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PREVENTION OF POSTOPERATIVE NAUSEA AND VOMITING IN LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Objective: To assess the efficacy of ondansetron and dexamethasone in the prevention of nausea and vomiting in patients undergoing laparoscopic cholecystectomy.

Material and Methods: This study was conducted at the Department of Surgery, Khyber Teaching Hospital, Peshawar from May 2010 to December 2010. A total of 67 patients, aged 18 years and above, scheduled for elective cholecystectomy were included by purposive non probability sampling. All the patients received ondansetron 4mg and dexamethasone 8mg intravenously as prophylactic antiemetics at the commencement of surgery. Post operatively the frequency of nausea and vomiting was observed.

Results: During the immediate postoperative 24 hour period, 57 (85%) patients did not experience nausea or vomiting. 10 (15%) patients experienced some degree of nausea and vomiting requiring administration of rescue anti emetic. No significant side effects were noted.

Conclusion: The combination of ondansetron and dexamethasone administered prophylactically effectively prevents nausea and vomiting during the postoperative period after laparoscopic cholecystectomy.

Key Words: Postoperative nausea and vomiting (PONV), dexamethasone, ondansetron.

INTRODUCTION

Post operative nausea and vomiting (PONV) is a common unwanted effect in patients undergoing laparoscopic cholecystectomy[1,2]. PONV can be very distressing to the patient, sometimes more than the surgery itself, and it can result in several complications like dehydration, gastric aspiration and wound disruption[3,4,5]. Several factors have been implicated specifically in laparoscopic cholecystectomy like carbon dioxide insufflation, distension of the abdomen and irritation of the diaphragm and other abdominal viscera. In addition, other factors have also been associated like female gender, history of motion sickness, obesity, length of surgery, postoperative pain, use of opioids and use of inhalational anaesthetics like halothane[4,5,6]. Among a variety of options, ondansetron and dexamethasone have been studied extensively.[7,8] Ondansetron 4 mg and dexamethasone 8 mg IV have been shown to reduce the risk of PONV significantly. Their efficacy has been proven against a variety of antiemetic drugs.[9] It has been shown to reduce the frequency of rescue anti emetic drugs use and reduce the length of hospital stay. As laparoscopic cholecystectomy has become the preferred procedure for gallstone disease and upto 70% patients suffer postoperative nausea and vomiting without adequate prophylaxis or with routine antimetics like metoclopramide or cyclizine[10], this study was designed to study the efficacy of ondansetron and dexamethasone in prevention of nausea and vomiting in patients undergoing laparoscopic cholecystectomy.

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MATERIAL AND METHODS

This descriptive study was conducted over a period of 8 months from May 2010 to December 2010 in the Department of Surgery, Khyber Teaching Hospital, Peshawar. The study design was approved by the ethical committee of the hospital. A total number of 67 patients undergoing laparoscopic cholecystectomy under general anaesthesia were included in the study. Patients with ASA (American Society of Anaes-thesiologists) grade III and IV, BMI more than 30 kg/m^2, history of motion sickness, upper gastrointestinal pathology like peptic ulcer disease, conversion of the procedure to open cholecystectomy and length of surgery more than 90 minutes were excluded from the study. An informed and written consent was obtained from all the patients.

The patients were admitted the day before surgery, all routine investigations were done and any co morbid conditions were excluded. They were kept nil by mouth for 6-8 hours. On arrival into the operation theatre an 18 G IV cannula was passed in

the non-dominant arm and routine haemodynamic monitoring started. Before induction of anaesthesia, ondansetron 4 mg and dexamethasone 8 mg in separate syringes were administered iv slowly. Anaesthesia induction was done with propofol and succinyl choline and endotracheal tube passed. Anaesthesia was maintained with inhalation of isoflurane and oxygen, pain control was with tramadol 100 mg I.V. slow and muscle relaxation with acuron.

The stomach was emptied with 16 French nasogastric tube. With the patient in a supine position, entry into the abdomen was done with veress technique at subumbilical incision site. Three ports were used in all cases. Gas insufflation was done with carbon dioxide with maximum pressure of 12 mm Hg. At the end of the procedure ketorolac 30 mg was given i.v. and the port site wounds were infiltrated with 10 ml of bupivicaine 0.125%. Patients were recovered from anaesthesia in the operation theatre. During the first 24 hours after surgery the patients were assessed for the presence or absence of nausea and vomiting, adequacy of analgesia and the use of rescue anti emetics. Whenever the patient complained of nausea for more than 15 minutes or vomiting, rescue anti emetic metoclopramide 10 mg was given. Analgesia was routinely obtained with tramadol 50 mg 8 hourly i.v. and ketorolac 30 mg 8 hourly i.v. All the data was recorded on a pre designed proforma. Statistical analysis was done with SPSS ®version 11.0 for windows. For continuous variables mean and standard deviation was calculated. Categorical data was presented in percentages and proportions.

