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A Comparative Evaluation Of Prophylactic Single Dose Metoclopramide, Single Dose Ondansetron And A Combination Of Ondansetron Plus Dexamethasone In The Reduction Of Post Operative Nausea And Vomiting

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Abstract: *Post operative nausea and vomiting (PONV) is a common problem. Unresolved PONV can result in prolonged hospital stay and unanticipated hospital admission resulting in patient distress and increased medical costs. The goals of PONV prophylaxis are an improvement in the quality of life of the patients, as well as a decrease in the hospital costs. Our study was aimed to evaluate the efficacy of prophylactic single dose Metoclopramide; single dose Ondansetron and a combination of Ondansetron plus Dexamethasone at the end of surgery, in reducing the incidence of PONV and to identify the antiemetic medication amongst these best suited for reducing post operative emesis.300 adult, ASA I and II patients posted for various elective General; Obstetric and Gynaecological; Ophthalmic; Orthopaedic and Otorhinolaryngological surgeries were divided into 3 equal groups (I,II and III) and anaesthetized using various general and regional anaesthesia techniques. Group I patients received Metoclopramide in the dosage of 10mg IV; Group II patients received Ondansetron in the dosage of 4mg IV; and patients in Group III received a combination of Ondansetron 4mg IV plus Dexamethasone 8mg IV just before completion of the surgical procedure. The patients were then monitored for PONV for the first 24 hours postoperatively. Highest incidence of PONV (49.37%) was observed in Group I. The incidence was 32.91% in Group II, while it was only 17.72% in Group III. Thus, the combination of Ondansetron with Dexamethasone was found to provide very good prophylaxis against PONV. This combination was found to be superior to either metoclopramide or ondansetron used alone.*

Keywords: *PONV, Ondansetron, Metoclopramide, Dexamethasone, Prophylaxis.*

I. Introduction

PONV constitutes a most common anaesthesia related undesirable event .Its incidence in the available literature is reported to vary between 20-80% [1] PONV has significant adverse effects. It can cause profound distress to the patients. Oral administration of drugs, fluids and nutrients can be delayed and can lead to dehydration and alkalaemia. It may at times lead to serious complications like Mallory Weiss syndrome and esophageal rupture.[2] It is an important cause of delayed discharge from day care surgery units, resulting in unscheduled overnight stay. It may be associated with poor surgical outcome. Vomiting can disrupt neck, abdominal and eye sutures. PONV is often severe on movement and may delay post operative mobilization[3] The etiology of PONV is multifactorial[2] with increased incidence in paediatric patients, adult females, obese and in patients with a history of motion sickness. The surgery related factors are after strabismus surgery, orchidopexy, middle ear surgery, intra abdominal and orthopaedic surgeries. Intravenous anaesthetic agents are associated with differing degrees of emesis. Newer agents like propofol are less emitogenic. Perioperative use of opoids is associated with an increased incidence of PONV. It is generally accepted that nitrous oxide is responsible for a significant degree of emesis. Inhalational agents like halothane and isoflurane also cause PONV, though to a lesser extent. Regional anaesthesia is associated with PONV when episodes of hypotension occur. Metoclopramide is a Dopamine (D2) receptor antagonist. It has antiemetic properties and is widely used for the prevention and treatment of PONV. Its side effects include extrapyramidal reactions, abdominal cramping, sedation, dizziness and cardiac dysrhythmias .[4,5,6] Metoclopramide is considered a weak antiemetic and at a dose of 10mg is not effective in reducing the incidence of nausea and vomiting.[7] The 5-HT3 receptor antagonists have a favourable side effect profile, and while generally considered equally safe, all except palonosetron affect the QTc interval. In June 2012, the U.S. FDA recommended the dose of ondansetron for chemotherapy-induced nausea and vomiting should not exceed 16mg in a single dose because of risks of QT prolongation.[8] Ondansetron is as effective as other 5-HT3s.[9] It is also as effective as dexamethasone[10]

with no difference in effect on the QTc interval.[11,12] The corticosteroid dexamethasone effectively prevents nausea and vomiting in postoperative patients.[13,14] For PONV prophylaxis, the efficacy of dexamethasone 4 mg IV is similar to ondansetron 4 mg IV and droperidol 1.25 mg IV.[10] More recent studies increasingly use the higher dose of dexamethasone 8 mg IV rather than the minimum effective dose of 4 to 5 mg.[15-19] Preoperative dexamethasone 8 mg enhances the post discharge quality of recovery in addition to reducing nausea, pain, and fatigue.[20] Dexamethasone also has dose-dependent effects on quality of recovery. At 24 hours, patients receiving dexamethasone 0.1 vs 0.05 mg/kg required less opioid and reported less nausea, sore throat, muscle pain, and difficulty falling asleep.[21] In most studies, a single dose of perioperative dexamethasone does not appear to increase the risk of wound infection.[13,22]

