

A comparative study between small dose dexamethasone, tropisetron, metoclopramide and normal saline in reducing nausea and vomiting after laparoscopic cholecystectomy

Received: 22/11/2011

Accepted: 26/4/2012

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Abstract

Background and objective: Nausea and vomiting are among the most common distressing complications encountered by patients postoperatively. The aim of this study is to evaluate the prophylactic effect of small dose of dexamethasone (5 mg) on postoperative nausea and vomiting (PONV) after laparoscopic cholecystectomy (LC).

Methods: A prospective double blind placebo controlled study of 160 patients who underwent elective LC at Rizgary Teaching and Hawler Private Hospitals in Erbil, Kurdistan in a period between Jan 2009 and Dec 2009. Preoperatively the patients were allocated randomly to one of the four groups ($n = 40$ each).

1. The dexamethasone group received dexamethasone 5mg.
2. The metoclopramide group received metoclopramide 10mg.
3. The tropisetron group received tropisetron 2mg.
4. The placebo group received normal saline 2ml.

Results: Both the dexamethasone and tropisetron groups were significantly different from the placebo group in the incidence of nausea and vomiting. The differences between the dexamethasone and tropisetron groups were not significant ($P = 0.799$).

Conclusion: : prophylactic IV dexamethasone 5 mg significantly reduces the incidence of PONV in patients undergoing LC.

Keywords: Postoperative, nausea , vomiting, laparoscopy

Introduction

Laparoscopic surgery provides benefits to patients, including tremendous faster recovery, shorter hospital stay and prompt return to normal activities¹. It has decreased the morbidity associated with cholecystectomy and has become a routine procedure for symptomatic Cholelithiasis^{2,3}. despite the minimally invasive nature of laparoscopy, high incidence of postoperative nausea and vomiting (PONV) remains a major cause for morbidity¹. A frequent incidence of PONV (53%-72%) has been reported⁴⁻⁷. PONV is among the most common distressing side effects encountered by patients following anesthesia and surgical procedures, Kapur described PONV as the 'big, little problem'⁸ a description that

still applies. Until recently, not enough attention was paid to PONV. As a result, it was considered by patients, and often unfortunately, also by doctors, as unnecessary and natural consequence of anesthesia and surgery⁹. Glucocorticoids are well known for their analgesic, anti-inflammatory, immune-modulating, and antiemetic effects, although the mechanisms by which glucocorticoids exert their action are far from clarified¹⁰. Several randomized, clinical trials in many different major and minor surgical procedures have been conducted to examine the effects of a perioperative single-dose glucocorticoid administration on surgical outcome¹¹. The overall results on postoperative outcome

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have either been positive in favor of the glucocorticoid group or without differences between study groups, with PONV and pain as outcome parameters most significantly improved¹¹⁻¹³. The aim of this study is to evaluate the prophylactic effect of small dose of dexamethasone (5 mg) on postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy and comparing these effects with tropisetron, metoclopramide and normal saline.

Methods

This is a prospective double blind placebo controlled study of 160 patients who underwent elective LC at Rizgary Teaching and Hawler Private Hospitals in Erbil, Kurdistan, Iraq in a period between Jan 2009 and Dec 2009. Only patients with ASA physical status I or II included in the study. Patients with a history of PONV, motion sickness, gastrointestinal disorders, pregnant or lactating patients, or who had received an antiemetic drug within 24 hrs before surgery were excluded from the study. Informed consents were taken from all patients. The study approved by Local Ethical comity. Preoperatively the patients were allocated randomly to one of the four groups ($n = 40$ each).

- 1.The dexamethasone group received dexamethasone 5mg.
- 2.The metoclopramide group received metoclopramide 10mg.
- 3.The tropisetron group received tropisetron 2mg.
- 4.The placebo group received normal saline 2ml.

the study medications were prepared by anesthesia nurses in identical 2-ml syringes. The drugs were given immediately after the induction of anesthesia intravenously. Postoperative analgesia was provided by either tramadol 100 mg or diclofenac 75 mg intramuscularly (IM). The patients' demographics and the duration of anesthesia, surgery, and CO₂ insufflations were recorded. Postoperatively data collected about presence of nausea, vomiting,

and rescue antiemetic. The condition regarded as complete response when there was no nausea, no vomiting, and no antiemetic medication during 24 h postoperatively. The number of vomiting episodes was registered. Rescue antiemetic was given in the form of metoclopramide 10mg IV for those patients who experienced vomiting. All patients reexamined after 10 days postoperatively to see if there is any complication. The data analyzed statistically by Microsoft Excel and internet(<http://www.graphpad.com>). Chi-square test used for p values calculation.