RESULTS

A total number of 67 patients fulfilled the selection criteria for inclusion into the study, among them 49 were females and 18 males. Mean age was 49.4 years (S.D. 14.6). Total number of 57(85%) patients did not complain of nausea or vomiting. Out of the remaining 10(15%), 7 experienced nausea for more than 15 minutes and 3 patients experienced single episode of vomiting. All the 10 patients who experienced nausea or vomiting were administered metoclopramide 10 mg i.v. as a rescue anti emetic. No side effect of ondansetron or dexamethasone was observed during the first 24 hours.

Table 1: Patients' characteristics and duration of surgery

Characteristic	Value
Number of patients	67
Age (years)	49.4 ± 14.6
Sex (F/M)	49/18
BMI (kg/m^2)*	26.3 ± 4.7
History of motion sickness (n)	12
History of PONV (n)	4
Non Smokers (n)	56
Duration of surgery (min)*	55.7 ± 23.2

DISCUSSION

Our study shows that with the administration of ondansetron 4 mg and dexamethasone 8 mg, 15% of the patients experienced PONV during the first 24 hours. Without prophylactic anti emetics, the incidence of nausea and vomiting after laparoscopic cholecystectomy has been more than 70%. According to the literature the combination of ondansetron and dexamethasone reduces the risk significantly[3.6.7.8].

Ondansetron is a selective 5 hydroxy tryptamine (serotonin) receptor antagonist used for prevention of PONV[9,10]. It is given in 4 mg and 8 mg doses but it has been shown in various studies that 4 mg is the optimal dose as increasing the dose to 8 mg does not confer any additional beneficial effect[6,7,11]. A drug more popular for prevention of nausea and vomiting associated with chemotherapy, it was shown that it is a very effective drug for the prevention of post operative nausea and vomiting as well. Dexamethasone is a glucocorticoid and has been successfully used for anti emesis[12,13]. The mechanism of action is unknown but it has been suggested that it may act by prostaglandin antagonism[14], serotonin inhibition in the gut[15] and by releasing endorphins[16]. The effectiveness of dexamethasone in preventing PONV has been shown in laparoscopic and gynaecological surgeries[17]. The optimal dose studied ranges from 2 to 32 mg, however, most of the studies show 8 mg to be the most effective dose[3,4,5,6,7].

The pathophysiology of vomiting reveals that vomiting can occur by different neurotransmitters acting on various receptors at various sites. The combination of dexamethasone and ondansetron provides blockade of these receptor actions at different sites and this phenomenon has been validated. Dexamethasone 8 mg plus ondansetron 4 mg have been shown in various studies to significantly reduce the incidence of PONV. Elhakim et al have shown that the incidence of PONV reduced from 83% to 16% with 4mg ondansetron and 8 mg dexamethasone[6]. Bano et al[3] in a randomised controlled trial comprising 100 patients in 2 groups, found that dexamethasone 8 mg plus ondansetron 4 mg significantly reduced the risk of PONV when compared to dexamethasone alone. Lekskowi et al similarly found that prophylactic antiemetics with ondansetron and dexamethasone significantly reduced the incidence of PONV when compared to

six different combinations of various antiemetics. Similar results have been found by several studies[18-26].

CONCLUSION

A combination of dexamethasone 8 mg and ondansetron 4 mg appears to be a safe prophylactic measure for the prevention of PONV in patients undergoing laparoscopic cholecystectomy.

