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Original Article

A Randomized Control Study of Comparison of Ondansetron and Combination of Ondansetron and Dexamethasone as a Prophylaxis for Post-operative Nausea and Vomiting in Adults Undergoing Elective Laparoscopic Surgery

M Santhi Sree[1], M Srinivas[2], M Ramarao[2], K S S M P Vyas[3]

[1]Professor, Department of Anaesthesia, ACSR Medical Collage, Nellore, Andhra Pradesh, India, [2]Associate Professor, Department of Anaesthesia, ACSR Medical Collage, Nellore, Andhra Pradesh, India, [3]Senior Resident, Department of Anaesthesia, Siddhartha Medical College, Vijayawada, Andhra Pradesh, India

Abstract

Aim: The aim of study is to compare Ondansetron's effectiveness in preventing post-operative nausea and vomiting in laparoscopic procedures under general anesthesia with combination of Ondansetron and dexamethasone

Materials and Methods: In this randomized, double-blind clinical study, we looked at 86 ASA Grades I and II patients between the ages of 18 and 60 who were having an elective laparoscopic cholecystectomy under general anesthesia. They were divided into two groups of 43 people each at random, for example, Groups O and OD are two different groups. Ondansetron 4 mg intravenous (IV) was given to group O, and both 4 mg ondansetron and were given to group OD. IV Ondansetron and 4 mg dexamethasone as a preventive antiemetic, 05 min before induction. All post-operative cases were monitored for post-operative nausea and vomiting from 0 to 6 h, 6 to 12 h, and 12 to 24 h. The number of emesis and nausea episodes was counted.

Results: When the nausea and vomiting in the ondansetron and ondansetron + dexamethasone groups was compared it was discovered that the nausea and vomiting in the ondansetron + dexamethasone group were significantly less than the nausea and vomiting in ondansetron group alone which is statistically significant.

Conclusion: We conclude that an IV combination of ondansetron and dexamethasone given before induction is safer and more effective than IV ondansetron or IV dexamethasone given alone in preventing early nausea and delayed vomiting.

Key words: Ondansetron, Dexamethasone, PONV

INTRODUCTION

Anesthesia and surgery are known to cause pain, nausea, and vomiting. The foremost thing is the unpleasant sensation of pain. Nausea and vomiting might cause delay in hospital release.

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In the last few decades, pain treatment has gotten a lot more attention than post-operative nausea and vomiting (PONV). Despite the availability of newer medications, the prevalence of PONV remains high. It's somewhere between 15% and 30%. The combination of medicines produces better antiemetic effects. There are at least 3 forms of vomiting, 1st of which is caused by anesthetic medications, the 2nd by reflex responses, and the third by narcotics like opioids. There has been a general trend towards decrease in the incidence and severity of the problem due to a shift in anesthesia practice to non-opioid or supplemented opioids, use of less emetic anesthetic agents, improved pre- and post-operative medication,

Corresponding Author: Dr. M Santhi Sree, Department of Anaesthesia, ACSR Medical Collage, Nellore, Andhra Pradesh, India.

refinement of operative techniques, and identification of patient predictive factors.

Despite these developments, the prevalence of PONV associated with surgery and anesthetic remains unacceptable. The patient's nausea and vomiting might have serious medical consequences, as well as financial consequences of postponed hospital discharge.

PONV has been linked to a variety of problems, including incision site pain, hematoma formation, wound dehiscence, pneumothorax, and aspiration pneumonitis.

Intractable nausea is uncomfortable, possibly dehydrating, and difficult to manage at home; nonetheless, the cost of a hospital stay for most healthy outpatients is disproportionate to the real morbidity of nausea.

Dexamethasone has been shown to be an effective antiemetic in cancer patients undergoing chemotherapy. The hunt for a newer and better antiemetic agent was prompted by the negative effects of traditional using drugs.

