ORIGINAL ARTICLE

Severity of Postoperative Nausea and Vomiting Following Gynaecological Laparoscopic Procedures: Ondansetron vs Metoclopramide

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ABSTRACT

Background: Postoperative nausea and vomiting have remained significant causes of morbidity in patients undergoing general anaesthesia for gynaecological laparoscopic procedures. **Objectives:** This study compared the severity of postoperative nausea and vomiting following gynaecological laparoscopic procedures after prophylaxis with metoclopramide and ondansetron. **Methods:** Sixty-six consenting patients aged 18-55 years undergoing day case gynaecological laparoscopic procedures were recruited and randomly allocated into two groups with each receiving either intravenous ondansetron 4mg or intravenous metoclopramide 10mg prior to induction of anaesthesia. The severity of nausea and vomiting were then assessed over a period of 4 hours before discharge. **Results:** Nausea was mild in 24.2% and 6.1% of patients that received metoclopramide and ondansetron respectively, and severe in 9.1% of patients in both groups. In the metoclopramide group, 6.1% experienced 1 bout of vomiting compared to 3% in the ondansetron group. 3% had 2 bouts of vomiting in the metoclopramide, none in the ondansetron group had up to 2 bouts of vomit. **Conclusion:** Ondansetron was more effective in the prevention of the mild form of nausea, the two study drugs are similarly effective for the prevention of vomiting.

Key words: Nausea, vomiting, ondansetron, metoclopramide

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Introduction

Postoperative nausea and vomiting (PONV) is one of the most common complaints following anaesthesia. Transient nausea and vomiting in the early postoperative period are certainly troublesome and undesirable complications of anaesthesia.[1,2] However, refractory postoperative nausea and vomiting requiring repeated treatment with antiemetic drugs is a miserable experience for the patient.[2] PONV is usually listed by patients as their most important perioperative concern.[3] PONV is typically seen following laparoscopic surgeries,[4] with incidences as high as 70%.[5] This is due to pneumoperitoneum causing stimulation of mechanoreceptors in the gut.[6] If severe, vomiting may result in bleeding at the

operation site, oesophageal tear, gastric herniation, wound dehiscence, aspiration of vomitus, fluid and electrolyte imbalance. This could lead to unplanned admission and prolonged hospital stay by approximately 3 to 4 times,[7] this is more likely so in the severe form of PONV.

Factors associated with an increased risk of PONV include age, gender, obesity, history of motion sickness, type of surgery (laparoscopic, gynaecological, strabismus, middle ear surgery, abdominal), use of opioids and nitrous oxide. The female gender is one of the strongest predictors of PONV.[8] Therefore, patients undergoing laparoscopic gynaecological surgeries are particularly prone to PONV.

Use of antiemetic drugs forms the basis of prevention and treatment of PONV. Ondansetron which selectively antagonise the action of hydroxytryptamine (serotonin) at the 5HT3 receptor has given better option for the prevention of PONV.[9]

Unlike ondansetron, the commonly used antiemetics such as promethazine, metoclopramide and droperidol are known to cause adverse effects such as dry mouth, sedation, hypotension, tachycardia, extrapyramidal reactions, dystonic effects and restlessness. Metoclopramide, a dopamine antagonist acts on the chemoreceptor trigger zone (CTZ) to provide its antiemetic effects.

It is much cheaper and more affordable than ondansetron but it is associated with extrapyramidal effects, tardive dyskinesia and hyperprolactinaemia.[10,11]

This study seeks to compare the severity of PONV following day case gynaecological laparoscopic procedures following prophylaxis with ondansetron and metoclopramide.

Materials and Methods

This was a prospective double-blind, randomised controlled study conducted in a tertiary health facility Northwest Nigeria following approval from the research ethics committee. Sixty-six consenting American Society of Anaesthesiologist (ASA) risk classification status I or II patients aged between 18 and 55 years and scheduled for day case gynaecological laparoscopic surgeries were recruited into the study. Patients who had known sensitivities to either of the study drug, received antiemetics 24 hours prior to surgery, history of motion sickness or previous PONV were excluded from this study.

