

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

RANDOMIZED COMPARATIVE STUDY OF ONDANSETRON AND COMBINATION OF ONDANSETRON AND DEXAMETHASONE, AS A PROPHYLAXIS OF POST-OPERATIVE NAUSEA AND VOMITING IN ADULTS UNDERGOING ELECTIVE LAPAROSCOPIC SURGERIES



Anaesthesiology

Dr Rumani Ruku* Department of Anaesthesiology and Intensive Care. *Corresponding Author

Dr Jasmeen Chowdhary Department of Anaesthesiology and Intensive Care.

ABSTRACT

Background: Post-operative nausea and vomiting (PONV) is quite associated with laparoscopic surgery. In spite of advances in surgery and post surgical care, nausea and vomiting still has a high incidence. This study was planned to explore the efficacy of a combination therapy of ondansetron with dexamethasone against PONV and compare the results with the efficacy of ondansetron-only.

Method: A randomized clinical trial study was conducted in the Department of Anesthesia, GMC Jammu, over a period of 6 months, on 50 patients in the age group of 18-50 years, of either gender, undergoing laparoscopic surgeries under general anesthesia. Patients were divided into two groups of 25 each: Group A received 4 mg of Ondansetron intravenously, while Group B received 4 mg of Ondansetron and 8 mg of Dexamethasone intravenously, soon after intubation.

Results: The demographic variables of two groups were similar. While 19 (76%) patients showed post-operative nausea in Group A, while in Group B, only 8 (32%) patients experienced nausea, which was very significant. Similarly, 11 (44%) patients showed post-operative vomiting in Group A and only 2 (8%) complained of vomiting. 24% patients did not complain about any kind of nausea or vomiting in Group A. Mild nausea was observed in 60% patients in Group A, while among only 32% patients in group B. No complications of any kind were observed during this study.

Conclusion: Ondansetron and dexamethasone, administered intravenously, after intubation, in laparoscopic surgery, is safe and has a better patient response in preventing post-operative nausea and vomiting.

KEYWORDS

Laparoscopic Surgery, Ondansetron, Dexamethasone, Post-Operative Nausea and Vomiting

INTRODUCTION

Laparoscopic surgery often leads to incidence of post operative nausea and vomiting (PONV), which further causes delayed discharge from hospital. Pain is considered the most common symptom of distress following any surgery and anesthesia and an important peri-operative concern.[1] This pain often leads to nausea and vomiting. Pain tends to receive the most attention post surgery, while nausea and vomiting may be more distressing.[2]

Post operative nausea and vomiting (PONV) is typically used to describe nausea and/or vomiting or retching in the post-anesthesia care unit (PACU) or in the immediate 24 postoperative hours. These symptoms usually peak 2 to 3 days after surgery and then get better. Many people also feel a little dizzy, sleepy, or drowsy. Nausea is defined as feeling sick to stomach and vomiting is defined as forceful expulsion of gastric contents from mouth or retching. Incidence of PONV is still very high even though we have so many new medications available till date. In some studies, PONV was found to be in the range of 20-30% in all post-surgical patients, which may be as high as 80% among high risk patients.[3][4]

There is currently a rapid change going on in the practice from non-opioid to opioid use, use of less emetic anesthetic agents and identification of risk factors. In spite of these advances, nausea and vomiting still has a high incidence having association with surgery and anesthesia.

Persistent nausea and vomiting is bound to exaggerate the trauma of the surgery, having serious medical consequences and financial implication with quite late discharge from the hospital. As the field of ambulatory anesthesia increases, the necessity to find more useful alternatives is becoming imperative.

Dexamethasone is a proven effective drug for reducing PONV in combination with ondansetron.[5] A single dose of dexamethasone (4-8 mg IV) is effective for PONV prophylaxis predominantly when it is combined with other antiemetics. There is no substantiation to get a higher prevention of PONV with a single antiemetic at any dose. Combinations drugs are therefore quite common in search. A more optimal result is expected with combinations, as there could be many causes of PONV and one type of receptor may not be sufficient for mechanism of action. Evidence also suggests that combination of antiemetics act synergistically.[6]

This study was undertaken to compare the efficacy of 'only-ondansetron' with that of combination drug: 'ondansetron with

dexamethasone' in preventing PONV in laparoscopic surgery under general anesthesia.

METHOD

A randomized clinical trial study was undertaken in the Department of Anesthesia, GMC Jammu, over a period of 6 months. A total of 50 patients of either gender undergoing laparoscopic surgeries were included. Patients were randomly divided into two groups: Group A, consisting of 25 patients, received 4 mg of Ondansetron intravenously, while Group B, consisting of 25 patients, received 4 mg of Ondansetron and 8 mg of Dexamethasone intravenously, soon after intubation.

Inclusion Criteria:

- Patients posted for elective laparoscopic surgeries under general anesthesia.
- ASA grade I & II patients in the age group of 18 to 50 years.