Ondansetron, a selective 5 HT3 receptor antagonist with no effects on other receptors, was a prospective new entrance into the antiemetics market. Ondansetron is structurally similar to serotonin. Ondansetron's antiemetic effect can be mediated peripherally, centrally, or both. It has been seen as an exceptionally effective antiemetic with no major side effects in patients taking cytotoxic chemotherapy. Ondansetron is being used for PONV on a regular basis. Several studies have validated the efficacy of ondansetron, which has a lower side effect profile. Ondansetron has now become the gold standard against which other antiemetic drugs are measured. Due to the multifactorial nature of emesis, antiemetic benefits are best achieved when a 5HT3 antagonist is used in conjunction with steroids.

PONV has been observed to be reduced when dexamethasone and ondansetron are used together. Because the causes of PONV are diverse, antiemetics can work in concert. From nausea to severe vomiting, PONV has a wide range of effects.

Aim of the Study

The aim of study is to compare ondansetron's effectiveness in preventing PONV in laparoscopic procedures under general anesthesia with combination of ondansetron and dexamethasone has been shown to be effective with respect to:

1. Vomiting
2. Nausea
3. The use of a rescue antiemetic if required
4. Side effects.

To start vomiting, the emetic center delivers motor output from the dorsal nucleus of the 10th cranial nerve and the nucleus ambiguous. Despite the fact that there no alternate pathway for emetic response, no drug has been discovered that can inhibit it and hence work as an antiemetic.

Different types of receptors send diverse signals to the vomiting center. Emesis caused by the stimulation of a receptor may be alleviated by signal antagonists. However, no medicine currently on the market can block all of the mechanisms involved in the emetic reaction.

Dopaminergic, histaminic (H1), cholinergic, muscarinic, and 5HT 3 neurotransmitter systems appear to play essential role in modulating emetic response. Because there are four different types of receptors, medicines have at least four separate receptor site of action. Antiemetic medicines may operate on multiple receptors, but they usually focus on one or two of them.

As a result, a combination of medications will almost certainly have a stronger antiemetic effect than a single agent. Sedation itself may help in the prevention of vomiting.

MATERIALS AND METHODS

Source of Data

1. This study was done at Siddhartha Medical College, Government general hospital, Vijayawada, from December 2019 to June 2021
2. The trial included 86 individuals who were scheduled for laparoscopic cholecystectomy
3. In this randomized, double-blind clinical study, we looked at 86 ASA grade I and II patients between the ages of 18 and 60 who were having an elective laparoscopic cholecystectomy under general anesthesia.

The ethical committee gave their approval, and all patients signed written informed permission. They were divided into two groups of 43 people each at random, for example, Groups O and OD are two different groups. Ondansetron 4 mg intravenous (IV) was given to Group O, and both 4 mg were given to group OD. IV Ondansetron and 4 mg dexamethasone as a preventive antiemetic, 05 min before induction.

Patients are Chosen at Random

Inclusion criteria

The following criteria were included in the study:

1. Patients aged 18–60 years old
2. ASA I and II physical status
3. Cholecystectomy (laparoscopic) is scheduled as an elective procedure.

Exclusion Criteria

The following criteria were excluded from the study:

1. Patients with ASA III and IV physical status
2. Patients who received opioids, nonsteroidal anti-inflammatory drugs, or antiemetic drugs 48 h before surgery
3. Patients on ASA I and II having a history of (a) an allergic reaction to any drug or food (b) body mass index of more than 25 kg/m^2 (c) motion sickness or migraine (d) alcohol, drug addiction, or smoking
4. The patient's cholecystectomy was modified to an open procedure.

Methods

Pre-operative assessment

1. One day previous to surgery, the patient was assessed and given typical institutional pre-operative instructions
2. All patients had basic investigations such as hemoglobin, total leukocyte count, differential leukocyte count, urinalysis, and liver function tests, and further investigations such as electrocardiogram (ECG), fasting and postprandial blood sugars were done preoperatively based on the patient's ASA status, age, and clinical profile
3. The anaesthesiologist performing all laparoscopic operations was ignorant of the preventive therapy administered. All patients were given 0.5 mg Alprazolam tablets and kept NPO for 8 h before to surgery.
4. Using a computer-generated random number table, patients were randomly assigned to one of two groups (n = 43 each)
5. Study medicine was produced by a non-study PG trainee in two identical syringes labelled A and B, containing Ondansetron 4 mg and Ondansetron 4 mg + Dexamethasone 4 mg, respectively, given 5 min before anesthesia induction. The guide had the master list of cases.

