

A Comparative Evaluation of Ondansetron and Granisetron with Dexamethasone Combination in Prevention of Nausea and Vomiting Following post Operative Laparoscopic Cholecystectomy.

Preeti Agarwal¹, Ankur Jain¹

¹Associate Professor, Department of Anaesthesia, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh.

Received: September 2018

Accepted: October 2018

Copyright:© the author(s), publisher. It is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Post operative nausea and vomiting (PONV) have been considered among most distressing symptoms after surgery under anaesthesia. Different combinations of anti-emetic drugs have been used but no drug has achieved 100% efficacy in reducing PONV after laparoscopic surgery. Therefore, the present study was designed to assess if there is any effect of granisetron and ondansetron with dexamethasone in prevention of PONV after general anaesthesia for laparoscopic cholecystectomy. **Methods:** The study population was divided into three groups according to introduced combination of drugs. Group I (n=50), group II (n=50) and group III (n=50) were introduced Ondansetron (4mg) & Dexamethasone 8mg, Granisetron (1mg) & Dexamethasone 8mg and Normal saline & Dexamethasone 8mg respectively. VAS scale from 0-10 was used to assess the intensity of pain after operation. PONV scoring system considering 0 as no nausea, 1 as nausea and 3 as vomiting was incorporated in this study. **Results:** The incidence of PONV (score-1,2,3) are tabulated at intervals of 6 hours and complete response was noted in all three groups. There was no statistical difference observed between group I and II in first 24 hours but significant difference was observed between group I, group II and control group III. Complete response score 96%, 98% and 56% respectively for group I, group II and group III correspondingly after at 6 to 12 hours. **Conclusion:** Findings of the present study suggest that PONV was significantly decreased in group I ondansetron & dexamethasone and group II of granisetron & dexamethasone. Therefore, we strongly suggest that combination of dexamethasone either with ondansetron or granisetron are equally effective in decreasing incidence of PONV in laparoscopic cholecystectomy patients as prophylaxis.

Keywords: Laparoscopic cystectomy, PONV, Ondansetron, Granisetron.

INTRODUCTION

Post operative nausea and vomiting (PONV) have been considered among most distressing symptoms after surgery under anaesthesia. Moreover, nausea, vomiting and retching individually considered as separate entity.^[1] PONV is a common complication which disrupts the advantages of laparoscopic surgery.^[2]

The incidence of PONV is more common in female compare to male. Studies report incidence of PONV as high as up to 70% laparoscopic cystectomy. PONV upset suture of surgery as well as healing of stitches.^[3]

Different combinations of anti-emetic drugs have been used but no drug has achieved 100% efficacy in

reducing PONV after laparoscopic surgery.^[4,5]

Granisetron and Ondansetron are among commonly incorporated 5HT₃ antagonists which is commonly used in combination with dexamethasone as prophylaxis against PONV in surgical patients.^[6,7] Very few studies have compare the efficiency of both drugs.^[3,7] Therefore, the present study was designed to assess if there is any effect of granisetron and ondansetron with dexamethasone in prevention of PONV after general anaesthesia for laparoscopic cholecystectomy.

MATERIALS AND METHODS

This prospective randomized double-blind study was conducted in the Department of Anaesthesia of Muzaffarnagar Medical College, Muzaffarnagar. The present study was approved from the ethical committee of the institute. Present study included 150 male patients 18 to 60 years classified according to ASA grade I and grade II of posted laparoscopic

Name & Address of Corresponding Author

Dr. Ankur Jain,
Associate Professor,
Department of Anaesthesia,
Muzaffarnagar Medical College,
Muzaffarnagar,
Uttar Pradesh.

cystectomy. Total population of the present study (150) was divided into three groups (50 patients each group). Group I, group II and group III included patients on granisetron with dexamethasone, Ondansetron with dexamethasone and dexamethasone with normal saline. Patients with history of previous exposure to general anaesthesia, gastrointestinal disease, motion sickness, PONV, pregnancy and menstruation or those who had taken antiemetic drugs within 24 hours of operation were excluded from the study. Pre-anesthetic evaluation was done on the previous day and assessed for risk factors.

