSN in

comparison to CS O GROUP where it was used 18 times.

	Cs O ephedrine use frequency	Cs N ephedrine usefrequency
Basal	0	0
5 Min	1	4
10 Min	2	11
15 Min	7	7
20 Min	4	8
25 Min	1	8
30 Min	1	8
35 Min	1	9
40 Min	1	9
45 Min	0	7
50 Min	0	8
55 Min	0	2
60 Min	0	0
Sum	18	81

Table 3

Similarly in surgical patients ephedrine was used 30 times in SX N GROUP than SX O GROUP where it was used 8 times.

	SXO ephedrine usefrequency	Sx N ephedrine use frequency
Basal	0	0
5 Min	3	2
10 Min	1	1
15 Min	0	6
20 Min	0	6
25 Min	2	4
30 Min	1	4
35 Min	1	4
40 Min	0	1
45 Min	0	2
50 Min	0	0
55 Min	0	0
60 Min	0	0
Sum	8	30

Table4:

DISCUSSION

Hypotension following spinal anaesthesia is a common physiological complication with an incidence ranging from 25-75% among general population and a little higher in patients undergoing caesarean section. In one of the metaanalyasis done by L Gao et al [4] review was done for prophylactic use of Ondansetron for obstetric and non-obstetric case and was found effective. But more studies are for its use in obstetric and elderly non obstetric cases. So in our study we thought to include obstetric and non-obstetric patient of same age group and study the effect of relatively safe drug which if given pre operatively can cater to hypotension, shivering, nausea and bradycardia

all together. In our study we found that Ondansetron when given preoperatively cause reduced spinal induced hypotension not only in obstetric patients but also in non-obstetric non elderly patients. It was also seen that maximum hypotension occurred at 25-35 minutes after spinal anaesthesia in group where Ondansetron was not used later it was stabilized this could because of vasopressor used. One of the metaanalysis found that treatment with Ondansetron is safe, and may reduce post anaesthesia shivering[7] In our study there was no difference in incidence of shivering in both surgical group while in caesarean group there were 5 episode of shivering where Ondansetron was not used. Wang M et al found 4 mg of Ondansetron as the optimal dose for prevention of nausea and vomiting , maternal hypotension, and other adverse events in patients undergoing cesarean [11].In our study also we used 4mg of Ondansetron and found effective to prevent spinal induced hypotension in both caesarean and infraumblical surgery patients and prevent nausea vomiting .There was 4 incidence of bradycardia in caesarean group where Ondansetron was not used. One of the pharmacological study to show gender and age sensitivity of Ondansetron found that Females and elderly showed higher absolute bioavailability for ondansetron[8].With this study we found that it is useful not only in female coming for obstetric but also useful for common surgical population for infraumblical surgical procedures done under spinal anaesthesia .

CONCLUSION

Thus we can conclude that 4 mg Ondansetron when given intravenous prevent spinal induced hypotension in obstretic patients for caesarean section as well as in patients undergoing infraumblical surgeries which are most common surgeries performed in indian scenario.

Limitations

As no one has compared use of Ondansetron in all common surgical group with common age group, we feel large study group is require to confirm results. Moreover as maternal physiology is different it is difficult to substantiate it effectiveness in these patients, though we have not compared obstetric directly to non-obstetric group.

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REFERENCES

1. Sahoo, Tirtha, Chaitali Sendasgupta, Anupam Goswami and Avijit Hazra. “Reduction in Spinal-induced Hypotension With Ondansetron in Parturients Undergoing Cesarean Section: A Double-blind Randomized, Placebo-controlled Study.” *Obstetric Anesthesia Digest* 33 (2013): 31-32.
2. Lee JE, George RB, Habib AS. Spinal-induced hypotension: Incidence, mechanisms, prophylaxis, and management: Summarizing 20 years of research. Best Pract Res Clin Anaesthesiol. 2017 Mar;31(1):57-68. doi: 10.1016/j.bpa.2017.01.001. Epub 2017 Jan 8. PMID: 28625306.

3. Vafi Salmasi, Kamal Maheshwari, Dongsheng Yang, Edward J. Mascha, Asha Singh, Daniel I. Sessler, Andrea Kurz; Relationship between Intraoperative Hypotension, Defined by Either Reduction from Baseline or Absolute Thresholds, and Acute Kidney and Myocardial Injury after Noncardiac Surgery: A Retrospective Cohort Analysis. *Anesthesiology* 2017;126:47–65
4. Gao L, Zheng G, Han J, Wang Y, Zheng J. Effects of prophylactic Ondansetron on spinal anesthesia-induced hypotension: a meta-analysis. Int J Obstet Anesth. 2015 Nov;24(4):335-43. doi: 10.1016/j.ijoa.2015.08.012. Epub 2015 Aug 22. PMID: 26421701.
5. SpencerS. Liu, Susan B. McDonald; Current Issues in Spinal Anesthesia. *Anesthesiology* 2001; 94:888–906 doi: https://doi.org/10.1097/00000542-200105000-00030
6. Campagna JA, Carter C. Clinical relevance of the Bezold-Jarisch reflex. Anesthesiology. 2003 May;98(5):1250-60. doi: 10.1097/00000542-200305000-00030. PMID: 12717149.
7. Li M, Hu X, Tan Y, Yang B, Li K, Tang Z. Meta-analysis of randomized controlled trials on the efficacy and safety of Ondansetron in preventing postanesthesia shivering. Int J Surg. 2016 Nov;35:34-43. doi: 10.1016/j.ijsu.2016.09.009. Epub 2016 Sep 12. PMID: 27632391.
8. Pritchard, J.F., Bryson, J.C., Kernodle, A.E., Benedetti, T.L. and Powell, J.R. (1992), Age and gender effects on Ondansetron pharmacokinetics: Evaluation of healthy aged volunteers. Clinical Pharmacology & Therapeutics, 51: 51- https://doi.org/10.1038/clpt.1992.7
9. Warltier DC, Campagna JA, Carter C. Clinical relevance of the Bezold–Jarisch reflex. The Journal of the American Society of Anesthesiologists. 2003 May 1;98(5):1250-60.
10. Bhandarkar, P., Gadgil, A., Patil, P. *et al.* Estimation of the National Surgical Needs in India by Enumerating the Surgical Procedures in an Urban Community Under Universal Health Coverage. *World J Surg* **45**, 33–40 (2021).
11. Wang M, Zhuo L, Wang Q, Shen MK, Yu YY, Yu JJ, Wang ZP. Efficacy of prophylactic intravenous Ondansetron on the prevention of hypotension during cesarean delivery: a dose-dependent study. Int J Clin Exp Med. 2014 Dec 15;7(12):5210-6. PMID: 25664023; PM nausea,CID: PMC4307470.