Monitoring Before Surgery

1. NIBP
2. 3 lead ECG
3. Oxygen saturation with pulse oximeter
4. Heart rate (HR).

Laparoscopic Surgery Anesthesia Technique

1. Premedication: Inj Fentanyl 2 g/kg and Inj Glycopyrrolate 5 mcg/kg, both of which were induced by Propofol at a dose of 2–2.5 mg per kg body weight
2. Vecuronium 0.1 mg per kg body weight was used to help with tracheal intubation. The gastric contents were emptied using a nasogastric tube
3. N_2O + O_2 + Isoflurane were used to maintain anesthesia (0.6–0.8%). During anesthesia, 1/5th of loading dose of vecuronium is administered to ensure appropriate muscular relaxation throughout the surgery
4. During the procedure, the patient's HR, blood pressure, oxygen saturation, ECG, and urine output were all monitored
5. The abdomen was insufflated with CO_2 at a pressure of 8–12 mm Hg during laparoscopic surgery
6. The surgeon deflated the abdomen when the operation was completed
7. The patient was extubated at the end of operation by reversing the patient with neostigmine and glycopyrrolate (dose according to body weight). Patients' vitals were checked in the post-operative period
8. All post-operative cases were monitored for post-operative nausea and vomiting from 0 to 6 h, 6 to 12 h, and 12 to 24 h. Metoclopramide was utilized as a rescue antiemetic in patients who complained of vomiting.

Assessment

The number of emesis and nausea episodes was counted. Single emesis was defined as repeated vomiting in a period of 1–2 min. The intensity of each case of nausea, vomiting, and pain was also measured using the VAS system.

a. Nausea was assessed using an 11-point visual number scale, with 0 indicating no nausea and 11 indicating severe nausea
   - 10 = The worst nausea you've ever had.
   - A score of more than five indicates that the problem is severe. 5 is a moderate score.
   - 5 is the bare minimum.
   - Major nausea was defined as a score of severe or moderate.
b. Vomiting was classified as severe if it was more than 2 times the normal amount <2 is Mild
   - 2 = Moderate.
   - Even for a single bout of vomiting, a rescue antiemetic of 0.15 mg/kg metoclopramide IV was given.

Statistics Analysis

Statistical Package for the Social Sciences was used to conduct statistical analysis. The qualitative factors were expressed as percentages, whereas the quantitative data were expressed as Mean ± SD (standard deviation). The student t-test was used to examine age, weight, operation duration, and anesthetic duration, whereas the Chi-square test was used to examine gender, ASA physical status, nausea and vomiting frequency, and usage of rescue antiemetic. Student's t-test for unequal variances was used to examine the potency of ondansetron, dexamethasone individually or in combination among groups.

P = 0.05 was deemed insignificant.

RESULTS AND OBSERVATIONS

Demographic Information

a. A total of 86 patients were randomized into two groups O and OD, each with 43 patients, and received PONV prophylaxis either IV ondansetron or a combination of ondansetron and dexamethasone
b. Sex distribution — The baseline characteristics of all the groups were similar, with Group O having 20 males and 23 females and Group OD having 21 males and 22 females.

Distribution of Age in the Study Population in Both the Groups

Mean age of the study population identified as 33.77 ± 7.52 and 34.47 ± 6.09 in ondansetron group and Ondansetron + Dexamethasone group, respectively, and the difference is not statistically significant [Table 1].

The percentage of males and females was identified to be 23.2 and 26.7 in the 'O' group followed by 25.5 and 24.6 females and males, respectively, in 'OD' group [Table 2].

