

# Gabapentin Versus Dexamethasone for Prophylaxis of Post-Operative Nausea and Vomiting in Patients Undergoing Laparoscopic Cholecystectomy.

Kirandeep Kaur<sup>1</sup>, Smriti Anand<sup>2</sup>, Rakesh Sadhu<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Anaesthesia, Maharishi Markandeshwar Medical College and Hospital Solan.

<sup>2</sup>Associate Professor, Department of Anaesthesia, Maharishi Markandeshwar Medical College and Hospital Solan.

<sup>3</sup>Professor, Department of Anaesthesia, Maharishi Markandeshwar Medical College and Hospital Solan.

Received: May 2019

Accepted: May 2019

**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) is one of the commonest complications in anaesthesia accounting for 20-30% cases but number may rise to 70% in laparoscopic surgeries.<sup>1,2</sup> Laparoscopic cholecystectomy is carried out as day care surgery but PONV prolongs hospital stay. Several studies have documented role of Gabapentin and Dexamethasone for prophylaxis of PONV but none has compared them for the same. This study aimed at comparing the efficacy of oral gabapentin and dexamethasone for prophylaxis of PONV and need for rescue anti-emetics in first 24 hours. **Methods:** This prospective, single blind randomized trial enrolled 100 ASA physical status I and II patients assigned into two groups: Group G (Gabapentin group, n=50) received 600 mg of Gabapentin oral formulation with sip of water on the morning of surgery whereas Group D (Dexamethasone group, n=50) received 8 mg of Dexamethasone oral formulation with sip of water on the morning of surgery. Following parameters were noted: time to first rescue anti-emetic drug (Injection Ondansetron), total number of rescue anti-emetic doses, complications if any. **Results:** The two groups i.e the Gabapentin group and the dexamethasone group were comparable with regards to the demographic profile (age, weight and sex). However the mean duration of surgery was more in Gabapentin group compared to Dexamethasone group, the difference being statistically significant ( $P < 0.05$ ). Time between extubation and first rescue antiemetic was also comparable in the two groups the results being statistically non significant ( $P > 0.05$ ). The mean of total number of rescue antiemetics in 24 hours as well as grading of Wilsons score for PONV in the two groups was also statistically non significant ( $P > 0.05$ ). **Conclusion:** Both the drugs gabapentin and dexamethasone are equally effective in preventing postoperative nausea and vomiting.

**Keywords:** Gabapentin, Dexamethasone, Laparoscopic cholecystectomy, Postoperative nausea vomiting (PONV).

## INTRODUCTION

Postoperative nausea & vomiting (PONV) is one of the commonest complications of anaesthesia. It is challenging for the physician and equally distressing for the patients. PONV is multifactorial depending on patient characteristics, type of surgery, nature of underlying disease and technique of anaesthesia. PONV accounts for 20-30% cases after surgery but incidence may rise up to 50-70% after laparoscopic surgeries.<sup>[1,2]</sup> Trend is changing now-a-days from open to laparoscopic cholecystectomy as a part of day care surgery but PONV prolongs the hospital stay and leads to poor patient satisfaction or sometimes life-threatening complications like aspiration. A number of drugs have been used for the

prevention and management of PONV including 5HT<sub>3</sub> antagonists, prokinetics, dopaminergic antagonists, anticholinergics, phenothiazines, antihistamines, benzamides, NK1 antagonists and steroids, either alone or in combination with other antiemetics.<sup>[3-8]</sup> There have been studies demonstrating the effect of gabapentin in chemotherapy induced nausea & vomiting in breast cancer.<sup>[9]</sup> Several studies have supported the role of preoperative gabapentin for prevention of PONV.<sup>[10]</sup> In this study we aimed at comparing the efficacy of oral gabapentin and dexamethasone for prophylaxis of PONV and the need for rescue antiemetics in patients undergoing laparoscopic cholecystectomy.