II. Aims Of The Study

The present study was undertaken with the aim to evaluate the efficacy of various antiemetics viz Metoclopramide (single dose), Ondansetron (single dose) and a combination of Ondansetron plus Dexamethasone (single dose) administered prophylactically, intravenously, at the end of surgery, in reducing the incidence of PONV and to identify the antiemetic medication amongst these best suited for reducing post operative emesis.

III. Material And Methods

300 patients of either sex, ASA Physical status I and II, aged between 18 to 60 years, posted for various elective General; Obstetric and Gynaecological; Ophthalmic; Orthopaedic and Otorhinolaryngological surgeries were divided into 3 equal groups(I,II and III). Patients with a history of motion sickness were not included in the study. Premedication with both sedatives and anticholinergics was omitted in all the patients with the aim of excluding their remote interference in studying PONV. The patients were anaesthetized using different anaesthetic techniques viz Regional anaesthesia (Spinal); General anaesthesia with Sodium thiopentone (STP) plus Nitrous oxide (N2O) and Oxygen (O2) with an opioid; General anaesthesia with STP, N20:O2 combination without opioids; Inhalational induction. All patients receiving general anaesthesia were intubated using Suxamethonium. Atracurium besylate was used for long term skeletal muscle paralysis. Intraoperative monitoring included monitoring of heart rate, blood pressure, oxygen saturation, ECG and temperature.

Group I patients received Metoclopramide in the dosage of 10mg IV; Group II patients received Ondansetron in the dosage of 4mg IV; and patients in Group III received a combination of Ondansetron 4mg IV plus Dexamethasone 8mg IV at the completion of the surgical procedure. Muscle paralysis in case of general anaesthesia was reversed at the end of surgery with 0.05mg/kg of Neostigmine and 10mcg/kg of Glycopyrollate.

The patients were then monitored for PONV for the first 24 hours postoperatively. For this, the patients were visited at intervals of 6 hours for this period. PONV was graded according to the method described by Gan et al[2] as under:

Grade 0 – No nausea
Grade 1 – Mild nausea
Grade 2 – Moderate to Severe nausea
Grade 3 – Occassional Vomiting (< 2 episodes/hour)
Grade 4 – Recurrent Vomiting (> 2 episodes/hour)

The data was analysed statistically. The tests used were Chi-square test, t-test and Mann-Whitney U-test.

IV. Results

Mean age, height, weight, sex ratio and ASA Class of three groups were statistically comparable. Regarding the surgical procedures conducted, the three study groups were comparable. With regard to the comparison of types of anaesthesia received, there was no statistically significant difference observed in the three groups (Table 1).

Study Group	Subarachnoid block	STP induction N2O:O2:Hal	STP induction N2O:O2:Opoid	Inhalational Induction
I	28	40	27	5
II	20	32	40	8
III	21	42	28	9
P-Value	0.342	0.305	0.090	0.529
Remarks	Not significant	Not significant	Not significant	Not significant

Table 1: Comparison of types of Anaesthesia in Groups I, II and III

Highest incidence of PONV (49.37%) was observed in Group I. The incidence was 32.91% in Group II, while it was only 17.72% in Group III. The different study groups differed significantly in this regard (Table 2 and Figure 1).

Study Group	No. of Cases	PONV (%age)	Intergroup P-value comparison	Remarks
I	100	39 49.37	I &II= 0.049	Significant
II	100	26 32.91	II &III= 0.034	Significant
III	100	14 17.72	I & III= 0.000	Highly Significant

Table 2: Incidence of Nausea and Vomiting in the three groups.