The study population's mean operation duration was 35.30 + 5.44 in ondansetron group and 36.63 + 5.74 in the Ondansetron + Dexamethasone group, respectively, and the difference was not statistically significant [Table 3].

The above table shows the mean values of systolic blood pressure, diastolic blood pressure, and HR, and the difference between those clinical measures was not significant statistically [Table 4].

AHA I accounted for 46.5% of the study population in both groups, while AHA II accounted for 3.5% in both [Table 5].

When the nausea in the ondansetron and ondansetron + dexamethasone groups was compared at 0–6 h, it was discovered that the nausea in the ondansetron + dexamethasone group was significantly less than the nausea in ondansetron group alone [Table 6].

On comparing the nausea at 6–12 h in ondansetron and ondansetron + dexamethasone groups, it is observed that there is no difference in occurrence of nausea and it is not statistically significant [Table 7].

On comparing the nausea at 12–24 h in ondansetron and ondansetron + dexamethasone groups, there is no difference in occurrence of nausea and it is not statistically significant [Table 8].

When comparing vomiting at 0–6 h in ondansetron and ondansetron + dexamethasone groups, it is shown that vomiting is reduced in the ondansetron + dexamethasone group, which is statistically significant [Table 9].

When the vomiting in the ondansetron and ondansetron + dexamethasone groups was compared at 6–12 h, it was discovered that there was no difference in the frequency of vomiting and that it was not statistically significant. At 12–24 h, no patient in either group reported vomiting [Table 10].

About 2.17% of patients in the Ondansetron + Dexamethasone group required a rescue antiemetic, whereas 37% of patients in ondansetron group did, and this difference is statistically significant [Table 11].

There is no difference in occurrence of side effects in both groups [Table 12].

DISCUSSION

For a patient undergoing anesthesia and surgery, PONV is the most uncomfortable experience. It is a common side effect of general anesthesia and an unexpected hospital admission following a day care procedure. The cause of nausea and vomiting following laparoscopic surgery is unknown.

Multimodal Analgesia is a type of systemic analgesia. Only if given before the onset of pain, prophylactic IV acetaminophen as part of a multimodal analgesic regimen lowers nausea.

Following a gastrectomy, IV acetaminophen, along with continuous epidural analgesia, resulted in the lower opioid use

Table 1: Age distribution

Age in years	Ondansetron (Mean+SD)	Ondansetron + Dexamethasone (Mean±SD)	*P*-value
Mean±SD	33.77±7.52	34.47±6.09	0.63

Table 2: Gender distribution of study population in both the groups

Gender	Frequency (n)	Percentage
Ondansetron group		
Females	23	26.7
Males	20	23.2
Ondansetron+Dexamethasone		
Females	22	25.5
Males	21	24.6
Total	86	100

Table 3: Ondansetron and ondansetron+ dexamethasone groups duration of surgery comparison

Duration of surgery	Ondansetron (Mean±SD)	Ondansetron + Dexamethasone (Mean±SD)	*P*-value
Mean±SD	35.30±5.44	36.63±5.74	0.27

Table 4: Comparison of mean SBP a DBP among Ondansetron and Ondansetron+Dexamethasone groups

Clinical parameters	Ondansetron (Mean±SD)	Ondansetron+Dexamethasone (Mean±SD)	*P*-value
Mean systolic BP	126.28±4.82	125.00±5.72	0.22
Mean diastolic BP	79.77±3.52	78.60±3.19	0.11
HR	72.98±5.68	72.14±4.94	0.46

BP: Blood pressure, HR: Heart rate, SBP: systolic blood pressure, DBP: Diastolic blood pressure

Table 5: Comparison of ASA grades

AHA grading	Ondansetron %	Ondansetron+Dexamethasone
I	46.5	46.5
II	3.5	3.5
Total	50	50

Table 6: Comparison of nausea using vas scale scoring in both the groups (At 0–6 h)

Score	Ondansetron	Ondansetron + Dexamethasone	Total	*P*-value
0	19	38	57	*P*=0.000*
2	3	0	3	
3	4	2	6	
4	14	3	17	
5	3	0	3	
Total	43	43	86	