## MATERIALS AND METHODS

The present study was a randomized, prospective study which included 100 patients belonging to ASA physical status I and II of either sex between the age group of 18-65 years undergoing elective laparoscopic cholecystectomy. Before enrollment for

### Name & Address of Corresponding Author

Dr. Smriti Anand  
Associate Professor,  
Department of Anaesthesia,  
Maharishi Markandeshwar Medical College and Hospital  
Solan.

the study patients were informed about the aims, methods and potential hazards of the study. Using a sealed envelope technique, patients were randomly allocated into two groups: Group G (Gabapentin group, n=50) received gabapentin 600 mg orally, with a sip of water on the morning of surgery whereas Group D (Dexamethasone group, n=50) received dexamethasone 8 mg orally, with a sip of water on the morning of surgery. The patients included in the study belonged to ASA physical status I or II between age group 18-65 years posted for elective laparoscopic cholecystectomy and willing to consent for the study. Pregnant, lactating or diabetic patients, patients receiving steroids or antiemetics within 24 hours before surgery or those with episode of vomiting within 24 hours before surgery, patients with known hypersensitivity or contraindication to any of the study groups, chronic smokers as well as those with history of motion sickness were excluded from the study.

A thorough pre anaesthetic evaluation was done prior to surgery comprising of detailed history, general physical examination. Routine investigations (complete haemogram, blood sugar, liver function tests, renal function tests, ECG, chest X-ray) were done prior to surgery. Written informed consent was taken from all the participants. Patients were given oral formulation of gabapentin 600 mg or dexamethasone 8 mg with a sip of water, on the morning of surgery depending on the group that they were allocated to.

After shifting the patient to the operation theatre, pre-induction vitals were recorded. Standard anaesthetic technique (injection midazolam 0.05 mg/kg, injection tramadol 2mg/kg, injection Propofol 2mg/kg, injection vecuronium 0.1 mg/kg intravenous and maintenance on nitrous oxide oxygen and isoflurane) was followed in both the study groups. After completion of the procedure patients were extubated after reversal (injection neostigmine 0.05mg/kg and injection glycopyrrolate 0.01 mg/kg intravenous) and shifted to the post

anaesthesia care unit. In the post operative period patients were observed for 24 hours for events of PONV and need for rescue anti emetics (Injection Ondansetron 0.1mg/kg intravenous). PONV was graded as per Wilson's Score:

**No PONV:** Absence of any emesis or nausea

**Mild PONV:** patient having only mild nausea, or one emetic episode or nausea lasting for 10 minutes and where no anti emetic is required

**Moderate PONV:** patient has 1-2 emetic episodes or moderate to severe nausea and anti emetic therapy is required

**Severe PONV:** patient has more than 2 emetic episodes or is nauseated more than twice and more than one anti emetic required

**Following parameters were noted:** time to first rescue anti-emetic drug (Injection Ondansetron), total number of rescue anti-emetic doses, complications if any.

## RESULTS

The two group's i.e the Gabapentin group and the dexamethasone group were comparable with regards to the demographic profile (age, weight and sex). However the mean duration of surgery was more in Gabapentin group (80.7 ± 18.91 minutes) compared to Dexamethasone group (70.6 ± 18.91 minutes), the difference being statistically significant (P < .05). Time between extubation and first rescue antiemetic was also comparable in the two groups (Group G- 1.7 ± 4.33 hours and Group D- 1.94 ± 4.77 hours) the results being statistically non-significant (P > 0.05). The mean of total number of rescue antiemetics in 24 hours was 0.18 ± 0.43 and 0.2 ± 0.45 in group G and group D respectively, the difference being statistically non-significant. The mean grades of Wilsons score for PONV in the two groups (Group G- 1.38 ± 0.80 and Group D- 1.44 ± 0.78) was also statistically non-significant (P > 0.05). No other side effects were seen in any of the patients in either of the groups.