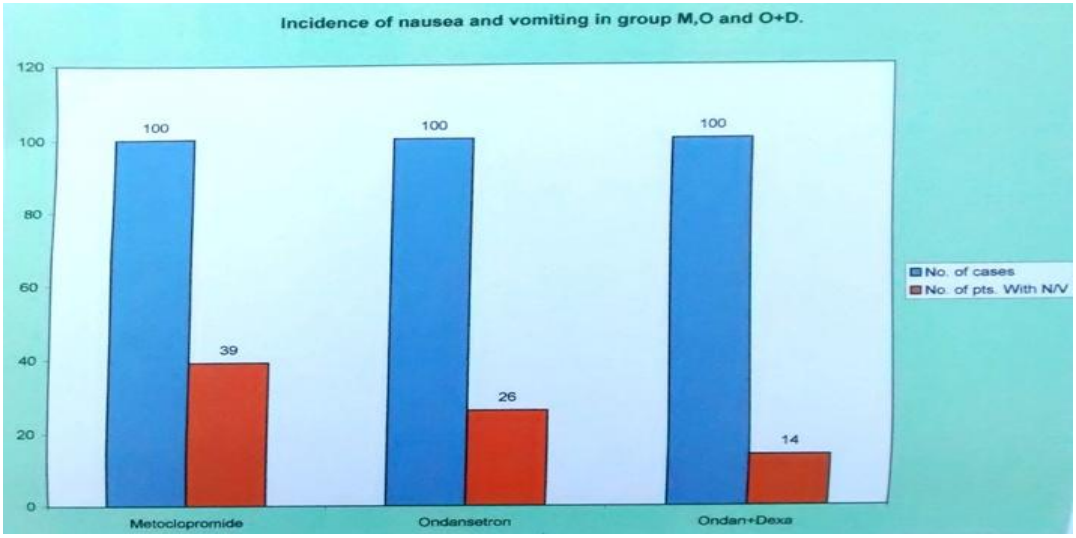

Figure 1: Incidence of PONV in the three groups.

Statistically non-significant difference(p=0.753) was observed in the distribution of mild nausea(Grade 1) in the three groups; while as a significant difference (i.e p= 0.012, 0.011 and 0.045) was observed in moderate to severe nausea(Grade 2), occasional vomiting(Grade 3) and recurrent vomiting(Grade 4) respectively. In Group I, 63.16%, 66.67% and 66.67% had Grade 2, 3 and 4 PONV respectively, followed by 26.32%, 26.67% and 33.33% in Group II, while as only 10.52%,6.66% and 0.00% was the score recorded in Group III.(Table 3 and Figure 2.)

Study Group	Grade 1 %age	Grade 2 %age	Grade 3 %age	Grade 4 %age
I	11 30.55	12 63.16	10 66.67	06 66.67
II	14 38.89	05 26.32	04 26.67	03 33.33
III	11 30.55	02 10.52	01 6.66	0 0.00
p-value	0.753	0.012	0.011	0.045
Remarks	Not significant	Significant	Significant	Significant

Table 3: Distribution of different grades of PONV in groups I, II and III

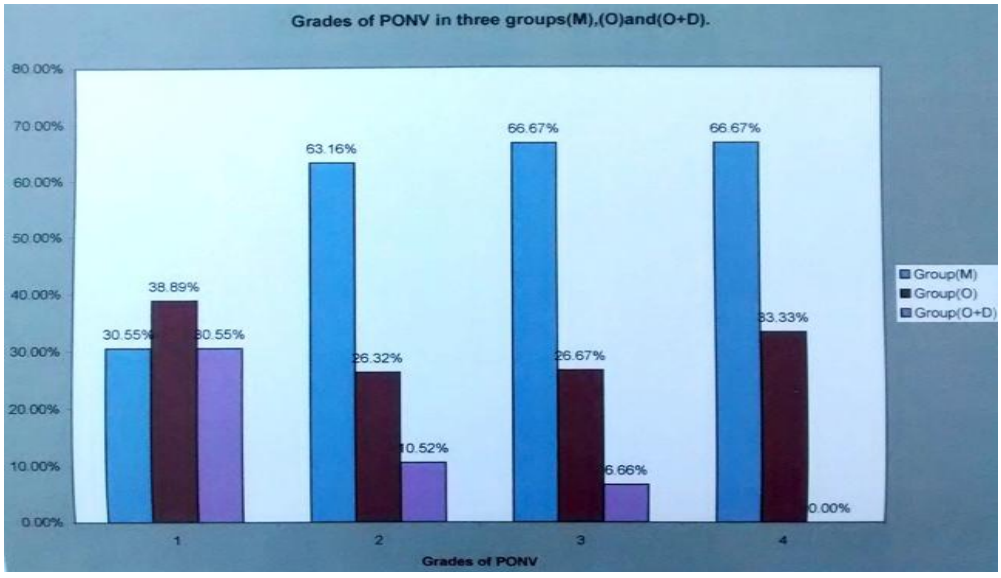

Figure 2: Grades of PONV in the three groups.