Table 7: Comparison of nausea using vas scale scoring in both the groups (At 6–12 h)

Score	Ondansetron	Ondansetron+Dexamethasone	Total	*P*-value
0	37	40	77	*P*=0.21
2	3	3	6	
4	3	0	3	
Total	43	43	86	

Table 8: Comparison of nausea using vas scale scoring in both the groups (At 12–24 h)

Score	Ondansetron	Ondansetron+Dexamethasone	Total	*P*-value
0	42	43	85	*P*=0.31
5	1	0	1	
Total	43	43	86	

Table 9: Comparison of vomiting using vas scale scoring in both the groups (At 0–6 h)

Score	Ondansetron	Ondansetron+Dexamethasone	Total	*P*-value
0	39	43	82	*P*=0.04
4	4	0	4	
Total	43	43	86	

Table 10: Vomiting comparison in both groups using vas scale scoring (at 6–12 h)

Score	Ondansetron	Ondansetron+Dexamethasone	Total	*P*-value
0	42	43	85	*P*=0.31
5	1	0	1	
Total	43	43	86	

and a lower incidence of PONV. While oral acetaminophen has been found to minimize opiate need and is significantly less expensive, its impact on PONV has not been well investigated. The reported incidence of PONV during the ether era was high (70–85%). It was then proposed that the PONV could be caused by something other than anesthesia. At least 3- types of vomiting have been identified, 1st of which is related to anesthesia drugs 2nd to reflex responses and 3rd to narcotics. In most cases, using regional anesthesia to totally avoid general anesthesia in children is impractical. It could, however, be considered in older children undergoing minor procedures, with the goal of reducing N_2O, volatile agents, and narcotic exposure. Long-term fasting should be avoided, and good hydration should be encouraged to reduce PONV. With the shift from opioid-based anesthesia to non-opioid or supplemented low-dose opioids and non-ether anesthesia, the use of less emetic anesthetic agents, improved pre- and post-operative medication, refinement of operative techniques, and identification of patient predictive factors, the incidence and severity of the problem has decreased. Despite these advances, nausea and vomiting continue to be an unacceptably common side effect of surgery and anesthesia.

Long periods of CO_2 insufflation, intraoperative use of isoflurane, fentanyl, and glycopyrrolate, female sex, and post-operative opioid use may all play a role in these events. Other factors include intraoperative hypotension and abdominal viscera manipulation.[1,2]

According to Apfel *et al*.[3] one of the known risk factors for PONV is female sex. PONV is also increased by laparoscopic surgeries such as ovum retrieval and other gynecological procedures.

Female patients getting operated for total abdominal hysterectomy with or without oopherectomy have been identified as a high-risk group for PONV, and Watcha and White[4] have investigated the incidence of PONV in this group. The efficacy of any mono or combination antiemetic medicine is better studied in such patients who are at risk.

Neurokinin-1 receptor antagonists are a promising new family of antiemetics that were developed and approved to treat emesis caused by chemotherapy. When given orally before surgery, aprepitant has a similar antiemetic effect

Table 11: Comparison of anti-emetic rescue in both groups

Requirement of rescue antiemetic	Ondansetron (n)	Ondansetron+Dexamethasone (n)	Total	*P*-value
No	26	41	67	*P*=0.000*
Yes	17	2	19	
Total	43	43	86	

*Highly significant

Table 12: Comparison of side effects in both the groups

Side effects	Ondansetron (n)	Ondansetron+Dexamethasone (n)	Total	*P*-value
No	42	42	84	*P*=1.0
Yes	1	1	2	
Total	43	43	86	

on nausea and a stronger effect on vomiting than other regularly used antiemetics.

In fact, aprepitant reduced the incidence of vomiting by 70–80% in two randomized controlled trials. Aprepitant is not linked to QTc prolongation or sedative effects, but its expensive price makes it only suitable for high-risk individuals.

