Original Research Article

Indian Journal of Anesthesia and Analgesia
November – December 2020;7(6)
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.7620.80

Comparison of Ondansetron 4mg, Dexamethasone 8mg and Ondansetron 4 mg with Dexamethasone 8mg in Preventing Nausea and Vomiting Post-Laparoscopic Cholecystectomy

Priyadarshini M Bentur[1], Ashwini R[2]

Author's Affiliation: [1]Professor, [2]Senior Resident, Department of Anaesthesia, Jagadguru Jayadeva Murugarajendra Medical College, Davangere, Karnataka 577002, India.

Corresponding Author: Priyadarshini M Bentur, Professor, Department of Anaesthesia, Jagadguru Jayadeva Murugarajendra Medical College, Davangere, Karnataka 577002, India.

E-mail: priyadarshiniveereshangadi@gmail.com

How to cite this article:

Priyadarshini M Bentur, Ashwini R. Comparison of Ondansetron 4mg, Dexamethasone 8mg and Ondansetron 4 mg with Dexamethasone 8mg in Preventing Nausea and Vomiting Post-Laparoscopic Cholecystectomy. Indian J Anesth Analg. 2020;7(6):1423–1426.

Abstract

Introduction: The most common distressing symptom following surgery and anaesthesia are nausea and vomiting with an incidence of up to 20 to 30% despite newer medications like Ondansetron and steroids in our armamentarium.

Aims: To determine the efficacy of combination therapy with Ondansetron and Dexamethasone and each drug alone in prevention of Postoperative nausea and vomiting (PONV) post laparoscopic cholecystectomy.Also to assess adverse effects if any.

Methods: 105 patients aged between 18 and 55 years belonging to ASA status 1 and 2, electively posted for lap cholecystectomy were randomly divided into three groups of 35 each. Gp A received 4mg Inj Ondansetron, Gp B received Inj Dexamethasone 8mg and Gp C received both drugs together. Similar anaesthesia and surgery techniques were used. Upto 24 h period was assessed for incidence of nausea and vomiting and need for rescue antiemetic.

Statistical analysis: Chi square test and Student t test were used.

Results and Discussion: Overall cumulative incidence of PONV was 54.2% in A Gp, 25.7% in B Gp and 14.2% in Gp C. Complete response, that is no nausea and vomiting was seen in 85.7%in Gp C, 74.2% in Gp B and 45.82%in Gp A which was statistically significant. Ondansetron, a selective 5HT3 receptor antagonist is a good drug for PONV in gynaecological laparoscopy. Dexamethasone is effective against onco and chemotherapy related nausea and vomiting. Combination therapy of the 2 showed good results and reduction in incidence of PONV in lapchole cystectomy.

Keywords: Ondansetron; Dexamethasone; Post-operative nausea and vomiting; Laparoscopic cholecystectomy.

Introduction

150 years ago, John Snow described the phenomenon of nausea[7] and vomiting in 1848, 18 months after introduction of anaesthesia into Great Britain. He observed it to be high in patients who had 'eaten recently 'or following movement shortly after surgery. Treatment included use of wine, smelling salts, etc. Due to use of ether, opioids and other drugs, PONV was a common distressing problem in the early years of Anaesthesia inception. Subsequent research unfolded a spectrum of non-anaesthetic factors in the pathogenesis of PONV.

There has been a general trend towards decrease in the incidence and intensity of the problem because of a change in Anaesthesia practice from opioid and deep ether use to non-opioid or supplemental opioid to lighter and non-ether Anaesthesia, use of less emetic Anaesthesia agents, improved preoperative and postoperative medication, refinement of operative techniques and identification of patient predictive factors.

Yet the 'big little problem'[8] of PONV still persists and can cause potentially serious consequences to the patient as well as financial implications in the form of delayed discharge from hospital. Now with an array of surgical procedures being done in the ambulatory setting, the need to find more effective alternatives to the options available has become more urgent. The potential cost saving by performing ambulatory procedures may be offset by an unanticipated post-operative admission for intractable nausea and vomiting.

Drugs like antihistamines[1], anticholinergics, dopamine antagonists, physical manoeuvres like imposing 'nothing per Os'[8] regimens, pre anaesthetic suctioning of gastric contents, use of cricoid pressure, avoiding gastric inflation during bag mask ventilation, none of these alone or in combination have been entirely successful.

Dexamethasone has shown promising results in chemotherapy[9] related nausea and vomiting. Ondansetron introduced in 1991[10], $5HT_3$ receptor antagonist, is a good antiemetic without the side effects of cholinergic, adrenergic, dopaminergic or histaminergic receptor activation.[4]

Incidence of PONV is high in laparoscopies due to pneumoperitoneum, (extent and duration), general anaesthesia, manipulation of viscera, etc. Many drugs have been used to prevent it either alone or in combination.[5]

Aims

To compare the efficacy of combination of Ondansetron and Dexamethasone with either drug alone in prevention of post laparoscopic cholecystectomy nausea and vomiting.

To study any adverse effects due to the use of the drug.