Routine pre-anaesthesia evaluation was carried out in all patients on the morning of surgery. Patients were randomly assigned into one of two groups A (ondansetron) or B (metoclopramide) using sealed envelope technique. They were asked to pick from a bag containing the sealed envelopes and hand over same to an assistant who was either a nurse anaesthetist or a doctor who prepared the drug as per the group indicated in the chosen envelope while the researcher was blinded. Group A received 4mg of intravenous ondansetron and Group B had 10mg of intravenous metoclopramide 10 minutes before induction of anaesthesia. Patients were then wheeled into the operating room and positioned supine on the operating table. Pulse oximeter probe, electrocardiographic leads and blood pressure cuff were applied onto the patients and baseline heart rate, peripheral oxygen saturation of haemoglobin (SpO2), and non-invasive blood pressure (BP) were recorded. All patients were preoxygenated with 100% oxygen for 3 minutes followed by a sleeping dose of 2.5% sodium thiopentone at 4mg/kg.

After the loss of eyelash reflex, mask ventilation was tested on all patients to confirm ease of ventilation after which 0.5mg/kg of the muscle relaxant atracurium was administered intravenously followed by gentle mask ventilation using 1-2% isoflurane in 100% oxygen for two minutes. With patient deeply anaesthetised and well relaxed, laryngoscopy and orotracheal intubation was done with appropriate sized single use portex, cuffed endotracheal tube (ETT). Correct ETT placement was confirmed by chest movement and auscultation as well as capnography and satisfactory SpO2 after which the tube was secured with a tape. All patients were given 0.5mg/kg of pentazocine with a maximum dose of 30mg for analgesia. Anaesthesia was maintained with 33% oxygen in air using 1-1.5% isoflurane using intermittent positive pressure ventilation (IPPV) at tidal volume of 7ml/kg and a rate of 12-16/min as appropriate. Intraoperative monitoring included continuous ECG, capnography, temperature, pulse oximetry, and non-invasive BP measurements at 5min intervals. At the end of the procedure, isoflurane was cut off and residual neuromuscular blockade was reversed with 0.02mg/kg atropine and 0.04mg/kg neostigmine administered intravenously. All patients were extubated awake after satisfactory spontaneous ventilation, obeying command, sustained headlift or a hand grip for 10s as well as satisfactory vitals. Patients were transferred to the recovery room where monitoring of vital signs continued. All patients were given an IV infusion of 1gm paracetamol.

Assessment of nausea and vomiting was done by direct questioning after recovery from anaesthesia in the immediate postoperative period, at 10 minutes of arrival in the recovery room, 30 minutes, 1 hour, 2 hours thereafter, and at intervals of 1 hour for 4 hours in the ward. Nausea was defined as a subjectively unpleasant feeling associated with the awareness and urges to vomit, and vomiting was defined as the forceful expulsion of gastric contents from the mouth. Nausea was graded as mild when it lasted for less than 2 hours and severe if for more than 2 hours. Vomiting was assessed by recording the number of bouts of vomiting.

Side effects of drugs sought were headache, drowsiness and tremors every 30 minutes. Patients with nausea were reassured and given intravenous fluids if it persisted for more than 2 hours. Patients who experienced vomiting were treated with 4 mg of intravenous ondansetron as rescue antiemetic after 2 bouts of vomiting.

Data was analysed using Statistical Package for Social Sciences (SPSS) version 16.0 Chicago, IL for windows. Summary statistics were done using means, standard deviations, frequency and percentages and the results presented in the form of tables and charts. Student's t-test was used for analysis of continuous variables and chi test for categorical variables. $P<0.05$ was regarded as significant.

Results

Sixty-six patients were evaluated in two treatment groups.

Figure 1 is a comparison of the frequencies of nausea and vomiting in the two groups. Nausea occurred in 11 patients (33.3%) in the metoclopramide group and 5 (15.2%) in the ondansetron group ($p=0.001$). Three patients (9.1%) vomited in the metoclopramide group and 1 (3%) in the ondansetron group($p<0.0001$)

The severity of PONV varied in the two groups. Eight patients (24.2%) experienced

mild nausea in the metoclopramide group while 3 patients (9.1%) experienced severe nausea. Two patients (6.1%) developed mild nausea in the ondansetron group and 3 (9.1%) had severe nausea (p =0.2). (Table 1) Two patients (6.1%) in the metoclopramide group experienced 1 bout of vomiting while one (3%) in the ondansetron group had an episode of vomiting. (Table 2) One patient (3%) in the metoclopramide group experienced 2 bouts of vomiting, none in the ondansetron group had up to 2 bouts of vomiting (p =0.5)