REFERENCES

1. Koivuranta MK, Laara E, Ryhanen PT. Antiemetic efficacy of prophylactic ondansetron in laparo-scopic cholecystectomy. A randomized, double-blind, placebo-controlled trial. Anaesthesia 1996; 51: 52-55.
2. Unlugenc H, Guler T, Gunes Y, Iskik G. Comparative study of the antiemetic efficacy of ondansetron, propofol and midazolam in the early postoperative period. Eur J Anaesthesiol 2003; 20: 668-73.
3. Bano F, Zafar S, Aftab S, Haider S. Dexamethasone plus ondansetron for prevention of postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy. A comparison with dexamethasone alone. J Coll Phy Surg 2008; 18: 265-69.
4. Ashfaque M. Prevention of postoperative nausea and vomiting: A review of causative factors and management. Med Channel 1998; 4: 43-52.
5. Goodarzi M, Matar MM, Shafa M, Townsend JE, Gonzalez I. A prospective randomized blinded study of the effect of intravenous fluid therapy on postoperative nausea and vomiting in children undergoing strabismus surgery. Paediatr Anaesth 2006; 16: 49-53.
6. Elhakim M, Nafie M, Mahmoud K, Atef A. Dexamethasone 8 mg in combination with ondansetron 4 mg appears to be the optimal dose for the prevention of nausea and vomiting after laparoscopic cholecystectomy. Can J Anaesth 2002; 49: 922-26.
7. Leksowski K, Peryga P, Szyca R. Ondansetron, metroclopramide, dexamethasone and their combinations compared for the prevention of postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy: A prospective randomized study. Surg Endosc 2006; 20: 878-82.
8. Alghanem SM, Massad IM, Rashed EM, Abu-Ali HM, Daradkeh SS. Optimization of anesthesia antiemetic measures versus combination therapy using dexamethasone or ondansetron for the prevention of postoperative nausea and vomiting. Surg Endosc 2010; 24: 353-58.
9. White LA, Vanarase M, Brockbank K, Barrett RF. Patient-controlled analgesia and postoperative nausea and vomiting: efficacy of a continuous infusion of ondansetron. Anaesthesia 2001; 56: 365-69.
10. Bowhay AR, May HA, Rudnicka AR, Booker PD. A randomized controlled trial of the antiemetic effect of three doses of ondansetron after strabismus surgery in children. Paediatr Anaesth 2001; 11: 215-21.
11. McKenzie R, Kovac A, O'Connor T, et al. Comparison of ondansetron versus placebo to prevent postoperative nausea and vomiting in women undergoing ambulatory gynecologic surgery. Anesthesiology 1993; 78: 21-28.
12. Wang JJ, Ho ST, Liu HS, Ho CM. Prophylactic antiemetic effect of dexamethasone in women undergoing ambulatory laparoscopic surgery. Br J Anaesth 2000; 84: 459-62.
13. Subramanian B, Madan R, Sadhasivam S, et al. Dexamethasone is a cost-effective alternative to ondansetron in preventing PONV after paediatric strabismus repair. Br J Anaesth 2001; 86: 84-89.
14. Rich WM, Abdulhayoglu G, DiSaia PJ. Methylprednisolone as an antiemetic during cancer chemotherapy – a pilot study. Gynecol Oncol 1980; 9: 193-98.
15. Fredrikson M, Hursti T, Furst CJ, et al. Nausea in cancer chemotherapy is inversely related to urinary cortisol excretion. Br J Cancer 1992; 65: 779-80.
16. Harris AL. Cytotoxic-therapy-induced vomiting is mediated via enkephalin pathways. Lancet 1982; 1: 714-16.
17. Huang JC, Shieh JP, Tang CS, Tzeng JI, Chu KS, Wang JJ. Low-dose dexamethasone effectively prevents postoperative nausea and vomiting after ambulatory laparoscopic surgery. Can J Anesth 2001; 48: 973-77.
18. Pearman MH. Single dose intravenous ondansetron in the prevention of postoperative nausea and vomiting. Anaesthesia 1994; 49 (Suppl.): 11-15.
19. Smith DB, Newlands ES, Rustin GJS, et al. Comparison of ondansetron and ondansetron plus dexamethasone as antiemetic prophylaxis during cisplatin-containing chemotherapy. Lancet 1991; 338: 487-90.
20. Gautam B, Shrestha BR, Lama P, Rai S. Antiemetic prophylaxis against postoperative nausea and vomiting with ondansetron-dexamethasone combination compared to ondansetron or dexamethasone alone for patients undergoing laparoscopic cholecystectomy. Kathmandu Univ Med J 2008; 6(23): 319-28.
21. Alghanem SM, Massad IM, Rashed EM, Abu-Ali HM, Daradkeh SS. Optimization of anesthesia antiemetic measures versus combination therapy using dexamethasone or ondansetron for the prevention of postoperative nausea and vomiting. Surg Endosc. 2010; 24(2): 353-58.

22. Erhan Y, Erhan E, Aydede H, Yumus O, Yentur A. Surg Endosc. Ondansetron, granisetron, and dexamethasone compared for the prevention of postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy: A randomized placebo-controlled study. 2008; 22(6): 1487-92.

23. Voigt M, Fröhlich CW, Waschke KF, Lenz C, Göbel U, Kerger H. Prophylaxis of postoperative nausea and vomiting in elective breast surgery. J Clin Anesth. 2011; 23(6): 461-68.

24. Kaki AM, Abd El-Hakeem EE. Prophylaxis of postoperative nausea and vomiting with ondansetron, metoclopramide, or placebo in total intravenous anesthesia patients undergoing laparoscopic cholecystectomy. Saudi Med J. 2008; 29(10): 1408-13.

25. Nesek-Adam V, Grizelj-Stojciæ E, Rasiæ Z, Cala Z, Mrsiæ V, Smiljaniæ A. Comparison of dexamethasone, metoclopramide, and their combination in the prevention of postoperative nausea and vomiting after laparoscopic cholecystectomy. Surg Endosc. 2007; 21(4): 607-12.

26. Oksuz H, Zencirci B, Ezberci M. Comparison of the effectiveness of metoclopramide, ondansetron, and granisetron on the prevention of nausea and vomiting after laparoscopic cholecystectomy. J Laparoendosc Adv Surg Tech A. 2007; 17(6): 803-8.