**Table 1: Demographic Profile of Patients**

Demographic Profile	Group G	Group D	P Value
Age in years (Mean ± SD)	46.96 ± 13.19	43.78 ± 14.88	0.26, non significant
Weight in Kg (Mean ± SD)	60.76 ± 8.43	59.88 ± 8.00	0.59, non significant
Sex (Female: Male)	44.6	45.5	
Duration of surgery in minutes (Mean ± SD)	80.77 ± 26.03	70.60 ± 18.91	0.03, significant

P < 0.05 significant

**Table 2: Time between Extubation and First Rescue Antiemetic**

Time In Hours	Group G	Group D	P Value
Mean ± SD	1.70 ± 4.33	1.94 ± 4.77	0.79, non significant

P < 0.05 significant

**Table 3: Total Number of Rescue Antiemetics In 24 Hours**

No. Of Doses In 24 Hrs.	Group G	Group D	P Value
Mean ± SD	0.18 ± 0.43	0.2 ± 0.45	0.82, non significant

P < 0.05 significant

**Table 4: Wilsons Score For PONV**

Score	Group G	Group D	P Value
Mean ± SD	1.38 ± 0.80	1.44 ± 0.78	0.70, non significant

P < 0.05 significant

## DISCUSSION

Postoperative nausea vomiting is one of the most common symptomatology affecting post-surgical patients to the tune of 30% especially more so in patients undergoing laparoscopic cholecystectomy.<sup>[12-14]</sup> In the present study the two groups i.e group G and group D were comparable with regards to the demographic profile (age, weight and sex). However the mean duration of surgery in Gabapentin group was  $80.7 \pm 18.91$  minutes while in the Dexamethasone group  $70.6 \pm 18.91$  minutes, the difference being statistically significant ( $P < 0.05$ ). The difference could be ascribable to the fact that there were varied surgeons involved in the present study with diverse experiences and competencies.<sup>[15]</sup> The time between extubation and first rescue antiemetic was  $1.7 \pm 4.33$  hours and  $1.94 \pm 4.77$  hours in group G and group D respectively. Gabapentin, an anti-epileptic drug has already been proven to be an efficacious antiemetic in patients receiving chemotherapy.<sup>[9]</sup> However its role as an antiemetic agent in patients undergoing laparoscopic cholecystectomy has been elucidated in various studies.<sup>[10,16,17]</sup> Alleviation of the neurotransmitter tachykinin by Gabapentin has been postulated as the possible mechanism of its antiemetic action.<sup>[9,18]</sup> The role of dexamethasone, a glucocorticoid as an antiemetic agent not only in chemotherapy induced nausea vomiting but also in laparoscopic procedures has been very well promulgated in various studies.<sup>[19-22]</sup> How glucocorticoids exert their antiemetic effect is not yet clear. Possible mechanisms surmised include hampering of prostaglandin synthesis or impedance to the release of endogenous opioids.<sup>[23]</sup> The mean duration between extubation and first rescue antiemetic was comparable in both the groups (group G and group D) the difference being statistically non significant ( $P > 0.05$ ).

The mean of total number of rescue antiemetics in 24 hours was  $0.18 \pm 0.43$  and  $0.2 \pm 0.45$  in group G and group D respectively, the difference being statistically non significant. A number of studies have demonstrated a notable reduction in the use of rescue antiemetics in patients receiving prophylactic Gabapentin as well as dexamethasone.<sup>[10,16,24]</sup>

The mean grades of Wilsons score for PONV in the two groups (Group G-  $1.38 \pm 0.80$  and Group D-  $1.44 \pm 0.78$ ) was also statistically non significant ( $P > 0.05$ ). Both gabapentin as well as dexamethasone have been demonstrated to attenuate the severity of postoperative nausea vomiting in laparoscopic procedures significantly.<sup>[16,25,26]</sup>

There were no side effects reported from either of the drugs i.e gabapentin or dexamethasone used. Some of the well known adverse effects seen with gabapentin are drowsiness, dizziness, tremors, lack of coordination, amnesia.<sup>[27]</sup> Similarly dexamethasone is implicated with an increased risk

of wound infection, delayed wound healing, impaired glucose tolerance and adrenal suppression. However, these detrimental effects occur with long term administration and are not related to a single dose as was received in the patients in the present study.<sup>[28]</sup>