Results

The patient demographics (e.g. age, sex, and weight) and the duration of anesthesia, surgery, and CO₂ insufflations were similar among the groups Table 1. The overall incidence of PONV during the first 24 h after surgery was 25% with dexamethasone, 27.5% with tropisetron, 37.5% with metoclopramide and 47.5% with placebo groups Table 2. Both the dexamethasone and tropisetron groups were significantly different from the placebo group in the following variables: the total incidence of nausea and vomiting, more than 3 vomiting episodes, the proportions of patients requiring rescue antiemetic, and the incidence of complete responses Table 2. The differences between the dexamethasone and tropisetron groups were not significant ($P = 0.799$). Of these patients, 12.5% in dexamethasone group, 15% in tropisetron group, 17.5% in metoclopramide group, and 37.5% in placebo group were required rescue antiemetic Table 2. No clinically serious adverse effects of the study drugs observed.

Table 1: The patients' demographics and operative characteristics.

	Dexamethasone (n=40)	Metoclopramide (n=40)	Tropisetron (n=40)	Placebo (n=40)
Mean age (Yr)	50	48	47	51
Sex(M/F)	12/28	14/26	11/29	10/30
Mean Weight (kg)	62	60	59	63
Mean Duration of anesthesia (min.)	45	45	47	48
Mean Duration of operation (min.)	20	21	22	23
Mean Duration of CO ₂ insufflations (min.)	26	25	23	26
Diclofenac	15	16	18	19
Tramadol	12	13	15	17

Table 2: The Evaluation of Postoperative Nausea and vomiting during the first 24 h postoperatively.

Variable		Dexamethasone (5 mg)	Tropisetron (2 mg)	Metoclopramide (10 mg)	Placebo (2ml)
Nausea		6(15%)	6(15%)	8(20%)	12(30%)
Vomiting		4(10%)	5(12.5%)	5(12.5%)	7(17.5%)
Total (Nausea+ Vomiting)	N(%) P value	10(25%) 0.036	11(27.5%) 0.064	13(32.5%) 0.170	19(47.5%)
Vomiting episodes	0-3 episodes	3(7.5%)	3(7.5%)	3(5%)	3(7.5%)
	>3 episodes	1(2.5%)	2(5%)	4(7.5%)	4(10%)
Rescue Antiemetic	N(%) P value	5(12.5%) 0.009	6(15%) 0.022	7(17.5%) 0.045	15(37.5%)
Complete Responses	N(%) P value	30(75%) 0.01	29(72.5%) 0.02	27(67.5%) 0.07	21(52.5%)

Discussion

Several studies have demonstrated dexamethasone's efficacy in the prevention of nausea and vomiting associated with chemotherapy¹⁴⁻¹⁷. Dexamethasone also prevents PONV in patients undergoing hysterectomy, tonsillectomy, and thyroidectomy¹⁸⁻²⁰. The dose often used is 8 to 10mg¹⁸, but the minimal effective dose is 5 mg in patients undergoing thyroidectomy¹⁹. Dexamethasone 8 mg is also effective in reducing the incidence of PONV after LC⁵. We further found that dexamethasone 5 mg is also effective for this purpose. Tropisetron, a serotonin subtype 3 receptor antagonist, is primarily used in the prevention of chemotherapy-related nausea and vomiting²¹⁻²². It has also been applied to the prophylaxis of PONV²³⁻²⁵. Although tropisetron 2 and 5 mg frequently used in the prevention of PONV. Many studies proved that 2 mg Tropisetron enough for this purpose²³⁻²⁶. Our study also showed this fact. Metoclopramide, a central dopaminergic D₂ receptor antagonist and a prokinetic drug, was found by some authors to be an efficient agent in the prevention of PONV when given in 10 mg²⁷⁻²⁹ or 20 mg dose²⁹ where as others found that it is inefficient in preventing PONV³⁰⁻³². In our study metoclopramide in a dose of 10 mg proved to be a poor preoperative prophylactic antiemetic agent. We found no significant reduction of PONV on comparing metoclopramide with placebo. In this study dexamethasone 5 mg was as effective as tropisetron 2 mg and was more effective than placebo for this purpose. Near same results were found in other studies^{17,33}. In our locality 1 ampule dexamethasone (5mg) costs 1000 ID while 1 ampule tropisetron (2 mg) costs 22000 ID. Therefore, dexamethasone 5 mg is a more reasonable choice than tropisetron 2 mg for the prevention of PONV. No impaired wound healing, postoperative Infetion were associated with the use of dexamethasone in this study, same as seen in the studies done by (Wang J et al)³⁴, (Feo C et al)³⁵.

Conclusions

Prophylactic IV dexamethasone 5 mg significantly reduces the incidence of PONV in patients undergoing LC. At this dose, dexamethasone is as effective as tropisetron 2 mg and is more effective than metoclopramide and placebo.

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