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Antiemetic Efficacy of Dexamethasone in Prevention of Postoperative Nausea and Vomiting after Laparoscopic Surgery

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Abstract

Background: Efficient prevention and management of postoperative nausea and vomiting [PONV] continues to be a concern that needs to be addressed.

Objective: The aim of this study is to evaluate the effectiveness of the single dose dexamethasone [I.V. 8 mg] in preventing post operative nausea and vomiting in patients undergoing laparoscopic surgery under general anesthesia.

Design: This was a hospital based Retro prospective Study.

Duration: One Year December 2019 to November 2019.

Setting: Department of Surgery, Owaisi Hospital and Research Centre.

Participants: 50 patients undergoing laparoscopic surgery.

Materials and Methods: A randomized, placebo-controlled study was conducted on 50 patients undergoing elective laparoscopic surgery under general anesthesia. The patients were allocated randomly to one of the two groups Group A - Dexamethasone I.V 8 mg, Group B - I.V saline The anesthetic was standardized. The patients were premedicated with glycopyrrolate 0.2 mg i.v., ranitidine 50 mg i.v., midazolam 0.05 mg/kg and fentanyl 1.5 mg/kg i.v. Vomiting was treated with metoclopromide 10 mg i.v. repeated if necessary.

Results: The total incidence of nausea and vomiting was 28% in the dexamethasone group compared with 68% in the saline group. Dexamethasone is shown to be more effective in reducing nausea than vomiting.

Conclusion: Prophylactic administration of single dose of dexamethasone 8 mg, IV resulted in prevention of post operative nausea and vomiting. Dexamethasone is more useful either alone or in combination with other antiemetics in prevention and treatment of postoperative nausea and vomiting, especially when it is severe andfrequent.

Keywords: Dexamethasone; Post operative Nausea and Vomitting [PONV]; Saline; Anesthesia; Metroclopromide.

Introduction

Postoperative nausea with or without vomiting is probably the most common complication of surgery performed under general anesthesia. Patients undergoing laparoscopic surgeries are particularly at risk of experiencing postoperative nausea and vomiting. In the absence of any antiemetic

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prophylaxis, the incidence of postoperative nausea and vomiting after laparoscopic surgery can range from 40%-75%.[1]

Postoperative nausea and vomiting is one of the important factors that determine the length of stay after day care surgery. Most of the currently used antiemetic drugs [for example: antihistaminics, anticholinergics and dopamine receptor antagonists] possess clinically significant side effects such as sedation, adrenergic blockade, dry mouth, dysphoria, restlessness, and extra pyramidal symptoms.[2]

The quest for more effective antiemetic drugs without the potential for side effects has led to the idea that the combination of drugs currently used in the treatment of nausea and vomiting in patients receiving chemotherapy could be a solution to control postoperative nausea and vomiting where it is severe and frequent.[3]

Dexamethasone is one such drug which has been used successfully since 1981 for the treatment of nausea and vomiting in patients receiving chemotherapy either alone or in combination with other antiemetics. The abundant research in the oncology literature demonstrates its efficacy with minimal adverse effects.

Investigations of perioperative use of dexamethasone are surprisingly uncommon. Recently dexamethasone has also been reported to be effective in reducing the incidence of postoperative nausea and vomiting in pediatric patients undergoing strabismus repair, tonsillectomy, and adenoidectomy and in women undergoing major gynaecological surgery.[4] As dexamethasone has an antiemetic effect in various situations, we thought that it may also be effective in the prevention of emesis after laparoscopic surgery. Therefore we have planned to evaluate the antiemetic effect of intravenous dexamethasone in the prevention of nausea and vomiting after laparoscopic surgery in adult patients.

Materials and Methods

Place of Study: Department of Surgery, Owaisi Hospital and Research Centre, Hyderabad.

Type of Study: Hospital based retro prospective study.

Sample Collection: Sample size: 50 Patients.

Sampling Methods: Consecutive Sampling.

Inclusion Criteria: Patients aged between 20–60 years, Patients belonging to ASA I and II, Patients undergoing elective laparoscopic surgery under general anesthesia.

Exclusion Criteria: Patients with a history of motion sickness, Patients who had received antiemetics within 24 hrs prior to surgery. Patients with clinically significant cardiovascular, pulmonary, renal, hepatic, neurological or endocrine abnormalities.

Statistical Methods: Data were presented in the form of statistical Tables and charts. SPSS software version 20 was used for statistical analysis.

Ethical Approval: Approval was taken from the Institutional Ethics Committee prior to commencement of the study.

A randomized, placebo-controlled study was conducted on 50 patients undergoing elective laparoscopic surgery under general anesthesia at Owaisi Hospital and Research Centre. The patients were allocated randomly to one of the two groups Group A - Dexamethasone I.V 8 mg, Group B - I.V saline.

The anesthetic was standardized. The patients are premedicated with glycopyrrolate 0.2 mg i.v., ranitidine 50 mg i.v., midazolam 0.05 mg/kg and fentanyl 1.5 mg/kg i.v.

At the end of surgery, glycopyrrolate 0.5 mg i.v and neostigmine 2.5 mg i.v were administered for reversal of neuro muscular block, and the patient was extubated. After surgery, patients were observed for 24 hrs. Post operative analgesia was provided by injdiclofenac sodium 1.5 mg/kg every 8th hourly. Throughout the 24 hrs period, vital signs such as pulse rate, blood pressure and respiratory rate were monitored every 4th hourly except during sleep. The incidence of nausea or vomiting was also recorded every 4th hourly for 24 hours, except during sleep.