In the present study gabapentin and dexamethasone were comparable with regards to the duration of antiemetic effect, need for rescue antiemetic in 24 hours and degree of severity of postoperative nausea and vomiting. Though traditionally dexamethasone is being used for quite sometime as a useful preemptive for postoperative nausea vomiting, novel studies have implicated the role of gabapentin as well as a useful prophylaxis for postoperative nausea vomiting.<sup>[16,18]</sup> Also both the drugs are potent analgesics as documented in various studies and cost-effective as well.<sup>[18,29]</sup> In the present study however on comparing the two drugs with regards to postoperative nausea and vomiting, both were found to be equally efficacious. Therefore the final selection of the preclusive antiemetic for postoperative nausea vomiting should be the discretion of the individual anaesthetist.

## CONCLUSION

Both the drugs gabapentin and dexamethasone are equally effective in preventing postoperative nausea and vomiting.

## REFERENCES

1. M. F. Watcha and P. F. White, "Postoperative nausea and vomiting: its etiology, treatment, and prevention. *Anesthesiology* 1992; 77(1): 162-184, 1992.
2. Thune A, Appelgren L, and Haglind E. Prevention of postoperative nausea and vomiting after laparoscopic cholecystectomy. A prospective randomized study of metoclopramide and transdermal hyoscine. *European Journal of Surgery* 1995; 161: 265-268, 1995.
3. Sikka R, Kaul T, Grewal A, Satija A. Postoperative nausea and vomiting. *J Anesth Clin Pharmacology* 2007; 23(4): 341-56.
4. Kothari SN, Boyd WC, Botcher ML, Lambert PJ. Antiemetic efficacy of prophylactic dimenhydrinate (Dramamine) vs ondansetron (Zofran). *J Surg Endoscopy* 2000; 14(10): 926-29.
5. Wang JJ, Ho ST, Liu YH, Lee SC, Liu YC, Lia YC et al. Dexamethasone reduces nausea and vomiting after laparoscopic cholecystectomy. *Br J Anaesth* 1999; 83: 772-75.
6. Wilson EB, Bass CS, Abrameit W, Roberson R, Smith RW. Metoclopramide versus ondansetron in prophylaxis of nausea and vomiting for laparoscopic cholecystectomy. *Am J Surg* 2001; 181: 138-41.
7. Madej TH, Simpson KH. Comparison of the use of domperidone, droperidol and metoclopramide in the prevention of nausea and vomiting following gynaecological surgery. *Br J Anaesth* 1986; 56: 879-83.
8. Kotelko DM, Rottman RL, Wright WC, Stone JJ, Yamashiro AY, Rosenblat RM. Transdermal scopolamine decreases nausea and vomiting following cesarean section in patients receiving epidural morphine. *Anesthesiology* 1989; 71: 675-78.