Antiemetic medications such ondansetron, dexamethasone, and droperidol, as previously mentioned, are similarly effective, each lowering the patient's risk by 28%. Their actions are cumulative because they work on distinct receptor classes. Patients with a low-to-moderate risk can receive one or two interventions (e.g., TIVA and antiemetic medications), while those with increased risk factors can receive three or four. Expert guidelines propose using the patient's risk to personalize antiemetic prophylaxis is beneficial. It is critical to think about the patient's risk as well as the safety and relative efficacy of the various therapies. But putting in place an institutional protocol to prevent and treat PONV is much more crucial.

Ondansetron is a serotonin type-3 receptor antagonist that is selective. The STN and chemoreceptor trigger zone have the highest concentration of 5HT3 receptors in the central nervous system (CNS), and 5HT3 antagonists decrease nauseating sensation and emetic episodes by acting at these regions. They do not have the sedative and dysphoric side effects of Droperidol, as well as the extrapyramidal adverse effects of Metoclopramide at large doses. In the laparoscopic cholecystectomy,[5] It has been shown to be useful in both treating and preventing PONV.

Ondansetron is more effective than dexmedetomidine and metoclopramide 10 mg. Because no single antiemetic, including ondansetron, is completely successful in all patients, the notion of combination therapy was developed.[6,7]

A quantitative systemic review found that combination of dexamethasone with a serotonin type-3 receptor antagonist provides the best prophylactic for PONV currently available. PONV has been controlled in numerous studies using various combinations of therapy.[8,9] In all of these investigations, the incidence of nausea was quite variable, most likely due to the different types and lengths of operation.

A 5-HT3 receptor antagonist with either Droperidol or with steroids has been the most widely researched combination. The efficacy of both combination regimens appears to be equal. The absolute risk of PONV was lowered to zero when dexamethasone was taken in conjunction with a 5HT3 receptor antagonist. This combination also has few side effects, the majority of which are caused by the 5 HT3 receptor antagonists. As a result, dexamethasone with a 5HT3 receptor antagonist appears to be a sensible choice for PONV treatment.

Our findings suggest that when Dexamethasone 4 mg and ondansetron 4 mg iv are given together to patients undergoing laparoscopic surgery, the incidence of PONV is much lower than when they are given separately. In comparison to the ondansetron 4 mg group, the combination group with Dexamethasone 4 mg + ondansetron 4 mg had a lower overall (0–24 h) rate of failure of PONV prophylaxis.

In a study of male surgical outpatients, Kovac *et al*. assessed the preventive role of ondansetron and found that 4 mg doses were more efficient than placebo in preventing PONV.

We chose the lowest effective dose of ondansetron, 4 mg IV, because we were studying the efficacy of antiemetic combinations. Khalil *et al*.[10] and Kovac *et al*. [11] employed a low dosage drug in their study, which we have taken as reference. Because it is the usual antiemetic at our institution, we chose 4 mg of ondansetron as

monotherapy. After a cesarean delivery, laparoscopic surgery, or day case surgery, this dose avoids PONV. In the adult population, dexamethasone 8 mg given alone has been useful to prevent PONV after general surgery and chemotherapy.

Because either 4 or 8 mg doses of ondansetron is equally effective in the prophylaxis of PONV and both doses are reported to be equally safe after rapid iv administration in terms of cardiovascular adverse effects, the incorporation of 4 mg ondansetron combination may offer a more cost-effective option, a smaller dose of 4 mg Ondansetron was chosen in this study both alone and in combination with dexamethasone 4 mg was chosen in this study both alone and in combination dexamethasone 8 mg IV significantly reduced the incidence of PONV in a study with 120 parturient who received epidural morphine 3 mg compared to placebo (18% and 51%, respectively).

Dexamethasone, alone or in combination with ondansetron, may have antiemetic effects throughout the postoperative phase, according to data. It's worth noting that the combination of dexamethasone 4 mg and ondansetron 4 mg antiemetic costs <8 mg ondansetron alone.

