



COMPARATIVE STUDY OF ONDANSETRON, DEXAMETHASONE AND BOTH IN COMBINATION FOR PROPHYLAXIS OF POST- OPERATIVE NAUSEA AND VOMITING IN PATIENTS UNDERGOING OPEN CHOLECYSTECTOMY.

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Aim & Objective - This study was designed to compare the antiemetic efficacy of Ondansetron, Dexamethasone and combination of both (Ondansetron & Dexamethasone) for reducing PONV and to assess advantage of one drug over the other.

Material and Method - A total of 270 patients of age Group 18 to 65 years, with ASA I and II, scheduled for open cholecystectomy under spinal anesthesia, They were divided into 3 Groups i.e. Group O, Group D & Group O + D. Frequency of Retching, Nausea & Vomiting, need of another drug and patients satisfaction were noted for next 24 hours.

Result - The incidence of nausea and vomiting was highest in Group O i.e., 87%, in Group D it is 70% and in Group O+D it is 10% during Intraoperative period (0-1 hr), incidence of nausea and vomiting was less in 1-6 hour period as compared to 0-1 hr. Incidence of nausea and vomiting was high in intra-operative period in both the Groups (Group O and Group D) as compared to Group O+D and it was statistically significant ($p < 0.05$). On comparing with Group O & Group O+D it was statistically significant ($p < 0.005$).

Conclusion - Combination of Ondansetron and Dexamethasone are very effective for PONV, and have great patient satisfaction.

Keywords :- Ondansetron, Dexamethasone, PONV

Introduction

Postoperative nausea and vomiting (PONV) is a significant complication after open cholecystectomy.¹ The incidence of PONV after surgery is in the range of 20 -30 %, but it may be up to 70% in gall bladder surgery.² Many drugs are available for PONV prophylaxis, but none of these drugs providing satisfactory results. PONV may leads to significant morbidity from dehydration, electrolyte imbalance, wound dehiscence, aspiration of gastric content, psychological distress, and leads to delayed recovery from anesthesia and discharge from hospital.³ Our objective is to compare the antiemetic efficacy of Ondansetron, Dexamethsone and combination of both for reducing PONV and to asses advantage of one drug over the other & to assess the efficacy of prophylactic antiemetic effect, safety and benefit of combination, and patient satisfaction .

Material and Method –

The study was done from June 2019 to May 2020 at A.K Tibbiya College and Hospital, AMU, Aligarh. Informed consent had been taken from all patients. This study is a prospective randomized double blind study, randomized by envelop method. 270 patients of ASA I and II of both sex and age between 18 to 65 yrs were included in the study. Patients were divided into 3 Groups. Group O received 0.1mg/kg of Ondansetron and Group D received 0.1mg /kg Dexamexasone and Group O+D received Ondansetron and Dexamethasone (0.1mg /kg and 0.1mg /kg) half an hour before surgery. Ondansetron Group is considered as control Group.

Exclusion Criteria –

Patients with ischemic heart disease, Gastro-esophageal reflex disease, uncontrolled diabetes and hypertension, Alcohol addiction and smoking.

PAC was done a day before surgery and Tablet Alprazolam 0.5 mg was given to all patients at night before surgery. On the day of surgery intravenous line has been secured and preloading was done with 500 - 1000ml of Ringer lactate. All the essential monitor were placed including SpO₂, BP cuff, ECG. Spinal was performed in sitting position and Lumbar puncture was done at L3-L4 level and 3.5 ml of heavy Bupivacaine was given by 25 G Quincke needle and put the patient in supine position.

An independent nurse unaware of the patient's randomization noted the incidence of nausea and vomiting or retching Intraoperatively and postoperatively up to 24 hours. Recording period were divided in three columns 0-1 hours i.e. intraoperatively, 1 - 6 hours and 6- 24 hours, patients were assessed for episodes of retching, nausea and vomiting, need of another antiemetic, and patient's satisfaction. We also assessed rescue antiemetic use in the first 24 hours after surgery, injection Metoclopramide (0.1mg/kg) was given when more than two episodes of vomiting had occurred.