Methods

105 patients aged between 18 and 55 years,weighing between 50 and 75 kg belonging to ASA1 and 2 categories posted for elective laparoscopic cholecystectomy under general anaesthesia were selected. Institutional ethical committee approval was taken and patients divided into Gp A (receiving Inj Ondansetron 4mg), Gp B (receiving Inj Dexamethasone 8mg) and Gp C (receiving both).

Excluded were those belonging to ASA Gp 3 or 4, those who received opioids, NSAIDS, steroids, anti-emetics in the previous 24 h, pregnant and lactating mothers, those with history of motion sickness Diabetes, peptic ulcer disease, P/H/O PONV, significant cardiac, hepatic orrenal insufficiency.

Pre-operative visit was conducted on the previous day and general, systemic and airway examination were done. Necessary investigations were reviewed. Patients were told to remain 6 hours NPO and given T. Alprazolam 0.25 mg HS. On the day of surgery, they were hydrated with 15 ml/ kg of Inj RL and premedicated with Inj. Glyco 10 microgram/ kg and Inj Fentanyl 2 microgram/ kg and the study drugs intravenously before induction. Inj Propofol 2mg/ kg was given for induction followed by Inj Atracurium 0.6 mg/kg to facilitate endotracheal intubation. Anaesthesia was maintained with Isoflurane with 60% nitrous oxide and oxygen mixture and IPPV to maintain $eTCO_2$ between 35–45 mm of Hg and top up doses of muscle relaxant. Ryle's tube was passed to empty the stomach which was suctioned and removed before extubation.

During laparoscopy, intra-abdominal pressure was maintained between 8 to 12 mm of Hg by CO_2 insufflation and patient positioned 15 to 20-degree head up and left lateral tilt. At the end of the procedure, residual neuromuscular blockage was reversed with Inj. Neostigmine 50 microgram/ kg and Inj. Glyco 10 microgram/kg. Duration of Anaesthesia and surgery were noted. Postoperative analgesia was provided with Inj. Paracetamol 15 mg/kg iv. Until post-operative 3 hours, oxygen was given through face mask at 4 lpm. Throughout the procedure ECG, HR, NIBP, EtCO2 and SpO_2 were continuously monitored.

Patient was assessed hourly for first 4 hours and then till the end of 24 hours and the number of episodes of nausea and vomiting were recorded. Need for use of rescue antiemetic was recorded.

Results

All 105 patients were comparable with respect to age, gender, weight, ASA grading, duration of Anaesthesia and surgery as shown in Tables 1 to 7.

Overall cumulative incidence (0–24 h) PONV was 54.2% in Gp A, 25.7% in Gp B and 14.2% in Gp C which was statistically significant. (Table 8).

No nausea and vomiting was seen in 85.7% patients in Gp C, 74.2% in Gp B and 45.8% in Gp A. Thus,Gp C received maximum benefit of prevention of PONV (Table 9).

Early nausea (Table 10) defined as nausea occurring within first 4 hours was statistically insignificant among all the groups. Early vomiting that is vomiting occurring in the first 4 hours was significantly less in Gp C when compared to other groups (Table 10).

Late nausea, defined as nausea occurring between 4 and 24 hrs did not differ significantly among all the groups (Table 11). Late vomiting that is between 4 and 24 hours postoperative was again significantly less in Gp C (Table 11). Need for rescue antiemetic and adverse effects (Table 12) were not statistically significant.

Table 1: Age distribution among the groups.

Gp	Age (years)	Freq
A	21–40	16
	>41	19
B	21–40	10
	>41	25
C	21–40	12
	>41	23

Mean age in Gp A was 42.56 y, Gp B was 43.26 y and Gp C was 43.77 which was statistically insignificant.

Table 2: Age distribution in years.

Age group	Frequency	Percentage
21–40	38	36.2%
40	67	63.8%
Total	105	100%

Table 3: Gender wise distribution among groups

Gender	Frequency	Percentage
M	37	35.2%
F	68	64.8%
Total	105	100%

Table 4: Weight distribution.

Group	Mean in kg	S.D
A	60.49	6.026
B	60.49	5.590
C	57.89	6.914

P= 0.13 not significant

Table 5: ASA distribution.

Group	ASA 1	ASA 2	Total
A	20 (57.1%)	15 (42.9%)	35
B	20 (57.1%)	15 (42.9%)	35
C	17 (48.6%)	18 (51.4%)	35

Table 6: Duration of Anaesthesia.

Group	Mean (min)	S. D
A	85.8571	1.39627
B	87.0857	2.04898
C	87.1714	2.26853

P value = 0.19 insignificant

Table 7: Duration of Surgery.

Group	Mean (min)	S. D
A	78.2000	2.12548
B	77.7714	2.55626
C	78.2857	2.25664

P value = 0.65 insignificant

Table 8: Cumulative incidence of PONV in 0– 24 hours.

Group	Patients with PONV	Percentage
A	19	54.2%
B	9	25.7%
C	5	14.2%

P value =< 0.001 highly significant

Table 9: Complete response in 0– 24 hours.