9. Guttuso T Jr, Roscoe J, Griggs J. Effect of gabapentin on nausea induced by chemotherapy in patients with breast cancer. *Lancet* 2003; 361:1703-05.
10. Achuthan S, Singh I, Varthya SB, Srinivasan A, Chakrabarti A, Hota D. Gabapentin prophylaxis for postoperative nausea and vomiting in abdominal surgeries: a quantitative analysis of evidence from randomized controlled clinical trials. *Br J Anaesth* 2015; 114(4): 588-97.
11. Hermans V, De Pooter, F De Groote, De Hert S, Van der Linden P. Effect of dexamethasone on nausea, vomiting and pain in paediatric tonsillectomy. *Br J Anaesth* 2012; 109(3):427-31
12. Kovac AL. Prevention and treatment of postoperative nausea and vomiting. *Drugs* 2000; 59: 213-243
13. Helmy SA. Prophylactic antiemetic efficacy of ondansetron in laparoscopic cholecystectomy under total intravenous anaesthesia. *Anaesthesia* 1999; 54: 266-271.
14. Naguib M, Bakry AK, Khoshim MH. Prophylactic antiemetic therapy with ondansetron, tropisetron, granisetron and metoclopramide in patients undergoing laparoscopic cholecystectomy: A randomized, double blind comparison with placebo. *Can J Anaesth.* 1996; 43: 226-231.
15. Gomes AL. A comparison of effectiveness of two surgical units in performing laparoscopic cholecystectomy. *Int J Health Sci* 2008; 2(2):85-91.
16. Pandey CK, Priye S, Ambesh SP, Singh S, Singh U, Singh PK. Prophylactic Gabapentin for prevention of postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy: a randomized, double blind placebo controlled study. *J Postgrad Med* 2006; 52(2): 97-100.
17. Kim MK, Huh J, Lee SK, Park EY, Lee J M, Kim HJ. Combination of gabapentin and ramosetron for the prevention of postoperative nausea and vomiting after gynecologic laparoscopic surgery: a prospective randomized comparative study. *BMC Anesthesiology* 2017; 17: 65.
18. Kong VKF, Irwin MG. Gabapentin multimodal perioperative drug? *Br J Anaesth* 2007; 99(6): 775-86.
19. Italian Group for antiemetic research. Dexamethasone, Granisetron or both for prevention of nausea and vomiting during chemotherapy for cancer. *N Eng J Med.* 1995; 332: 1-5.
20. Callery MP. Preoperative steroids for laparoscopic surgery. *Ann Surg.* 2003; 238(5): 661-2.
21. Wang JJ, Ho ST, Liu HS, Ho CM. Prophylactic antiemetic effect of dexamethasone in women undergoing ambulatory laparoscopic surgery. *Br J Anaesth* 2004; 84(4): 459-62.
22. White PF. Prevention of postoperative nausea and vomiting- a multimodal solution to a persistent problem. *N Engl J Med* 2004; 350 (24): 2511-2.
23. Sapolsky RM, Romero LM, Munck AV. How do glucocorticoids influence stress response? Integrative, permissive, suppressive stimulatory and preparatory action. *Endocr Rev.* 2000; 21: 55-89.
24. DREAMS Trial Collaborators and West Midlands Research Collaborative. Dexamethasone versus standard treatment for postoperative nausea and vomiting in Gastrointestinal surgery: randomized controlled trial (DREAMS Trial). *BMJ* 2017; 357: j 1455.
25. Roy S, Gupta K. Prophylactic gabapentin for prevention of postoperative nausea and vomiting in patients undergoing laparoscopic surgery. *IOSR-JDMS* 2017; 16(1):9-13.
26. Arsian MD, Cicek R, Kalender HU, Yilmaz H. Preventing postoperative nausea and vomiting after laparoscopic cholecystectomy: A prospective, randomized, double blind study. *Curr Ther Res Clin Exp* 2011; 72(1): 1-12.
27. Grant MC, Lee H, Page AJ, Hobson D, Wick E, Wu CL. The effect of preoperative gabapentin on postoperative nausea and vomiting: A meta analysis *Anesth Analg* 2016;122(4):976-85.
28. Schimmer BP, Parker KL. Adrenocorticotrophic hormone; adrenocortical steroids and their synthetic analogs; inhibitors of the synthesis and actions of adrenocortical hormones. In: Hardman JG, Limbird LE, Molinoff PB, editors. Goodman and Gilman's the Pharmacological Basis of Therapeutics. 10th ed. McGraw-Hill; New York: 2001. Pp 1649-1677.
29. Bisgaard T, Klarskov B, Kehlet H, Rosenberg J. Preoperative dexamethasone improves surgical outcome after laparoscopic cholecystectomy. A randomized double-blind placebo-controlled trial. *Ann Surg* 2003; 238: 651-60

**How to cite this article:** Kaur K, Anand S, Sadhu R. Gabapentin Versus Dexamethasone for Prophylaxis of Post-Operative Nausea and Vomiting in Patients Undergoing Laparoscopic Cholecystectomy. *Ann. Int. Med. Den. Res.* 2019; 5(4):AN28-AN31.

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