ORIGINAL RESEARCH PAPER

Anaesthesiology

KEY WORDS:

A COMPARATIVE STUDY OF ONDANSETRON, RAMOSETRON AND DEXAMETHASONE AS ANTIEMETICS FOR PREVENTION OF POSTOPERATIVE NAUSEA AND VOMITING IN PATIENTS UNDERGOING LAPAROSCOPIC SURGERIES

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INTRODUCTION

The first successful administration of a neuromuscular blocker (curare) to produce surgical relaxation in an anaesthetized patient occurred in 1912, when Arthur Lawen, a German surgeon from Leipzig, used a partially purified preparation of the substance.(1) Since their introduction, muscle relaxants have become a part and parcel of every anaesthesiologist's routine practice. With the advent of endotracheal intubations and mechanical ventilation anaesthetic practice has reached newer heights. With the increasing number of surgeries done under general anaesthesia, the incidence of postoperative nausea and vomiting (PONV) is also on the rise.

More than two decades ago the phenomenon of postoperative nausea and vomiting was described. It was observed that vomiting was more likely to occur in patients who have eaten recently. In most cases the vomiting lasted only for a few minutes but in some it continued for hours and even days. During ether era, reported incidence of PONV was as high as 75-80%. It was then suggested that PONV may result from causes other than anaesthetics.

There has been a general trend towards a decrease in the incidence and intensity of the problem because of a change in Anaesthesia practice from opioid and deep ether anaesthesia to non opioid or supplemented opioids to lighter and non ether anaesthesia, use of less emetic anaesthetic agents, improved pre and postoperative medication, refinement of operative techniques and identification of patient predictive factors. However in spite of these advances, nausea and vomiting still occurs with unacceptable incidence of 30% in association with surgery and anaesthesia.(2) Persistence of nausea and vomiting can have serious medical consequences to the patient as well as financial implication in delayed discharge from the hospital. In addition PONV has been associated with various complications ranging from minor incision pain to more severe hematoma, wound dehiscence, esophageal rupture, bilateral pneumothorax, and increased risk for aspiration. Now that the number of acceptable surgical procedures have increased in the field of ambulatory anaesthesia, the need to find more effective alternatives to the options available has become more urgent. The potential cost saving by performing these procedures on an ambulatory basis may be neglected by an unanticipated postoperative admission for intractable nausea. In addition, although intractable nausea is distressing possibly dehydrating and not easily manageable at home, the expenses of a hospital stay is disproportionate to the actual morbidity of nausea for most healthy outpatients. Thus the therapy of last resort hospitalization is ultimately unsatisfactory for the patient, the anaesthesiologist and the surgeon.

None of the antiemetics have been 100% successful in control of nausea and vomiting. Dexamethasone is reported to be an effective antiemetic agent in patients undergoing cancer chemotherapy.(3) The introduction of newer 5 HT3 antagonists like ramosetron in the treatment of postoperative nausea and vomiting is promising because of their less adverse effects. However, ondansetron still forms the base of major chunk of anaesthesiologists' preference for treating or preventing PONV. The use of ondansetron has now become extended to the management of PONV routinely. Extensive trials using oral and intravenous ondansetron in various types of patients posted for various surgeries have confirmed the efficacy of the drug with a less side effect profile. This has become the gold standard now against which any future antiemetic drug must be judged.

Our study thus aims to compare the two 5 HT3 antagonists Ondansetron, Ramosetron and a corticosteroid Dexame thasone to find a better, safe, cost effective antiemetic with less side effects, for the prevention of postoperative nausea and vomiting in Laparoscopic surgeries .

MATERIALS AND METHODS

(7.1) SOURCE OF DATA

The proposed study will be conducted on 90 patients undergoing elective surgeries under general anaesthesia during the period from August 2019 to October 2019 in the Department of Anaesthesiology, Father Muller Medical College, Mangalore after obtaining ethical committee clearance.

(7.2) METHOD OF COLLECTION OF DATA

Study Type: Observational, Analytical study.