Diazepam 10mg and Ranitidine hydrochloride 150mg were given to each and every patients in the night before the surgery.

All the patients were randomly divided into three groups according to computed generated random numbers.

Group I (n=50) - Ondansetron (4mg) & Dexamethasone 8mg

Group II (n=50) - Granisetron (1mg) & Dexamethasone 8mg

Group III (n=50)- Normal saline & Dexamethasone 8mg

Name of drugs which introduced in particular patient were not disclosed to either observer or patient. Standardized anaesthesia procedure was followed for every patient. Intravenous access was secured with 18gauge intravenous catheter. NIBP, SPO2 and ECG were recorded.

Intravenous midazolam (1mg) and fentanyl (2µg/kg) were given to each patient. Drugs of study of every group were given before induction. Thiopentone sodium (5mg/kg) and inj. Atracurium (0.5mg/kg) were given for general anaesthesia and neuromuscular relaxation respectively. Positive pressure ventilation with 50% O2 and 50% air along with 1-2% isoflurane was maintained for anaesthesia.

The incidences of nausea, vomiting and retching were recorded in each patient of the all three groups within the post operative 24 hours. VAS scale from 0-10 was used to assess the intensity of pain after operation. Nausea and retching were explained in detail to each and every patient of all groups. Absence of nausea, retching and vomiting symptoms along with loss of requirement for antiemetic drug was considered as complete response. All the symptoms of patients were recorded after interval of six hours. PONV scoring system considering 0 as no nausea, 1 as nausea and 3 as vomiting was incorporated in this study.^[8]

Statistical analysis

Chi-square test was used to assess the statistical differences between the three groups. Descriptive regression analysis was done to compare the results of all three groups. The p value <0.05 was considered as statistically significant. The data obtained in the present study was statistically

analyzed by using statistical software SPSS 11.5 version.

RESULTS

Results of the current study recorded the follow up symptoms up to 24 hours after cholecystecmy. Table 1 show basic there was an insignificant difference between characteristics like age, weight and BMI of all the patients. There was no significant difference between anaesthesia duration, surgery duration and consumption of fentanyl [Table 1].

Table 1: Distribution of various parameters in all three groups.

Parameters	Group I (n=50)	Group II (n=50)	Group III (n=50)
Age (yrs)	38.6±6.23	39.2±6.47	38.9±6.09
Weight (Kg)	55.7±6.89	55.4±7.12	55.9±6.9
BMI (Kg/m2)	22.23±2.26	22.36±2.6	22.54±2.43
Anaesthesia duration	109.3±18.8	110.7±19.5	108.2±18.9
Surgery duration	88.8±12.6	89.5±14.8	90.4±13.1
Fentanyl doses	154±13	157±16	155±18

It is evident from [Figure 1] there was an insignificance difference between group I and group II. However, there was significantly high incidence of nausea in group III compare to group I and group II.

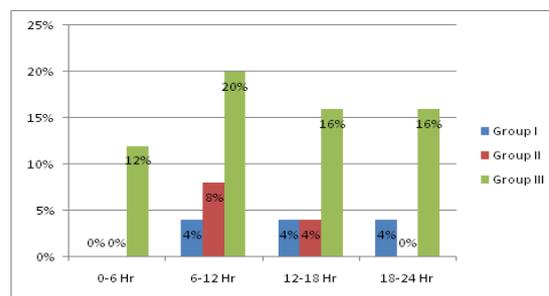


Figure 1: Incidences of nausea in each group according to time period.