Exclusion Criteria:

- Patients below the age of 18 years and above 50 years of age.
- Patients belonging to ASA grade III and IV.
- Pregnant women, patients with history of motion sickness, or patients on chronic steroid therapy
- Patients who had received antiemetic within 24 hours of surgery
- Patients suffering from diabetes mellitus, intestinal obstruction and hiatus hernia, renal and hepatic diseases.

In the pre-anesthetic checking, detailed history and present complaints were noted and examination of cardio vascular, respiratory and central nervous system were done. Routine laboratory investigations were also conducted. In the operative room, Intravenous cannulation with 18G catheter was established. After 3 minutes of preoxygenation, anesthesia was induced with 5 mg/kg thiopentone sodium and relaxed with vecuronium 0.1 mg/kg and ventilated with combination of oxygen, nitrous oxide and isoflurane for 3 minutes and then intubated with 7.5 size cuffed endotracheal tube.

Anesthesia was maintained with O₂ and N₂O at 50:50% with isoflurane 0.5 macs to maintain heart rate and blood pressure near pre-induction values. Muscle paralysis was reversed on completion of surgery, with 0.05 mg/kg neostigmine and 0.015 mg/kg glycopyrrolate. Diclofenac sodium was given for post operative pain. Duration of surgery and anesthesia was noted. Patient was observed for 24 hours post operatively. Instances of nausea, vomiting and pain were recorded hourly for 4 hours and then at the end of 24 hours. Any other complications were also noted. PONV were evaluated using nausea and vomiting score and categorized as severe, moderate and mild.

Calculation of sample-size:

With anticipated incidence of PONV taken as: 30-70%, anticipated difference of PONV between two groups: 20%, margin of error: 5%, power: 70%, minimum sample size came out to be: 36, i.e. 18 in each group.

Ethical clearance was received from Institutional Ethical Committee and statistical analysis was carried out using MS Excel 2010 software and Chi Square test was performed with p-value <0.05 considered as significant.

RESULTS

As all the fifty patients were randomly, but equally distributed into two groups: A and B, each group had 25 patients each. The mean age and mean weight of patients in each group was quite similar, besides the gender distribution among the two groups was also similar. The mean duration of surgery and anesthesia was also similar, with Group A having 60.43 ± 18.39 minutes and 85.64 ± 28.82 minutes respectively. The same was 61.02 ± 19.55 minutes and 87.73 ± 29.26 minutes respectively for Group B patients. (Table 1)

Table 1: Demographic Characteristics Of The Study Groups

Characteristics	Group A (n=25)	Group B (n=25)	P Value
Gender:			
Males	11	10	0.677
Females	14	15	
Age in Years (Mean ± SD)	30.32 ± 5.56	31.43 ± 5.93	0.433
Weight in Kg (Mean ± SD)	51.52	50.43	0.328

*P value <0.05 = significant

Post operative nausea and vomiting was significantly higher among Group A patients, however considerable number of patients (24%) did not complain about any kind of nausea or vomiting in Group A either. On comparison, the number of patients complaining nausea and those having vomiting, it was found that out of the 19 complaining mild to severe nausea, 11 complained about vomiting also. (Table 2,3)

Table 2: Post-operative Nausea Scores

Variable	Group A (n=25) (%)	Group B (n=25) (%)	P Value
Severe	1 (4%)	0 (0%)	<.001*
Moderate	3 (12%)	0 (0%)	
Mild	15 (60%)	8 (32%)	
No Nausea	6 (24%)	17 (68%)	

*P value <0.05 = significant

Table 3: Post-operative Vomiting Scores

Variable	Group A (n=25) (%)	Group B (n=25) (%)	P Value
Severe	1 (4%)	0 (0%)	0.019*
Moderate	3 (12%)	0 (0%)	
Mild	7 (28%)	2 (8%)	
No Vomiting	14 (56%)	23 (92%)	

*P value <0.05 = significant

While 19 (76%) patients showed post-operative nausea in Group A, only 8 (32%) patients showed nausea in Group B, which was very significant. Similarly, 11 (44%) patients showed post-operative vomiting in Group A and only 2 (8%) complained of vomiting.

DISCUSSION

PONV is a common side-effect of general anesthesia during day-care surgeries. It is one of the most important factors that determine the length of hospital stay after ambulatory anesthesia. The contribution of PONV to patients dissatisfaction or distress is such that more than 70% patients considered avoidance of PONV very important.[7]

The set of causes of nausea and vomiting after laparoscopic surgeries are not clear, however, the risk involved in CO₂ insufflation, use of fentanyl and other post-operative opioids, may cause and contribute to it.[8] However, all other kinds of factors, like: hypotension, manipulation of abdominal viscera, were avoided during the study. Ondansetron is a selective 5HT₃ receptor antagonist and it has been shown to be effective in the treatment and prevention of PONV in gynecological laparoscopy, laparoscopic cholecystectomy, etc.