After taking written informed consent, 90 patients aged between 20 to 60 years belonging to ASA grade I and ASA grade II of either sex, undergoing elective laparoscopic surgery under general anaesthesia will be included in the study. Purposive sampling method will be adopted and one of the study drug will be injected by Anaesthesiologist 1 (Qualified consultant anaesthesiologist), study results will be observed and recorded by Anaesthesiologist 2 (Post graduate resident in Anaesthesiology). During statistical analysis, the study subjects will be considered in three groups:

1. Group O (n=30)- Ondansetron 4mg (2ml)
2. Group R (n=30)- Ramosetron 0.3mg (2ml)
3. Group D (n=30)- Dexamethasone 8mg (2ml)

INCLUSION CRITERIA:

- Patients posted for elective laparoscopic surgery under general anaesthesia.
- Patients belonging to the age group of 20- 60 years, of either sex.
- ASA I and II.
- Mallampatti grade I and II.

EXCLUSION CRITERIA:

- Patients who received opioids, NSAIDS or anti emetic agents 48 hrs prior to surgery.
- Patients under ASA I and II but with the history of
  (a) allergic reaction to any drug or food

(b) BMI >25 kg/m2
(c) motion sickness, migraine or GERD
(d) alcohol, drug abuse or smoking

- Patients whose surgery got converted to open procedure.
- Pregnant females

(7.3) METHOD OF STUDY

A detailed history and complete clinical examination of patients was done to rule out the exclusion criteria. Routine investigations like serum hemoglobin, complete blood count, blood grouping, coagulation profile, serum urea, serum creatinine, serum electrolytes and random blood sugar levels were done. 12 lead ECG and chest X-Ray whenever indicated were taken. Preoperative pulse rate, respiratory rate, blood pressure values were noted. Patients were explained about the procedure of general anaesthesia. Patients involved in the study were asked to stay nil per oral (NPO) 8 hours prior to surgery. They were premedicated with tablet ranitidine 150mg on the night prior to surgery.

After the patient was brought inside the operation theatre, an intravenous access was obtained by an 18 G IV cannula and ringer lactate solution 10ml/kg/hr was started. Standard monitors like pulse oximetry, non-invasive blood pressure and electrocardiography were connected to the patient. An average of three recordings at time intervals of 1 minute were considered as baseline recording.

General anesthesia was induced in all patients with inj. fentanyl (2.0mcg/kg) IV, inj. propofol (2mg/kg) IV, followed by succinylcholine (1.5mg/kg) IV and intubated after 60 seconds using proper size endotracheal tube (male:8-8.5 and female:7-7.5). Anesthesia was maintained with N_2O:O_2=2:1, 1MAC sevoflurane, intermittent positive pressure ventilation with circle system and neuromuscular blockade by vecuronium (0.1mg/kg), the required dose was repeated whenever needed.

Before the closure of the peritoneum, the patient received one of the study drugs being administered by Anaesthesiologist 1. Blood pressure (systolic blood pressure, diastolic blood pressure and mean arterial pressure), pulse rate, SPO2 and ECG changes were recorded by Anaesthesiologist 2 just before, during and then after one, three, five and ten minutes of the administration of the study drug.

All the patients received injection diclofenac 75 mg deep IM for postoperative analgesia 30 minutes before closure of skin. Patients were reversed with neostigmine (0.05mg/kg) and glycopyrrolate (0.01 mg/kg) and extubated after fully awake. Postoperatively, patients was advised to take rest and remain in the bed at least for the first 24 hours. Other emetogenic analgesics and drugs were avoided for 24 hours. Emetic episodes were assessed immediately after surgery, after 4 hours, 8 hours, 12 hours and upto 24 hours.

Number of episodes of nausea, vomiting and retching were assessed, in addition to SpO2, Pulse, BP and any ECG changes recorded. Other side effects like headache, constipation, dizziness, backache and extra pyramidal symptoms were noted. Postoperative pain was treated with Inj. Diclofenac sodium 75 mg intramuscularly whenever patient complains of pain. Rescue antiemetic will be administered if patient has two or more episodes of nausea or vomiting. The duration of surgery from the skin incision to last suture, duration of anesthesia from induction to tracheal extubation will be recorded.