V. Discussion

Inspite of the advances in anaesthesia and surgery over the last few decades, PONV still occurs with significant frequency and is often regarded as the worst part of patients' 'surgical experience' [23].

In our study, the technique of anaesthesia chosen, whether general or regional was seen to have little or insignificant effect on PONV. With the use of metoclopramide, the incidence of PONV was 49.37%. It was 32.91% with the use of ondansetron and just 17.72% with the use of ondansetron plus dexamethasone combination. Out of the 100 patients who received the combination (Group III), 14 had PONV. Of these, none had grade 4 PONV and only 1 had grade 3 PONV. When this is compared to patients in group II who received ondansetron alone, 3 out of 100 patients had grade 4 PONV and 4 had grade 3 PONV. In the metoclopramide group, 6 had grade 4 PONV, while 10 had grade 3 PONV. The response rate(patients who had neither nausea nor vomiting) in the ondansetron plus dexamethasone group was 86% as compared to 74% in the ondansetron alone group and just 61% for metoclopramide group. Paxton et al[24] compared ondansetron, droperidol, metoclopramide and placebo in the prevention of nausea and vomiting after day case laparoscopic gynaecological procedures. The nausea score in the ondansetron group was 25% as compared to 59% in the metoclopramide group. Overall, the incidence of vomiting was 18% in the ondansetron group and 41% in the metoclopramide group. Mckenzie et al[25] compared ondansetron alone with ondansetron and dexamethasone combination in the prevention of PONV. Emesis occurred in 34% patients in the ondansetron alone group as compared to 15% in the group receiving the combination of ondansetron with dexamethasone.

In our study, the combination of ondansetron plus dexamethasone has proved to be quite beneficial and has greatly reduced the incidence of PONV.

VI. Conclusions

The combination of Ondansetron plus Dexamethasone given intravenously just before the end of surgery provides very good prophylaxis against PONV. This combination is certainly superior to either metoclopramide or ondansetron used alone.

References

[1]. Kaufmann MA, Rosov C, Schnieper P, Schneider M: Prophylactic antiemetic therapy with patient controlled analgesia: a double blind,placebo-controlled comparison of droperidol,metoclopromide and tropisetron. Anaesth Analg.1994;78:988-94.

[2]. Gan TJ,Collins,Hetreed M: Double blind comparison of ondansetron,droperidol and saline in the prevention of post operative nausea and vomiting. Br Jr of Anaesthesia.1994;72:544-547

[3]. Aitkenhead AR, Rowbotham DJ; Smith G: Nausea,vomiting and their treatment.Textbook of Anaesthesia. 2001; 4th Edition; 244-249

[4]. Aziz N, Naz U, Ilyas M (2011) A comparative study between metoclopramide and dexamethasone for prevention of postoperative nausea and vomiting in laparoscopic cholecystectomy. J Med Sci 19: 129-132.

[5]. Fujii Y (2008) Clinical strategies for preventing postoperative nausea and vomitting after middle ear surgery in adult patients. Curr Drug Saf 3: 230-239.

[6]. Rumore MM (2012) Cardiovascular adverse effects of metoclopramide: Review of literature. IJCRI 3: 1-10.

[7]. Henzi I, Walder B, Tramèr MR. Metoclopramide in the prevention of postoperative nausea and vomiting: a quantitative systematic review of randomized, placebo-controlled studies.Br J Anaesth 1999;83:761–71

[8]. U.S. Department of Health and Human Services. Ondansetron(Zofran) IV: Drug Safety Communication-QT prolongation 2012 [June 18, 2012]. Available at: http://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumanMedicalProducts/ucm237341.htm?utm_campaign=Google2&utm_source=fdaSearch&utm_medium=website&utm_term=dolasetron&utm_content=2.