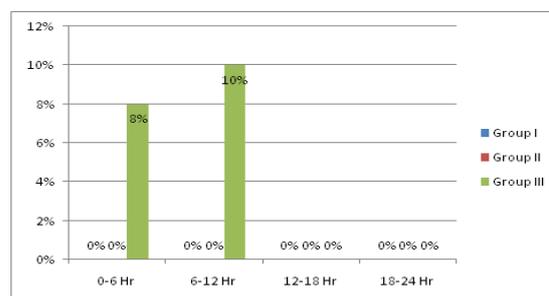


Figure 2: Incidences of retching in each group according to time period.

[Figure 2] shows that there 4 patients of group III showed incidence of retching in starting hours while 5 patients of same groups showed at 6 to 12 hours interval. Rest of the patients did not show any incidence of retching in any group in any time interval.

It is manifested from [Figure 3] that there was incidence of vomiting 4, 5 and 10 patients of group I,

group II and group III respectively in starting 6 hours after the surgery. After that 5 patients and 3 patients of group III complaint about vomiting at 6 to 12 hours and 12 to 18 hours interval correspondingly.

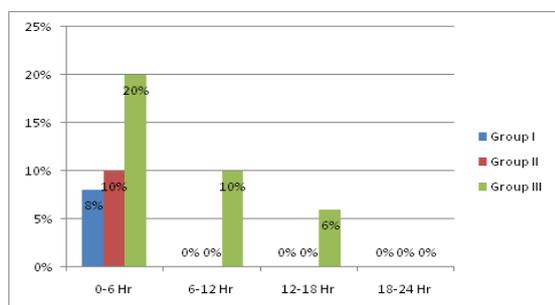


Figure 3: Incidences of vomiting in each group according to time period.

Complete response score 96%, 98% and 56% respectively for group I, group II and group III correspondingly after at 6 to 12 hours. [Table 2]

Table 2: Comparison of complete response in all three groups.

Time	Group I (n=50)	Group II (n=50)	Group III (n=50)
0-6 Hr	92%	90%	44%
6-12 Hr	96%	98%	56%
12-18 Hr	98%	96%	66%
18-24 Hr	96%	96%	80%

The incidence of PONV (score-1,2,3) are tabulated at intervals of 6 hours and complete response was noted in all three groups. There was no statistical difference observed between group I and II in first 24 hours but significant difference was observed between group I, group II and control group III. [Table 3].

Table 3: Comparison of PONV score between all three groups.

Time	Group I vs Group II	Group II vs Group III	Group III vs Group I
0-6 Hr	>0.05	<0.05	<0.05
6-12 Hr	>0.05	<0.05	<0.05
12-18 Hr	>0.05	>0.05	>0.05
18-24 Hr	>0.05	>0.05	>0.05

Table 4: Comparison of PONV, complete response and side effects in all three groups.

	Post operative nausea and vomiting	Complete response	Side effects
Group I (n=50)	20%	90%	0%
Group II (n=50)	20%	88%	0%
Group III (n=50)	70%	30%	0%

[Table 4] depicts that there was no significant difference in PONV score, complete response score and side effects in group I of ondansetron &

dexamethasone and group II of granisetron & dexamethasone.

DISCUSSION

Laparoscopic cholecystectomy is one of the most prevalent surgical techniques for the gall bladder removal. It bears various advantages like quick recovery, less pain and less hospital stay. However, high incidence of PONV have been reported in these types of surgeries. Few studies have recorded PONV incidence in as high as up to 70% in laparoscopic cholecystectomy patients within 24 hours of surgery.^[4,6,8] On the other hand, PONV have been considered most prevalent adverse effects of anaesthesia during surgery. Which in turn induces dissatisfaction along with stress in patients undergone the surgery. Various factors are involved in PONV which cannot be prevented; therefore, treatment of the condition is advisable instead of prevention. Moreover, due to various reasons including prevailing levels of hormones female patients are three time more susceptible for PONV in comparison of male patients.^[4,13,14]

Higher incidence of PONV after laparoscopic cholecystectomy may leads to loss of advantages of laparoscopic surgery and compels patients to stay longer duration to combat the electrolyte disturbance, disruption of sutures etc. That is why treatment of PONV is essential to sustain the efficacy of laparoscopic surgery.