STATISTICAL ANALYSIS:

Total of 90 patients, i.e. 30 patients in each group.
The following formula was used to obtain the sample size 'n'

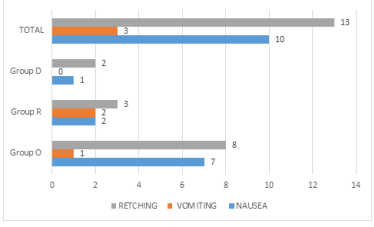
$$n = \frac{2(z_\alpha + z_\beta)^2 * \sigma^2}{d^2}$$

$z\alpha$=1.96 (at 95% confidence interval)
$z\beta$=0.841 (at 80% power)
σ= combined standard deviation
d= difference between the means of 2 groups

RESULTS AND OBSERVATIONS

TABLE 1 : PRE-OPERATIVE CHARACTERISTICS

AGE GROUP	**Group O**	**Group R**	**Group D**	TOTAL	group A OPEN	group B CLOSED	TOTAL	P =0.3004
<20	1	0	0	1	3.33%	0.00%	0.00%	
21-30	3	8	6	17	10.00%	26.67%	20.00%	
31-40	11	11	13	35	36.67%	36.67%	43.33%	
41-50	13	9	8	30	43.33%	30.00%	26.67%	
>50	2	2	3	7	6.67%	6.67%	10.00%	
TOTAL	30	30	30	90	100.00%	100.00%	100.00%	
MALE	20	19	19	58	66.67%	63.33%	63.33%	P =0.98
FEMALE	10	11	11	32	33.33%	36.67%	36.67%	
TOTAL	30	30	30	90	100.00%	100.00%	100.00%	
Operation Time	79.1±10.06	77.77±9.38	**80.71±10.38**	79.1	P =0.88			



There was an extremely significant correlation statistically with a p value <0.002 IN THOSE who received dexame thasone the incidence of Postoperatively, nausea, vomiting and retching were much less.

DISCUSSION

In today's fast moving world; laparoscopy has become the treatment of choke for many surgically treatable conditions s it provides faster recovery . There is a need to reduce the incidence of postoperative side effects caused by anaesthetics agents especially in laparoscopic surgeries as they tend to be **done as a day care procedure as and the patient tends to go to his work or home on the same day . in our study we found that** who received dexamethasone the incidence of Postoperatively, nausea, vomiting and retching were much less. This is comparable to the following studies:- **Swaika et. al.(4)** concluded that Ramosetron was more effective than Palonoseteron and Ondansetron for prevention of early postoperative vomiting.

Bajwa et al.(5) howed that Palonosetron has got a longer antiemetic effect, a lesser need for rescue antiemetic and in patients undergoing laparoscopic gynaecological surgery.

Yong Seon Choi et al.(6) found that antiemetic efficacy of

ramosetron plus dexamethasone was similar to that of ondansetron plus dexamethasone on preventing PONV in high-risk patients undergoing lumbar spinal surgery.

Rajeeva et. al.(7) found that the overall incidence of nausea and vomiting was found to be lower in combination combination of Ondansetron and Dexamethasone than Ondansetron and combination of Ondansetron and Dexamethasone alone .

Lopez et al.(8) stated that combination therapy Dexamet hasone is more cost effective than Ondansetron with absence of side effects and sedation.

Sridharan K et al.(9) found that dexamethasone and ondansetron have the best evidence as stand-alone options and the combination is preferred in high-risk category.\

CONCLUSION

Among the three drug's efficacy and side effects of single dose Ondansetron, Ramosetron and Dexamethasone as antiemetic, Dexamethasone is best suited for the for the prevention of postoperative nausea and vomiting in patients undergoing elective laparoscopic surgery.

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