Vomiting was treated with metoclopromide 10 mg i.v. repeated if necessary.

Observations and Results

A total of 50 patients were taken for study, 25 of them received placebo (normal saline) while the other 25 received dexamethasone.

Table 1: Patient Characteristics (mean or number and range)

	Placebo Group	Dexamethasone Group
N.	25	25
Age (yrs)	32.56 (20-60)	32.68 (20-60)
Weight (kgs)	54.08 (46-72)	54.16 (44-70)
Sex (M/F)	8/17	11/14
Duration of anesthesia (min)	101.2 (75-135)	97.92 (65-150)
Duration of surgery (min)	86.68 (60-120)	82.20 (60-120)
Duration of CO_2 Insufflations (min)	75.56 (50-105)	72.40 (50-110)

The mean duration of anesthesia for placebo group was 75–135 min (mean min) and for dexamethasone group it was 65–150 (mean 97.92 min).

The mean duration of surgery for placebo group was 86.68 min (range 60–120 min) and for dexamthasone group it was 82.20 min (range 60–130 min).

The mean duration of carbondioxide insufflation for placebo group was 75.56 min (range 50-105 min) and for dexamethasome group it was 72.40 min (range 50-110 min).

Table 2: Incidence of Nausea from 0-4 hr, 4-8 hr and 8-24 hr after Recovery from Anesthesia

Assessment Period	Placebo Group	Dexamethasone group
0 - 4 hr	9 (36%)	4 (16%)
4 - 8 hr	11 (44%)	4 (16%)
8 - 24 hr	4 (16%)	3 (12%)

During 0-4 hr of observation 36% (9 out of 25) of patients had nausea and 12% (3 out of 25) of patients had vomiting in placebo group. Whereas in the study group only 16% (4 out of 25) of patients had nausea and 8% (2 out of 25) of patients had vomiting.

During 4-8 hrs of observation period 44% (11 out of 25) of patients had nausea and 24% (6 out of 25) of patients had vomiting in placebo group. Whereas in the study group only 16% (4 out of 25) of patients had nausea and 8% (2 out of 25) had vomiting.

During 8-24 hrs of observation period 16% (4 out of 25) of patients had nausea and 16% (4 out of 25) had vomiting in placebo group. In study group only 12% of patients (3 out of 25) had nausea and 4% of patients (1 out of 25) had vomiting.

Table 3: Number of Episodes of Vomiting in First 24 Hour Post Operative Period

No. of episodes	Placebo group	Dexamethasone group
0	15 (60%)	22 (88%)
1	6 (24%)	1 (4%)
2	3 (12%)	2 (8%)
>2	1 (4%)	0
Total	25	25

The number of emetic episodes in both the groups were as shown in Table 4. In placebo group 24% (6 out of 25) had one emetic episode each and 12% (3 out of 25) had two emetic episodes each. Only one patient in placebo group had more than 2 emetic episodes. In dexamethasone group, one patient vomited once and two patients had two emetic episodes each.

In placebo group 4 out of 25 patients received rescue antiemetic, whereas in study group it is 2 out of 25 patients.

Discussion

Nausea and vomiting following general anesthesia has been a distressing problem for patients. Sometimes it may be the only distressing long lasting memory of patient's experience regarding general anesthesia. It increases the recovery time, intensity of nursing care and patient morbidity.[5,6] Even though laparoscopy avoids prolonged exposure and manipulation of intestines and decreases the need for peritoneal incision and trauma when compared to laparotomy, the incidence of postoperative nausea and vomiting is higher after laparoscopy than that after laparotomy probably because of various other reasons like gas insufflations, diaphragmatic irritation etc. Postoperative nausea and vomiting is one of the main complaints after laparoscopy (in 40 to 75% of patients) and the most important factor determining the length of stay after ambulatory anesthesia. But multiple postoperative benefits which include less trauma, less pain, less pulmonary dysfunction, quicker recovery and shorter hospital stay made laparoscopy as standard and accepted procedure for many surgical problems.

In this study all the patients underwent laparoscopic surgery, a type of surgery associated with the highest incidence of postoperative nausea and vomiting, under general anesthesia. Duration ofanesthesia, surgery and carbondioxide insufflation were similar in both groups. In addition, after random allocation, age and sex distribution in both groups was similar. Analgesia for postoperative pain was standardized and pain scores were similar in both the groups. Therefore we believe that differences in the incidence of postoperative nausea and vomiting were attributed to the study drugs.

In this study the prophylactic administration of dexamethasone significantly, reduced the incidence of nausea and vomiting after laparoscopic surgery.

The total incidence of nausea and vomiting was 28% in the dexamethasone group compared with 68% in the saline group. Dexamethasone is shown to be more effective in reducing nausea than vomiting.

These findings are in accordance with recent studies that showed dexamethasone can be effective in preventing PONV in adults and children. Compared with other preventive medications, dexamethasone has equal or even better efficacy

in reducing the incidence of PONV and has the advantages of low cost and longer effectiveness as well.[7-11]

Adverse effects related to single dose of dexamethasone are extremely rare. Usually the adverse effect of dexamethasone depends on duration and dose. Less than 24 hours of dexamethasone therapy is considered safe and almost without adverse effects.

Conclusions

We conclude that prophylactic administration of single dose dexamethasone (8 mg i.v), when given just before induction, significantly reduced the incidence of nausea and vomiting after laparoscopic surgery. If our results are confirmed in larger studies, dexamethasone will be more useful either alone or in combination with other antiemetics in prevention and treatment of postoperative nausea and vomiting, especially when it is severe and frequent.

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