Group	Patients with no PONV no RE	Percentage
A	16	45.8%
B	26	74.2%
C	30	85.7%

P value =< 0.001 highly significant

Table 10: Early PONV (0– 4 h).

Group	Nausea	Vomiting	Rescue Anti emetic
A	3 (8.6%)	10 (28.5 %)	3 (8.6%)
B	2 (5.7%)	5 (14.2%)	1 (2.9%)
C	1 (2.9%)	1 (2.9%)	0
P value	0.58	0.001	0.36

Incidence of vomiting was significantly less.

Table 11: Late PONV (4– 24 h).

Group	Nausea	Vomiting	Rescue Anti emetic
A	1 (2.9%)	5 (14.2%)	1 (2.9%)
B	0	2 (5.7%)	2 (5.7%)
C	1 (2.9%)	0	0
P value	0.61	0.05	0.35

Incidence of vomiting was significantly less.

Table 12: Adverse effects.

Group	None	Dizziness	Dry mouth	Headache	Total
A	33	1	0	1	35
B	32	2	0	0	35
C	31	2	1	1	35
Total	97	5	1	2	

Chi square 9.9, p value = 0.33.

Discussion

Our study revealed better results with combination group which was comparable to a similar study conducted by Suman Chattopadhyay et al[2] (62% Ondansetron vs 64.2% Dexamethasone vs 84.6% in combination group) and Gautam et al study[3] (66.7% Ondansetron vs 66% Dexamethasone vs 89.4% combination).

In our study, incidence of early vomiting in A Gp was 28.5% and delayed vomiting was 14.2%. This is comparable to V Rajeeva et al[6] who observed 15% early emesis and 35% delayed emesis after Ondansetron. In our study, in the combination group it was less, 2.9% (early vomiting) and 0% (late emesis) which was comparable to the same study (V Rajeeva et al[6]).

In our study post-operative pain scores were comparable in all groups. Rescue analgesic requirement was not significantly different in all groups. Use of Fentanyl as premedicate may have masked the effect of Dexamethasone on postoperative pain. All patients were hemodynamically stable.

3 patients in go A and 1 patient in Gp B needed rescue antiemetic in first 4 h, 1 patient in Gp A and 2 patients in Gp B in the period of 4 to 24 sought rescue antiemetic.

Adverse effects due to drugs were not significant enough to warrant treatment. Less than 24 hour of Dexamethasone therapy is considered safe.

Conclusion

We conclude that Ondansetron and Dexamethasone given intravenously just before Anaesthesia induction is safe and more effective than either drug given alonein long term prophylaxis of PONV inpatients under going elective laparoscopic cholecystectomy under general anaesthesia.

Cost is an ever-increasing concern in today's health care system. Dexamethasone can be used as an inexpensive alternative to other antiemetic alone or in combination.

References

1. Elkahim M, Nafie M, Mahmoud K, Atef A. Dexamethasone 8 mg in combination with Ondansetron 4 mg appears to be the optimaldose for the prevention of nausea and vomiting after laparoscopic cholecystectomy. Can J Anesth .2002 Nov 1; 49(9): 9922–6.
2. Chattopadhyay S, Biswas A, Ferdous SK, Bhowmik DK, Dey S, Biswas B. Comparison of Ondansetron, Dexamethasone and Ondansetron plus Dexamethasone for The Prevention of Postoperative Nausea and Vomiting after Laparoscopic Cholecystectomy. Indian J Clin Anaesth. 2016; 3(3):459–63.
3. Gautam B, Shreshta 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 University Medical Journal. 2008; 6(3): 319–28.
4. Thacker M, Patel N. Utilization of Ondansetron and Dexamethasone for postoperative Nausea and Vomiting (PONV) after laparoscopic cholecystectomy at Bhuj, Kutch, Gujarat. A Randomized Controlled Trial. Ind J Anaesth and Analg. 2017;4(2): 215–9.
5. Kortilla K. The study of postoperative nausea and vomiting. Br J of Anaesth 1992 Jan 1; 69: 205– 35.
6. Rajeeva V, Bharadwaj N, Batra YK, Dhaliwal LK. Comparison of Ondansetron with Ondansetron and Dexamethasone in prevention of PONV in diagnostic laparoscopy. Can J Anesth. 1999 Jan 1;46(1) :40 L.
7. Andrews PL, Davis CJ, Bingham S, Davidson HI, Hawthorn J, Maskell L. The abdominal visceral innervation and the emetic reflex, pathways, pharmacology and plasticity Canadian Journal of Physiology and Pharmacology. 1990 Feb 1; 68(2): 325–45.
8. Kapur PA. The big 'little problem'. Anaesthesia and Analgesia.1991 Sep 1; 73(3):243– 5.
9. Lopez Oleando L, Carrascosa F, Pueyo FJ, Monedero P, Busto N, Saez A. Combination of Ondansetron and Dexamethasone in the prophylaxis of postoperative nausea and vomiting. Br J Anaesth 1996 Jun 1; 76(6): 835–40.
10. Russell D and Kenny GNC, 5HT3 antagonist in postoperative nausea and vomiting. Br J Anaesth 1992;69(s1): 63–8.