[9]. Koivuranta M, Läärä E, Snåre L, Alahuhta S. A survey of postoperative nausea and vomiting. Anaesthesia 1997;52:443–9

[10]. Apfel CC, Korttila K, Abdalla M, Kerger H, Turan A, VedderI, Zernak C, Danner K, Jokela R, Pocock SJ, Trenkler S, Kredel M, Biedler A, Sessler DI, Roewer N; IMPACT Investigators. A factorial trial of six interventions for the prevention of postoperative nausea and vomiting. N Engl J Med 2004;350:2441–51

[11]. Diemunsch P, Gan TJ, Philip BK, Girao MJ, Eberhart L, Irwin MG, Pueyo J, Chelly JE, Carides AD, Reiss T, Evans JK, Lawson FC; Aprepitant-PONV Protocol 091 International Study Group.Single-dose aprepitant vs ondansetron for the prevention ofpostoperative nausea and vomiting: a randomized, double blind phase III trial in patients undergoing open abdominal surgery. Br J Anaesth 2007;99:202–11

[12]. Abdul Basit Mir, Umar Qadir Bacha, Rafia Hassan, Monisa Khursheed. Comparative Evaluation of the Influence of Intravenous Dexamethasone andOndansetron on Postoperative Nausea and Vomiting in Patients UndergoingLaparoscopic Surgeries Sch. J. App. Med. Sci., 2015; 3(2F):957-961.

[13]. Henzi I, Walder B, Tramèr MR. Dexamethasone for the prevention of postoperative nausea and vomiting: a quantitative systematic review. Anesth Analg 2000;90:186–94

[14]. Wang JJ, Ho ST, Lee SC, Liu YC, Ho CM. The use of dexamethasone for preventing postoperative nausea and vomiting in females undergoing thyroidectomy: a dose-ranging study.Anesth Analg 2000;91:1404–7

[15]. Arslan M, Cicek R, Kalender HT, Yilmaz H. Preventing postoperative nausea and vomiting after laparoscopic cholecystectomy:a prospective, randomized, double-blind study. Curr Ther Res Clin Exp 2011;72:1–12

[16]. Arslan M, Demir ME. Prevention of postoperative nausea and vomiting with a small dose of propofol combined with dexamethasone 4 mg or dexamethasone 8 mg in patients undergoing middle ear surgery: a prospective, randomized,double-blind study. Bratisl Lek Listy 2011;112:332–6

[17]. Feroci F, Rettori M, Borrelli A, Lenzi E, Ottaviano A, Scatizzi M. Dexamethasone prophylaxis before thyroidectomy to reduce postoperative nausea, pain, and vocal dysfunction: a randomized clinical controlled trial. Head Neck 2011;33:840–6

[18]. Bilgin TE, Birbicer H, Ozer Z, Doruk N, Tok E, Oral U. A comparative study of the antiemetic efficacy of dexamethasone,ondansetron, and metoclopramide in patients undergoing gynecological surgery. Med Sci Monit 2010;16:CR336–41
[19]. Chaparro LE, Gallo T, Gonzalez NJ, Rivera MF, Peng PW.Effectiveness of combined haloperidol and dexamethasone versus dexamethasone only for postoperative nausea and vomiting in high-risk day surgery patients: a randomized blinded trial. Eur J Anaesthesiol 2010;27:192–5
[20]. Murphy GS, Szokol JW, Greenberg SB, Avram MJ, Vender JS, Nisman M, Vaughn J. Preoperative dexamethasone enhances quality of recovery after laparoscopic cholecystectomy: effect on in-hospital and postdischarge recovery outcomes.Anesthesiology 2011;114:882–90
[21]. De Oliveira GS Jr, Ahmad S, Fitzgerald PC, Marcus RJ,Altman CS, Panjwani AS, McCarthy RJ. Dose ranging study on the effect of preoperative dexamethasone on postoperative quality of recovery and opioid consumption after ambulatory gynaecological surgery. Br J Anaesth 2011;107:362–71
[22]. De Oliveira GS Jr, Almeida MD, Benzon HT, McCarthy RJ.Perioperative single dose systemic dexamethasone for postoperative pain: a meta-analysis of randomized controlled trials.Anesthesiology 2011;115:575–88
[23]. Watcha MF, White PF. Postoperative nausea and vomiting. Its etiology, treatment and prevention.Anesthesiology, 1992; 77(1): 162-184.
[24]. Paxton LD, Mekay AC, Mira-Khur RK. Prevention of nausea and vomiting after day case gynaecological laparoscopy. Anaesthesia, 1995; 50: 403-406.
[25]. Mckenzie R, Tantisira B, Karambelkar DJ, Riley TJ et al.Comparison of ondansetron with ondansetron plus dexamethasone in the prevention of post operative nausea and vomiting. Anaesthesia Analgesia, 1994, 79: 961-964.

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