Statistical analysis

Dermographic data were analysed using student-t test, Quantitative data were displayed as mean \pm SD, Qualitative data were exhibited as frequency and percentage. The incidence of retching, PONV, need of rescue drug were analyzed using chi square test. *p* -value of less than or equal to 0.05 was consider significant, and 0.001 was consider as highly significant .

Result:-

Present study was conducted in the department of Jarahat (Surgery), A.K.Tibbiya College & hospital from June 2019 to May 2020 on 270 patients of ASA grade I & II.

The three Groups were comparable with respect to age, sex, weight, height, duration of surgery and ASA status.

Table-1: Demographic data of patients

Particulars	Group D	Group O	Group O+D
Age (years) (Mean±SD)	48.67±10.57	47.55±12.78	46.34±15.89
Weight (Kgs) (Mean±SD)	65.30±14.6	64.40±16.91	63.14±18.60
Sex (M/F)	21/69	19/71	9/81
Height (cms)	153±2.3	156±3.8	152±1.6
Physical status			
ASA I	65	61	67
ASA II	35	39	33
Duration of surgery (min)	37.5 ± 12.6	35.2 ± 9.5	36.5 ± 10.2

ASA I- Normal healthy patient.

ASA II- A patient with mild systemic disease with no functional limitations.

We separately analyzed incidence of retching, nausea and vomiting Intra-operatively and post operatively for 0-1 hours, 1-6 hours for up to 24 hours.

Table 2- Comparison of nausea & vomiting in Groups

Number of patients	Retching	Nausea & vomiting 0-1 hours	Nausea & vomiting 1 - 6 hours	Nausea & vomiting 6 - 24hours	Need of supplement
Group O (n =90)	81(90%)	63(70%)	33 (36%)	12(13%)	6 (6.6%)
Group D (n =90)	83(92%)	79(87%)	27(30%)	8(8.8%)	4(4.4%)
<i>p-value</i>	>0.10	>0.01	>0.01	>0.01	

Group O was considered as control Group & found that there were no statistically significant difference in the incidence of retching, nausea & vomiting and need of rescue drug.

Table 3 Comparison of nausea & vomiting in Groups

Number of patients	Retching	Nausea & vomiting 0-1 hours	Nausea & vomiting 1 - 6 hours	Nausea & vomiting 6 - 24hours	Need of supplement
Group O (n =90)	81(90%)	63(70%)	33 (36%)	12(13%)	6 (6.6%)
Group O+D (n =90)	21(23%)	9(10%)	5(5.5%)	0	0
<i>p value</i>	0.05	<0.005	<0.005	<0.025	

p-value <0.05 is considered as statistically significant

In 0-1 hr the incidence of nausea and vomiting was significantly lower ($p<0.005$) in Group O+D (10%) as compare to Group O (63%). After 1-6 hrs the incidence was 36% in Group O & 5.5% in Group O+D ($p<0.005$). During 6-24 hrs, 13% patients in Group O had PONV & none of the patient had PONV in Group O+D ($p<0.05$).

Discussion –

Nausea and Vomiting in postoperative period are the most distressing and unpleasant experience for patients. Severe post operative emesis results in dehydration, electrolyte imbalance, increased pain, wound dehiscence or may leads to life threatening complications like aspiration pneumonitis and alter the overall outcome of surgery.³

Ondansetron is a 5HT₃ receptors antagonist, highly specific and selective for nausea and vomiting, members of this Group exert their effects by binding to serotonin receptor in the chemoreceptor trigger zone (CTZ) of the area postrema.⁴ The mechanism of antiemetic action of corticosteroids is unknown, but may be related to inhibition of prostaglandin synthesis, decreases in 5HT₃ level in the CNS.⁵ Dexamethasone is most effective when administered at the time of induction.⁶ Dexamethasone lowers the rate of PONV, both after abdominal and non abdominal surgeries, it is especially effective for prevention of late nausea and vomiting because its half life is 36 to 72 hours.⁷ we administered both the drug 30 minute before surgery. The recommended dose for PONV is 4mg but our study shows maximum efficacy with 8 mg of Ondansetron. We found no difference among male and female patients and patient having history of motion sickness.

The result of Michael et al⁸ used dexamethasone & ondansetron in different doses and found that there is no significant difference among the Groups except the Group which receive 2 mg of dexmethasone.