Winokur et al., have shown the role of corticosteroids as antiemetics way back in 1981.[9] The mechanism of action of corticosteroids is unknown, but may be related to inhibition of prostaglandin synthesis, decrease in 5HT₃ level in CNS and by an anti-inflammatory action at operative site.[10] The studies have also shown that the adverse effects of single dose of dexamethasone are rare. A 24 hour or less, therapy of dexamethasone is considered safe and its combination with other antiemetics used prophylactically prevents PONV.[11][12]

Studies have revealed variegated data on the effect of combination therapies and their effect on the incidence of nausea and vomiting in patients after surgeries. In the present study, mild nausea was observed in 60% patients in Group A, while among only 32% patients in group B. Similarly mild vomiting was observed in 28% patients in Group A and among 8% patients in Group B. As a general observation also the overall performance of the combination therapy proved to be useful and quite in agreement to other studies, like that of Gan et al. in 2001 and Bhakta et al. in 2016.[13][14]

It is very important in a resource strived country like India, that a constant vigil is maintained in the research field to achieve cost-effective alternatives and the combination therapy of Ondansetron and dexamethasone can be one such alternative. No complications of any kind were observed during this study.

The limitation of the study was that no track of duration of hospital stay was kept and no follow-up was considered after the discharge of the patient.

CONCLUSION

It can therefore be safely concluded that ondansetron and dexamethasone, administered intravenously, after intubation, in laparoscopic surgery, is safe and quite effective in preventing nausea and vomiting. It has shown better results than that of intravenous ondansetron administered alone.

Acknowledgements: NIL

Declarations:

Funding: Nil

Conflict of interest: None

Ethical approval: Taken

REFERENCES

- Kovac AL. Prevention and treatment of postoperative nausea and vomiting. *Drugs* 2000;59:213-43.
- Joginipally A, Mudgalkar NA. Comparative study of single dose dexamethasone versus ondansetron for control of post-operative nausea and vomiting after high-risk surgeries. *Perspectives in Medical Research*. 2020;8(1):64-70
- Obrink E, Jildenstal P, Oddby E, Jakobsson JG. Post-operative nausea and vomiting: Update on predicting the probability and ways to minimize its occurrence, with focus on ambulatory surgery. *Int J Surg*. 2015;15:100-106.
- Veiga-Gil L, Pueyo J, López-Olaondo L. Postoperative Nausea and Vomiting: Physiopathology, Risk Factors, Prophylaxis and Treatment. *Rev Esp Anestesiol Reanim*. 2017;64(4):223-232.
- Cao X, White PF, Ma H. An update on the management of postoperative nausea and vomiting. *J Anesth*. 2017;31(4):617-626.
- Lopez JL, Cadahia PD, Noalles MJ, Cortés TS, Navarro PA. Perioperative Factors That Contribute to Postoperative Pain and/or Nausea and Vomiting in Ambulatory Laparoscopic Surgery. *Rev Esp Anestesiol Reanim*. 2019;66(4):189-198.
- Miller RD, Millers Anesthesia. Philadelphia: Elsevier Churchill Livingstone; 2005: 2294-97.
- De Souza DS, Costa AF, Chaves GV. Predisposing factors for postoperative nausea and vomiting in gynecological tumor patients. *Support Care Cancer*. 2016;24(11):4661-4667.
- Winokur SM, Baker JJ et al. (1981) Dexamethasone in the treatment of nausea and vomiting from cancer chemotherapy. *J Med Assoc Ga* 70: 263-264
- Shen YD, Chen CY, Wu CH, Cherng YG, Tam KW. Dexamethasone, ondansetron, and their combination and postoperative nausea and vomiting in children undergoing strabismus surgery: A meta-analysis of randomized controlled trials. *Paediatr Anaesth*. 2014;24(5):490-498.
- Parry H, Martin K. Single-dose i.v. dexamethasone—an effective anti-emetic in cancer chemotherapy. *Cancer Chemother Pharmacol*. 1991;28(3):231-2. doi: 10.1007/BF00685518. PMID: 1855281.
- Rajeeva V, Bharadwaj N, Balia YK, Dhaliwal LK., Comparison of ondansetron with ondansetron with dexamethasone in prevention of PONV in diagnostic laparoscopy. *Can J Anaesth* 1999;46:40-44.
- Gan T, Sloan F, Dear G, Moalem HE, Lubarsky DA. How much are patients willing to pay to avoid postoperative nausea and vomiting? *Anesth Analg*. 2001;92(2):393-400.
- Bhakta P, Ghosh BR, Singh U, Govind PS, Gupta A, Kapoor KS, et al. Incidence of postoperative nausea and vomiting following gynecological laparoscopy: A comparison of standard anesthetic technique and propofol infusion. *Acta Anaesthesiol Taiwan*. 2016;54(4):108-113.