Original Article

Comparative efficacy of ondansetron versus granisetron to prevent perioperative nausea and vomiting in patients undergoing gynaecological surgery under spinal anaesthesia

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ABSTRACT

Background: *Posotoprative nausea and vomiting remains a persistent and distressing problem inspite of many advances on perioperative care and anti-emetic drugs. A newer antiemetic drug Granisetron has not been studied in patients undergoing gynaecological surgery under spinal anaesthesia.*

Objective: *A randomized double blind study was conducted to compare Ondansetron and Granisetron for prevention of postoperative nausea and vomiting in patients undergoing gynaecological surgery under spinal anaesthesia.*

Material and methods: *60 consecutive patients, age between 20-65 years, ASA grade I and II undergoing gynaeacologicla surgery under spinal anaesthesia were randomized into two goups of 30 each. One group received intravenous Ondansetron 4.0 mg and the second received intravenous Granisetron 2.0 mg 5 minutes before induction of anaesthesia. For the first 24 hours postoperatively all episodes of nausea and vomiting were recorded. A complete response to the drug was considered if there was no nausea or vomiting and no need for rescue anti-emetic. The observations were tabulated and analysed.*

Results: *During early postoperative period (0-3 hrs) there was statistically no significant difference in the study groups. Statistically significant difference was found in the study groups in the late postoperative period (3-24 hrs).*

Conclusion: *In the early postoperative period both Ondansetron and Granisetron are equally effective in preventing postoperative nausea and vomiting in patients undergoing gynaecological surgery under spinal anaesthesia. Granisetron is better than Ondansetron in the late postoperative period of upto 24 hrs.*

Keywords: *Gynaecological surgery, spinal anesthesia, postoperative nausea and vomiting, ondansetron, granisetron*

Introduction

Nausea and vomiting in the postoperative period (PONV) is a particularly distressing problem for both patients and treating physician.[1] In spite of many antiemetic drugs available, the problem persists and novel methods and medicines continue to be searched for. No single drug is 100% effective in prevention of PONV and combinations have a lot of side effects.[2] Incidence of this complication is less in regional anaesthesia as compared to general anaesthesia but its effects are no less distressing. Post operative nausea and vomiting can add to hospital cost for patient care as it leads to complications such as bleeding, wound dehiscence, electrolyte imbalance, dehydration and aspiration pneumonitis. Gynaecological surgery has been identified as an independent risk factor for PONV.[3] The incidence of PONV is reported to be between 20-30%, but it can increase up to 80% in high risk patients.[4] 5-HT3 receptor antagonists are newer class of antiemetics which have only headache and dizziness as their adverse effects in the doses used for PONV.[5] Commonly used drug Ondansetron is effective on preventing PONV.[6] Granisetron, a recent drug, has been shown to be more potent and longer acting than Ondansetron against emesis caused by Cisplatin.[7]

A randomized double blind study was conducted to compare efficacy of Ondansetron versus Granisetron in patients undergoing gynaecological surgery under spinal anaesthesia, which is a population of patients most likely to suffer from PONV.[8]

Material and methods

Sixty (60) consecutive patients between age 20-65 years, in ASA grade 1-2, undergoing gynaecological surgical procedure under spinal anesthesia were randomized to two groups by computer generated random allocation, one receiving Ondansetron (4 mg intravenous) and the other receiving Granisetron (2 mg intravenous) in perioperative period. All patients' age, weight, height, body mass index (BMI) and the prior history of motion sickness, vertigo, nausea and vomiting will be noted. Patients with prior history of motion sickness, nausea and vomiting, steroid intake within last 24 hours, BMI more than 30, pregnancy and hypersensitivity to anesthetic drugs were excluded from the study.

Patients underwent detailed pre anesthetic checkup which included routine investigations. An informed consent was taken. Patients were kept fasting from 10 PM the day before surgery. Baseline parameters were noted and recorded after shifting the patient to operation theatre. Preloading with Ringer's lactate 10-15 millilitre per kilogram body weight was done and prophylactic dose of antiemetic was given 3-5 minutes before spinal anesthesia. Drugs were given by an investigator not involved in post operative assessment of symptoms. Under all aseptic precautions lumbar puncture was performed in L3-L4 or L4-L5 space using 25 gauge Quincke's needle in lateral decubitus position in midline, 3.0 ml of 0.5 % hyperbaric Bupivacaine was injected after confirming free flow of Cerebrospinal fluid with an aim to obtain level of anaesthesia till $7^{th}/6^{th}$ thoracic vertebra. Standard intraoperative monitoring was done any fall in blood pressure was managed by intravenous (i.v) fluids and injection Mephentermine 3.0 mg i.v. Intramuscular injection of Diclofenac 75 mg was given before shifting the patient for analgesia and prescribed twice a day dose or on request by the patient.

Nausea was defined as an unpleasant sensation with urge to vomit. Vomiting was defined as forceful expulsion of gastric contents from the mouth. Complete response was defined as no nausea or vomiting and no need for rescue antiemetic. Injection Dexamethasone 8.0 mg intravenous was used as rescue antiemetic. All episodes of PONV were recorded by an investigator blinded to the study groups. The results were tabulated and analysed using one way analysis of variance (ANOVA) or using chi-square test.