Souvik Maitra et al⁹ found that dexamethasone is superior to ondansetron in preventing PONV after 4-6 hrs of surgery however both the drugs are of equal efficacy in 24 hrs post operatively.

L. Lopez et al¹⁰ conducted a study to compare the effect of dexamethasone and ondansetron and found 52% patients in Ondansetron Group & 60% of dexamethasone Group had PONV but the incidence of PONV was significantly in when the drug used in combination.

Xian-Xue-Wang et al⁶ found Dexamethasone was not effective in early PONV as compared to Ondansetron and is highly effective in late PONV & can be used as an alternative to ondansetron.

Sandhya et al¹¹ used Ondansetron 4 mg & dexamethasone 8mg in ENT surgeries and noted that 83.3% had no nausea & vomiting in Dexamethasone Group & 93.3% had no episode of nausea & vomiting. The patient satisfaction score was equal in both Groups.

K. Ahsan et al¹² compare Ondansetron and Dexamethasone combination with Ondansetron alone in PONV and found 14 (28%)with incidence of nausea or vomiting while the other Group showed 6(12%). This difference was statistically significant ($p < 0.046$).

F Bano et al¹³ compared Dexamethasone plus Ondansetron combination with Dexamethasone alone and found lower frequency of nausea and vomiting in combination Group which was statistically significant ($p = 0.035$) and use of rescue antiemetic was significantly higher in Dexamethasone Group ($p = 0.022$).

M. Elhakim et al¹⁴ use Dexamethasone (8mg) alone and combination with Ondansetron (4 mg) and found that above mentioned dose is the minimum dose required for effectively prevent PONV.

Gildasio S de Oliveira et al¹⁵ used Dexamethasone in the dose of 4-5mg in 1 Group and 8-10 mg in 2nd Group and found that dexa to effective equally in both the Groups and these findings supports the current recommendations of SAMBA guidelines.¹⁶

Nita D'souza et al¹⁷ used Dexamethasone 4 mg in Group 1 & 8 mg in 2nd Group and Ondansetron 4 mg in 3rd Group and concluded that overall incidence of PONV was highest in the first 3 hours in all the Groups. In Group 1, the request for rescue antiemetic was significantly lower (0%) as compared with 6.7 % & 16.1 % in the dexamethasone (8 mg)& ondansetron 4 mg Groups respectively.

Jash D et al¹⁸ used 4mg Ondansetron & 8mg Dexamethasone and found that 86% patients in both the Groups experienced no emesis. The incidence of retching was higher in 1st hr. 33% patients experienced nausea in the

Ondansetron Group and 30% pts experienced nausea in the Dexamethasone Group. The incidence of PONV was very less after 6-12 hrs in both the Groups.

We did not observe any incidents or adverse events to either drug, time of discharge and patient satisfaction was equal in all the Groups. Use of single dose dexamethasone is free from significant side effects including delayed wound healing.¹⁹ it may decrease post operative pain and edema and it is cost effective too.

None of the patient reported any significant complication attributed to either Dexamethasone, or Ondansetron or combination of both, only few patients reported minor complication such as headache, dizziness and constipation up to 24 hrs.

Conclusion:-

Dexamethasone or Ondansetron alone are not effective in preventing PONV, Dexamethasone is effective for preventing delayed Nausea & Vomiting while Ondansetron is Effective in early hours but the combination of both Ondansetron & Dexamethasone are very effective in preventing PONV. Further studies are needed on larger Group of patients.