Results of the current study revealed that group I of ondansetron & dexamethasone and group II of granisetron & dexamethasone had very low PONV incidence in comparison of high incidence of PONV in group III of saline & dexamethasone. These findings are consistent with the findings of the earlier studies of Gan TJ et al,^[10] Fujii Y et al,^[11] as they recorded significant effect of ondansetron with dexamethasone and granisetron with dexamethasone respectively in prophylaxis of PONV. Moreover, Fujii Y et al,^[13] suggested a dose of granisetron 20mcg/kg along with 8 mg dexamethasone to avoid the incidence of PONV. Whereas, Elhakim M et al,^[3] reported that 8mg of dexamethasone with 4 mg of ondansetron is effective in decreasing the incidence of PONV.

This decrease incidence of PONV in group I of ondansetron & dexamethasone and group II of granisetron & dexamethasone may be due to 5 HT₃ receptor antagonist along with corticosteroid possess more effective antiemetic effects. The probable theory behind this may be that tryptophan is ceased in 5 HT pathway of neural tissue which in turn increase sensitivity of receptors towards antiemetic agents.^[14]

Finding of the present study recorded that there significant improvement in PONV and complete response in group I of ondansetron & dexamethasone and group II of granisetron &

dexamethasone compare to group III of saline & dexamethasone after 24 hours of surgery. However, no side effects were observed in any group. These findings of the current study is very similar to the previous study of Dabbous et al,^[15] as they recorded 4.8% incidence of PONV and up to 95% complete response in patients with ondansetron & dexamethasone and patients with granisetron & dexamethasone. Moreover, they did not observe any significant difference between these two group patients. Alike, Kushwaha et al,^[8] observed significant improvement in PONV and complete response in patients with granisetron & dexamethasone.

In addition present study recorded an insignificant difference in incidence of vomiting in both groups ondansetron & dexamethasone patients and granisetron & dexamethasone patients. These findings are in agreement with the findings of the earlier studies.^[9,13] Further, Sanjowal et al,^[17] and Ahsan et al,^[18] recorded significant improvement in complete response in the patients on ondansetron and dexamethasone.

This significant complete response in both groups of combination with dexamethasone compare to single dexamethasone group may be due to previous studies suggested that dexamethasone is an effective antiemetic drug either incorporated single or in combination.

CONCLUSION

Findings of the present study suggest that PONV was significantly decreased in group I ondansetron & dexamethasone and group II of granisetron & dexamethasone. Therefore, we strongly suggest that combination of dexamethasone either with ondansetron or granisetron are equally effective in decreasing incidence of PONV in laparoscopic cholecystectomy patients as prophylaxis.

REFERENCES

1. Knapp MR, Beecher HK. Post anaesthetic nausea, vomiting and retching: evaluation of anti-emetic drugs dimenhydrinate, chlorpromazine and pentobarbital sodium. *J Am Med Assoc* 1956; 160: 376-85
2. Kapur PA. The big "little problem". *Anaesthesia Analgesia* 1991; 73: 243-45.
3. Elhakim M, Nafie M, Mahmoud K, Atef A. Dexamethasone 8mg in combination with ondansetron 4mg appears to be the optimal dose for the prevention of nausea and vomiting after laparoscopic cholecystectomy. *Canadian J Anesthesia*. 2002;49(9):922-6.
4. Gan TJ. Risk Factors for Postoperative Nausea and Vomiting. *AnesthAnalg*. 2006;102:1884-98.
5. Gan TJ, Meyer TA, Apfel CC, Chung F, Davis PJ, Habib AS, et al. Society for Ambulatory Anesthesia guidelines for the management of postoperative nausea and vomiting. *Anesthesia Analgesia*. 2007;105(6):1615-28.