Results

Patients in both the groups were statistically comparable with respect to age, body mass index and duration of surgery and anesthesia (Table 1, p value > 0.05). During early postoperative period (0-3 hrs) the incidence of PONV in the Ondanseron group was more (nausea – 5; 16.67%, vomiting – 4; 13.3%) as compared to the Granisetron group (nausea 4;13.3%, vomiting 3;10.0%) but the difference was not significant statistically. Similarly, need for rescue antiemetic was in 4(13.3%) patients in Ondansetron group and 3(10.0%) in Granisetron group, which was statistically insignificant. Complete drug response in both groups in early postoperative period was comparable, 22(73.33%) in Ondansetron group, 23 (76.67%), p value > 0.05.

In the late postoperative period 8(26.67%) patients had nausea in Ondansetron group where as 4 (13.3%) patients had nausea in Granisetron group, the difference was statistically significant. Vomiting was present in 6(20.0%) patients in Ondansetron group as compared to 2(6.67%) patients in Granisetron group which was statistically highly significant. (Table 3) In the Ondansetron group rescue antiemetic was needed in 7(23.3%), but in the Granisetron group it was needed in 3(10.0%) again significant statistically. As regards complete response to drug (absence of nausea and vomiting), in the early postoperative period, it was statistically insignificant (Ondansetron 22;73.33%, Granisetron 23;76.67%) In the late postoperative period the difference was statistically significant in favour of Granisetron (Ondansetron 18;60.0%, Granisetron 26; 86,67%) as is evident from table 5. There was minimal incidence of side effects of headache and dizziness

ranging from 3.33%-10.0% across both groups, difference between groups was statistically insignificant (Table 6).

Table 1: Demographic profile

Variables	Ondansetron group	Granisetron group	P value
Age (yrs)	44.03+_11.28	48.06_+11.06	>0.05
BMI(kg/square m)	24.41+_1.58	24.52+_1.36	>0.05
Duration of surgery (min.)	99+_25	98+_20	>0.05

Table 2: Incidence of PONV in early postoperative period (0-3 hrs)

Parameters	Ondansetron group n=30		Granisetron group n=30		P value
	Number	Percentage	Number	Percentage	
Nausea	5	16.67%	4	13.3%	>0.05
Vomiting	4	13.3%	3	10.0%	>0.05
Rescue antiemetic	4	13.3%	3	10.0%	>0.05

Table 3: Incidence of PONV in late postoperative period (3-24 hrs)

Parameters	Ondanseron group n=30		Granisetron group n=30		P value
	Number	Percentage	Number	Percentage	
Nausea	8	26.67%	4	13.3%	<0.05
Vomiting	6	20.0%	2	6.67%	<0.001
Rescue antiemetic	7	23.3%	3	10.0%	<0.05

Table 4: Complete drug response in early postoperative period (0-3 hrs)

Parameter	Ondansetron group n=30		Granisetron group n=30		P value
	Number	Percentage	Number	Percentage	
Complete drug response	22	73.33%	23	76.67%	>0.05

Table 5: Complete drug response in late postoperative period (3-24 hrs)

Parameter	Ondansetron group n=30		Granisetron group n=30		P value
	Number	Percentage	Number	Percentage	
Complete drug response	18	60%	26	86.67%	<0.05

Table 6: Incidence of adverse effects

Adverse effect	Ondansetron group n =30		Granisetron group n=30	
	Number	Percentage	Number	Percentage
Headache	3	10.0%	2	6.67%
Dizziness	2	6.67%	2	6.67%
Others	0	--	0	--

Discussion

PONV is a challenging problem and continues to trouble in spite of many available drugs and advances in surgery and anesthesia. It has many etiological factors including gynaecological surgery, age, weight, pre - existing disease, history of

nausea, vomiting, anxiety and smoking. 5 HT-3 receptor antagonists are effective in preventing emesis caused by radiotherapy and chemotherapy. Ondansetron has been widely used for prevention of PONV. Newer drug, Granisetron, has not been studied for PONV prevention on gynaecology surgery under spinal anesthesia. The doses of drugs used were as reported in previous studies. [9,10]

In the present study both groups were matching with regards to demographic profile and anthropometric parameters. Other parameters such as duration of surgery and anesthesia, intraoperative haemodynamics were also similar. In early postoperative period (0-3 hrs) both Ondansetron and Granisetron were effective in PONV prevention with statistically non-significant difference. The requirement for rescue antiemetic was also similar. This is in congruence with the findings of previous studies of Fujii et al [10], Bhattachary et al. [11] Chaudhari et al did a comparative study of Ondansetron and Granisetron for prevention of PONV in elective lower segment Caesarian section and found Granisetron better during 24 hours of postoperative period. [12] In late postoperative period Granisetron was more effective in preventing PONV than Ondansetron with a statistically significant difference. Variance in need for rescue antiemetic and complete response incidence was statistically significant in favour of Granisetron probably because of long duration of action. Fuji et al found similar incidences of PONV with Granisetron in their study. [13] Headache and dizziness are the most common side effects of 5 HT-3 receptor antagonists. [14] No statistically significant difference was found in the incidence of adverse effects in both groups in our study which is similar as found by Fujji et al [13] and Kim et al. [15]

In conclusion, both Ondansetron and Granisetron were equally effective on preventing PONV in early postoperative period in patients undergoing gynaecological surgery under spinal anesthesia. In the late postoperative period, however, Granisetron was better with lessincidence of PONV and less need for rescue antiemetic. Adverse effects were not significant with either of the drugs.

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