References:-

1. Macario, M. Weinger, S. Carney, and A. Kim, "Which clinical anesthesia outcomes are important to avoid? The perspective of patients," *Anesthesia and Analgesia*, vol. 89, no. 3, pp. 652–658, 1999. View at: [Publisher Site](#) | [Google Scholar](#)
2. M. F. Watcha and P. F. White, "Postoperative nausea and vomiting: its etiology, treatment, and prevention," *Anesthesiology*, vol. 77, no. 1, pp. 162–184, 1992. View at: [Publisher Site](#) | [Google Scholar](#)
3. N. D'souza, M. Swami, and S. Bhagwat, "Comparative study of dexamethasone and ondansetron for prophylaxis of postoperative nausea and vomiting in laparoscopic gynecologic surgery," *International Journal of Gynecology and Obstetrics*, vol. 113, no. 2, pp. 124–127, 2011. View at: [Publisher Site](#) | [Google Scholar](#)
4. Fujii Y, Tanaka H, Toyooka H. Granisetron and dexamethasone provide more improved prevention of postoperative emesis than granisetron alone in children. *Can J Anaesth* 1996; 43 1229-32.
5. Henzi I, Walder B, Tramèr MR. Dexamethasone for the prevention of postoperative nausea and vomiting: A quantitative systematic review. *Anesth Analg*. 2000;90:186–194.
6. J.-J. Wang, S.-T. Ho, Y.-H. Uen et al., "Small-dose dexamethasone reduces nausea and vomiting after laparoscopic cholecystectomy: a comparison of tropisetron with saline," *Anesthesia and Analgesia*, vol. 95, no. 1, pp. 229–232, 2002. View at: [Publisher Site](#) | [Google Scholar](#)
7. Biswas BN, Rudra A. Comparison of granisetron and granisetron plus dexamethasone for the prevention of postoperative nausea and vomiting after laparoscopic cholecystectomy. *Acta Anaesthesiol Scand*. 2003;47:79–83.
8. Michael J, Mathew W. M. ondansetron and Dexamethasone dose combination for prophylaxis against post operative nausea and vomiting. *International Anesth Reserch sosity* . 2006 Dec ;108
9. Souvik Maitra,¹ Anirban Som,¹ Dalim K. Baidya,¹ and Sulagna Bhattacharjee. Comparison of Ondansetron and Dexamethasone for Prophylaxis of Postoperative Nausea and Vomiting in Patients Undergoing Laparoscopic Surgeries: A Meta-Analysis of Randomized Controlled Trials. *Anesthesiology Research and Practice*, Volume 2016 |Article ID 7089454

10. . Lopez-Olaondo L, Carrascosa F, Pueyo FJ, Mondero P, Busto M, Suez A. Combination of ondansetron and dexamethasone in the prophylaxis of postoperative nausea and vomiting. *Br J Anaesth* 1996; 76: 835-840.
11. Sandhya MS , Sugandha KR . Comparison ondansetron with Dexamethsone in the ptrevention of post operative Nausea and vomiting in ENT Surgeries . *J Medical Science and Clinical Research*. July 2018 vol 6 (7)
12. Ahsan K , Abbas N . comparision of efficacy of ondansetron and dexamethasone combination and ondansetron alone in preventing postoperative nausea and vomiting after laproscopic cholecystectomy. *J Pak Assoc* 2014 March.
13. Fauzia bano , Safia Zafar , Sadqa Aftab . Dexamethasone plus ondansetron for prevention of poatoperative nausea and vomiting in patients undergoing Laproscopic cholecysyectomy : a comparison with dexamethsone alone .*J Coll physician Surg pak* 2008May ;18(5);265-9
14. Elhakim M, Nafie M, Mahmoud K, Atef A: Dexamethasone 8mg in combination with ondansetron 4mg appears to be the optimal dose for the prevention of nausea and vomiting after laparoscopic cholecystectomy. *Can J Anaesth* 2002, 49:922-6. Vol 4, Issue 03, 2015.
15. De Oliveria GS, Castro-Alves LJS, Ahmad S et al. Dexamethasone to prevent postoperative nausea and vomiting; an updated meta-analysis of randomized controlled trails. *Center of Reviews and Dissemination*. York (UK) 2014.
16. Tong J Gan, Tricia A Meyer,. Society for Ambulatory Anesthesia guidelines for the manegment of postoperative nausea and vomiting. *Anesth Analgesia*. 2007 Dec;105 (6).
17. Nita D'Souza , Mohan Swami , Shama Bhagwat . Comparative study of dexamethsone and ondansetron for prophylaxis of post operative nausea and vomiting in laprascopic gynecological sugaery . *Int J Gynecol Obstet*.2011 May ;13(2).
18. Jash D, Haldar P et al. Comparative study between ondansetron and Dexamethasone for preventing post operative nausea & vomiting after laparoscopic cholecystectomy. *JEMDS*, 2019, 8(36).