Dexamethasone has an extra benefit over 5-HT3 receptor antagonists in that it reduces the need for analgesics in many studies.

It is fair to consider cost effectiveness if patients are not at danger of drug interactions due to polypharmacy. Ondansetron, a specific 5-hydroxytryptamine-3 antagonist, has been shown to reduce the incidence of PONV associated with elective cesarean delivery. Dexamethasone has a long biological half-life of 36–72 h and is suggested to provide better control of delayed PONV (i.e., after 24 h) after chemotherapy.

We hypothesized that the combination of dexamethasone 4 mg plus 4 mg ondansetron would reduce the incidence of PONV when compared to dexamethasone 8 mg alone or ondansetron 4 mg alone, based on the positive effects of the medications and prior research. In our study, 58% of patients in Group O experienced early nausea, while only 16 percent experienced delayed nausea.

Only 12% of patients in the combination group had delayed nausea, compared to 38% in the control group, according to Lopez *et al*.[8]

.In our study, 17 patients (56%) in Group O experienced mild nausea, 02 patients (16%) had moderate nausea, and 01 patients (8%) in Group OD had moderate nausea after receiving both antiemetic medicines. 10% of the participants experienced minor nausea. None of the participants in either group suffered significant nausea.

Vomiting is shown to be significantly lower in the mixture compared to the solo antiemetic prophylaxis group in our investigation.

Similarly, Rajeeva *et al*.[9] discovered that a combination of Dexamethasone and ondansetron is more successful as a PONV prophylaxis, they claimed that PONV that was delayed (2–24 h) was better controlled. Dexamethasone in combination with being more effective in PONV prophylaxis adds to earlier research.

Compared to other regimens of placebo, ondansetron, or Dexamethasone alone, López-Olaondo *et al*.[8] concluded that prophylactic administration of a combination of Dexamethasone and is effective in preventing PONV in patients undergoing gynecological surgery with fewer patients requiring rescue anti-emetics.

In addition, Biswas *et al*.[12] discovered that a combination of dexamethasone and ondansetron offered acceptable control of PONV in patients having laparoscopic tubal Ligation, in 78% of patients. However, due to restricted staff resources, the total frequency of PONV was determined in hours rather than at distinct intervals in this investigation.

In their meta-analysis, Henzi *et al*.[13] found that the best available prophylactic for PONV is a combination of dexamethasone and the 5-HT3 receptor antagonist ondansetron. There is remarkable reduction in PONV when ondansetron alone was used instead of dexamethasone alone, which is consistent with earlier research. Females had a higher rate of PONV than males, which is consistent with previous research. Patients in our study only had minor side effects that did not necessitate any active intervention.

In women undergoing major gynecological surgery, McKeniez *et al*. tested Ondansetron 4 mg and ondansetron 4 mg with dexamethasone 4 mg and found that the combination was more effective than ondansetron alone.

As a result, we used a combination of antiemetic medications in our study: Dexamethasone and ondansetron.

Patients receiving dexamethasone plus ondansetron required less analgesia than those receiving monotherapy, according to our findings. The afferent nerve fibers that mediate pain, which are a subset of polymodal

C-nociceptors, may play a role, with prostaglandins enhancing their transmission to the CNS.

PGE2 production is inhibited by dexamethasone, which may give analgesia. Ondansetron is also linked to pain processing in the brain. The analgesic characteristics of both drugs may have contributed to the lower analgesic use in the dexamethasone plus ondansetron group in our study.

In conclusion, IV dexamethasone + ondansetron was more successful than standard antiemetic medication, ondansetron or dexamethasone alone, in the prevention of PONV in patients undergoing laparoscopic cholecystectomy, which was linked with a high failure rate of PONV prophylaxis.

CONCLUSION

We conclude that an IV combination of ondansetron and dexamethasone given before induction is safer and more effective than IV ondansetron or IV dexamethasone given alone in preventing early nausea and delayed vomiting, as well as long-term prevention and PONV in patients posted for elective laparoscopic cholecystectomy under general anesthesia.

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