6. Watcha MF, White PF. Postoperative nausea and vomiting: Its etiology, treatment and prevention. *Anesthesiology*. 1992;77:162-82.
7. Sriraman R, Indu S, Chari P. Is granisetron-dexamethasone combination better than ondansetron-dexamethasone in the prevention of postoperative nausea and vomiting in outpatient gynaecological laparoscopy. *J AnaesthesiolClinPharmacol*. 2007;23(4):365.
8. Kushwaha B, Chakraborty A, Agarwal J, Malick A, Bhushan S, Bhattacharya P. Comparative study of granisetron and ondansetron alone and their combination with dexamethasone, for prevention of PONV in middle ear surgery. *Inter J Anesthesiol*. 2007;13(2):10.
9. Gan TJ, Meyer T, Apfel CC, Chung F, Davis PJ, Eubanks S, et al. Consensus guidelines for managing postoperative nausea and vomiting. *Anesthesia Analgesia*. 2003;97(1):62-71.
10. Gan TJ, Coop A, Philip BK, Kytril Study Group. A randomized, double-blind study of granisetron plus dexamethasone versus ondansetron plus dexamethasone to prevent postoperative nausea and vomiting in patients undergoing abdominal hysterectomy. *Anesthesia Analgesia*. 2005;101(5):1323-9.
11. Fujii Y, Tanaka H, Toyooka H. Granisetron-dexamethasone combination reduces postoperative nausea and vomiting. *Canadian J Anesthesia/J canadiend'anesthésie*. 1995;42(5):387-90.
12. Gan TJ. Selective serotonin 5-HT₃ receptor antagonists for postoperative nausea and vomiting. *CNS drugs*. 2005;19(3):225-38.
13. Si XY, Wu LP, Li XD, Li B, Zhou YM. Dexamethasone combined with other antiemetics for prophylaxis after laparoscopic cholecystectomy. *Asian journal of surgery*. 2015;38(1):21-7.
14. Fujii Y, Tanaka H, Toyooka H. Optimal Anti-Emetic dose of granisetron for prevention of post operative nausea and vomiting. *Can J Anaesth*. 1994;41(9):794-7.
15. Dabbous AS, Jabbour-Khoury SI, Nasr VG, Moussa AA, Zbeidy RA, Khouzam NE, et al. Dexamethasone with either granisetron or ondansetron for postoperative nausea and vomiting in laparoscopic surgery. *Middle East J Anesthesiol*. 2010;20(4):565-70.
16. Gan TJ, Coop A, Philip BK, Kytril Study Group. A randomized, double-blind study of granisetron plus dexamethasone versus ondansetron plus dexamethasone to prevent postoperative nausea and vomiting in patients undergoing abdominal hysterectomy. *Anesthesia Analgesia*. 2005;101(5):1323-9.
17. Sanjowal L, Biswas SK, Saha JC. Comparison of Ondansetron Used Alone and in Combination with Dexamethasone as a Prophylaxis for Postoperative Nausea and Vomiting Following Laparoscopic Cholecystectomy. *Faridpur Med Coll J*. 2014;9(1):3-6. Nanjundaswamy NH et al. *Int J Res Med Sci*. 2018 Feb;6(2):503-508
18. Ahsan K, Abbas N, Naqvi SM, Murtaza G, Tariq S. Comparison of efficacy of ondansetron and dexamethasone combination and ondansetron alone in preventing postoperative nausea and vomiting after laparoscopic cholecystectomy. *J Pak Med Assoc*. 2014;64(3):242-6.

How to cite this article: Agarwal P, Jain A. A Comparative Evaluation of Ondansetron and Granisetron with Dexamethasone Combination in Prevention of Nausea and Vomiting Following post Operative Laparoscopic Cholecystectomy. *Ann. Int. Med. Den. Res*. 2018; 4(6):AN17-AN20.

Source of Support: Nil, **Conflict of Interest:** None declared