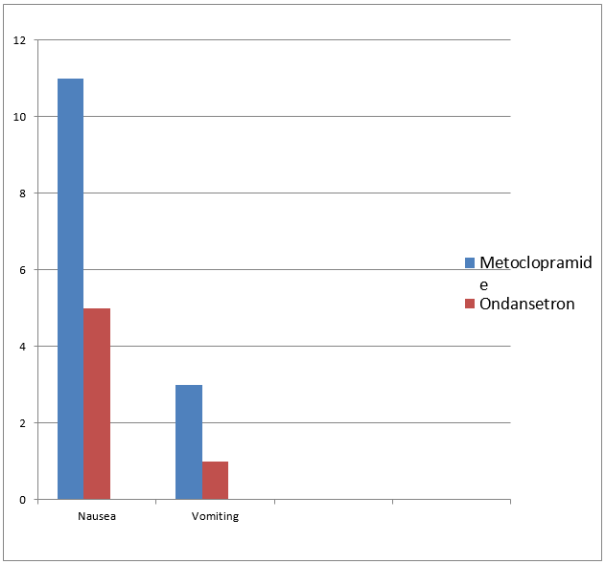

Figure 1: Comparison of Incidence of Nausea and Vomiting (Ponv) In the Treatment Groups

Table 1: Severity of Nausea.

Drug	Mild Nausea no(%)	Severe Nausea no(%)	X^2	p value
Metoclopramide group n-33	8 (24.2%)	3 (9.1%)	57.09	0.2
Ondansetron group n-33	2 (6.1%)	3 (9.1%)		

Table 2: Severity of Vomiting

Bouts of vomiting	Metoclopramide No(%)	Ondansetron No(%)	p value
1	2(6.1%)	1(3%)	
2	1(3%)	0	0.5
3	0	0	

Discussion

Nausea and vomiting are protective reflexes against the absorption of toxins, as well as response to certain stimuli. PONV is amongst the most common complications following anaesthesia and surgery with a selectively high incidence (up to 70%) in high risk patients.[14,15]

This study was carried out in a high risk group of patients being females in whom the incidence of vomiting is three times higher, and who were undergoing gynaecological laparoscopic surgery, a procedure associated with nausea and vomiting.[8,9]

In this study, nausea was mostly of the mild form in the metoclopramide group with 8 patients (24.2%) while 3 patients (9.1%) experienced severe nausea, the ondansetron group similarly had 3 patients (9.1%) experiencing severe nausea while 2 patients (6.1%) experienced mild nausea (p=0.2). This suggests that though the overall incidence of nausea was less in the ondansetron group compared to metoclopramide group, the former did not prevent severe nausea than the latter. Conversely, ondansetron was more efficacious in the prevention of the mild form of nausea. This tends to agree with findings in the Kushimo and Okeke[9] study. The difference in this study was however not significant. The lower incidences of the severe form of nausea probably explains why potent antiemetic drugs such as ondansetron aren't readily made available in our theatres, the first line antiemetics being promethazine and metoclopramide. This is despite the fact that the mild form of nausea could be as well distressing.

Quaynor et al[16] in their research used similar drugs as this study for 122 patients undergoing laparoscopic cholecystectomy and found that though the overall incidences of PONV were similar in both groups (43% for ondansetron group and 47% for metoclopramide), the proportion of patients that had moderate to severe symptoms were significantly higher in the ondansetron group compared to the metoclopramide group (61% vs 35%). Their study was however carried out in both male and female patients, and the female gender is known to be the strongest risk factor identified in PONV.[8] Their study also did not involve gynaecological procedures as in our study.

Ondansetron is a highly potent and selective 5HT3 receptor antagonist.[17] The results from this study reaffirms the superiority of ondansetron over metoclopramide in the prophylaxis of PONV in high risk patients. Kulsoom et al[18] studied patients who underwent laparoscopic cholecystectomy and reported a remarkably lower incidence of PONV (11.8%) with ondansetron prophylaxis compared to 42.2% with metoclopramide.

Both drugs had good safety profiles as the incidence of side effect was minimal. One patient (3%) in the ondansetron group developed headache while no side effect was reported in the metoclopramide group which is similar to observations in the study by Awana et al.[19]

Conclusion

We therefore conclude that ondansetron is a more effective agent against the mild form of nausea as patients in the metoclopramide group in this study had the highest incidence of mild nausea, their efficacy against severe nausea are however similar. Both drugs are

effective against vomiting irrespective of the severity though ondansetron still offered better protection against severe vomiting. This study also showed that ondansetron when compared to metoclopramide better reduces the incidence of PONV in patients undergoing day case gynaecological laparoscopic procedures

Limitations

We had no control (placebo) group for comparison with the studied antiemetic drugs due to ethical concerns.

Conflict of interest

We declare no conflicts of interest

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