ORIGINAL ARTICLE

Comparison of Dexamethasone With Ondansetron for Prevention of Post-Operative Nausea and Vomiting

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ABSTRACT

Aim: To evaluate the impact of dexamethasone (DEX) as a cost-effective drug to prevent Postoperative nausea and vomiting (PONV) in comparison to ondansetron in laparoscopic surgery.

Methods: In this randomized control study, we included 100 patients, who underwent laparoscopic surgery under general anesthesia at Nishtar Hospital Multan. Within 6 months from 21 Jan 2018 to 20 June 2019. Patients were divided into Group I, and Group II. Group I; in these patients intravenous (IV) DEX 8 mg was given at the time of induction of anesthesia. Group II; in these patients, Ondansetron (4 mg) IV was given at the time of induction of anesthesia. After completing the surgery and shifted the patient to the recovery room, the observation was done for early 6 hours of post-operative and noted down with the occurrence of PONV.

Results: The demographic profile which includes age, weight, sex, BMI, ASA I and ASA II were comparable and there were no significant differences [p>0.05] were observed between the two groups. PONV occurred in 11 (22%) patients in the DEX group and 21(42%) patients in the ondansetron group (p-value 0.03).

Conclusion: DEX reduced the incidence of PONV after laparoscopic surgery. A single dose of DEX was found to b a safe and cost-effective alternative to single-dose ondansetron for the prevention of PONV.

Keywords: Postoperative nausea and vomiting (PONV), laparoscopic surgery, Dexamethasone, Ondansetron.

INTRODUCTION

Postoperative nausea and vomiting (PONV) are typical troubling side effects in patients experiencing laparoscopic surgery and can contribute nervousness, dehydration, metabolic variation, wound disturbance, differed recovery and prolonged stay in the intensive care unit.[1] The incidence of PONV varies from 20 to 80%. The widespread use of narcotics for post-operative pain relief as a double-edged sword which aggravate nausea and vomiting. Ondansetron is a selective 5-HT3 receptor antagonist, which exhibits an anti-emetic action by antagonizing vomiting signals in the afferent pathway from the stomach or small intestine and is effective at preventing PONV,[2] being expensive, widely utilized.[3] DEX is cheap, cost-effective corticosteroid, administration at the induction time works as an effective anti-emetic agent and administration as a single dose doesn't provide any side effect like adrenocortical suppression and hypoglycemia,[4] the complete mechanism of DEX is still unknown, It might be associated with central inhibition of prostaglandin synthesis, or it might cause less amount of serotonin release, which turnover in the central nervous system[5].

The present study was conducted to assess the impact of DEX as a cost-effective drug to prevent PONV in comparison to ondansetron.

METHOD

This randomized controlled study was conducted in patients who underwent laparoscopic surgery under general anesthesia at Nishtar Hospital Multan were included in this study. The duration of the study was 6 months, from 21 December 2018 to 20 June 2019. In this study, we included 100 patients of ASA (American Society of anesthesiology) 1 and 2, patients age between 20 to 60 years old, both male and female genders include, including the patients who are scheduled to laparoscopic surgery under general anesthesia are selected. Approval of the ethical committee and written informed consent was taken from every individual patient. Patients taking pre-operative anti-emetics will be excluded because these patients can create biasedness in the outcome of the study, patients with ASA III or IV, allergic history of the study drug, female patients, who are menstruating or breastfeeding and past history of PONV are excluded. Patients were divided into two groups using the Draw randomization. Group I; in these patients intravenous (IV) DEX 8 mg was given at the time of induction of anesthesia. Group II; in these patients, Ondansetron (4 mg) IV was given at the time of induction of anesthesia. After completing the surgery and shifting the patient to the recovery room, I noted down the frequency of PONV within 6 hours after surgery in all patients. Data regarding the patient's age, gender, ASA status, BMI and PONV of the patients was noted. Data analysis was carried out using SPSS v20.0. Chi-square test was applied to compare PONV between the groups. P-value $\leq$0.05 was taken as significant.

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RESULTS

The demographic profile which include age, weight, sex, BMI, ASA I and ASA II were comparable and there were no significant differences [p>0.05] were observed between the two groups (table I). The PONV after the early 6 hours of post-surgery, occurred in 11(22%) patients in the DEX group and 21(42%) patients in ondansetron group (p-value 0.03). (Table-II).

Table- I. Comparison of Baseline Study Variables (n=100)

Parameter	Dex	Ondansetron	P-value
Age (years)	42.11±11.41	45.23±12.26	0.19
Weight (kg)	69.22±11.43	66.22±13.4	0.22
Gender (Male/Female)	28/22(56% / 44%)	30/20(60%/ 40%)	0.68
BMI	25.39±4.34	24.65±3.47	0.34
ASA I	39 (78%)	37 (74%)	0.63
ASA II	11(22%)	13 (36%)	

Table II. Comparison of PONV between the Groups.

PONV	Study Groups	
	Dex	Ondanestron
Yes	11 (22.00%)	21 (42.00%)
No	39 (78.00%)	29 (58.00%)

P value 0.032

DISCUSSION

Postoperative nausea and vomiting is a common compilation after laparoscopic surgeries and maybe even more distressing than postoperative pain. PONV may even delay the discharge of the patients.[6] Incidence of PONV can reach up-to 63% in LC patients if no anti-emetics are used[7,8].

In 1981 the anti-emetic efficacy of DEX was first time assessed in cancer patients.[9] Still the underlying mechanisms by which steroids reduce PONV is still not understood, possibly it may be due to its effects on prostaglandin synthesis or minimization of endogenous opioids release.[10] Infection, delayed wound healing are two common adverse complications of steroids use.[11] A meta-analysis on side effects of steroids did not reported any increase in the steroids administration using a single dose[12]. We did not have any postoperative complications which could be attributed to DEX prophylaxis. The introduction of serotonin (5HT3) receptor antagonists in 1991 have heralded a major advances in the treatment of PONV because of the absence of adverse effects that were observed with commonly used antiemetic drugs. Ondansetron has no sedative or extra-pyramidal symptoms or hemodynamic effects and is found to be effective for PONV prevention[13,14].

In the present study, we found a significantly lower rate of PONV in the DEX group as compared to the ondansetron group, PONV occurred in 11 (22%) patients in the DEX group and 21(42%) patients in ondansetron group.

Yuksek et al. while comparing ondansetron (4mg) with DEX (8mg) in gynecological laparoscopic surgeries found ondansetron to be better than DEX (incidence of PONV 35% vs. 55% respectively) with a significant difference only in the first 3 hours postoperatively when used for PONV prophylaxis at induction[15].

Apfel et al. in their very large study enrolling 5199 high-risk surgical patients, found a comparable reduction in PONV by ondansetron and DEX prophylaxis of about 26%, though the study population is a mixed one[16].

A study by Grimsehl et al. compared Ondansetron (4 mg) with Marzine (50 mg) for PONV prevention. The authors reported no significant difference in these drugs for prevention of PONV, with frequency of 54% vs 56% respectively[17].

Moreover, single dose of DEX also has no side effects such as delay in wound healing.[18] The use of steroids also has a significant role in reducing the severity of post-operative pain[19], However we did not determine effect of DEX on post-op pain. Cost of treatment is also a major issue now a days, DEX is cheaper as compared to Ondansetron, so it is a better choice for PONV prevention in patients undergoing laparoscopic surgeries

CONCLUSION

Dexamethasone is more effective than ondansetron for prevention of PONV in patients undergoing laparoscopic procedures. So DEX can be considered as a safe and cost-effective drug for PONV prophylaxis.

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