A study to evaluate the efficacy of ondansetron and metoclopramide for prophylaxis of post-operative nausea andvomiting after laparoscopic surgeries

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Abstract - The most common and distressing aspect of surgery and anaesthetic is post-operative nausea and vomiting. The purpose of this study was to assess the efficacy of ondansetron and metoclopramide for the prevention of post-operative nausea and vomiting after laparoscopic surgery. The approach used was an unpaired t-test analysis, and the sample size was 100 adult patients with ASA grades 1 and 2, aged 18 to 60 years. Patients with an ASA of 3 or 4 and a history of motion sickness were not eligible. The researchers examined the delivery of 4 mg ondansetron injection vs 10 mg metoclopramide. The findings of this study indicated that ondansetron was significantly more effective in preventing nausea and vomiting as compared to metoclopramide. The implication of this study suggests that ondansetron should be considered asa preferred drug for prophylaxis of PONV after laparoscopic surgeries, offering better outcome forpatients. Further research is needed to explore the long-term effects and potential side effect of ondansetron in a larger patient population.

Keywords: Nausea, Vomiting, Ondansetron, Metoclopramide, ASA, PONV and Lap

I. INTRODUCTION

Vomiting and retching are both common events characterised by the ejection of gastric contents and, correspondingly, muscular action without expulsion. They can be produced by a variety of causes, including complicated humeral and neurological interactions involving receptors foundin the emesis centre, chemoreceptor trigger zone (CTZ), and gastrointestinal tract. The CTZ receives input from a variety of sources, including the gastrointestinal system, vagus nerve, vestibular apparatus, and cerebral cortex. Post-operative nausea and vomiting (PONV) is an unpleasant and common side effect after anaesthesia and surgery that is commonly associated with risk factors such as female gender, a history of nausea, vomiting, and motion sickness, as well as the use of opioids and nitrous gas. Despite advances in anaesthetic procedures and the identification of risk factors, PONV continues to be a major issue, with the potential to result in catastrophic surgical complications and delayed hospital discharge.
To prevent PONV, many therapies have been investigated, with antiemetic medicines playing a critical role. Antihistamines, anticholinergics, and dopamine receptor antagonists have been tried, however they may have limited efficacy and undesirable side effects. Serotonin receptor antagonists (SRA), a novel family of medicines, provide superior prevention with improved safety profiles. By binding to 5-hydroxytryptamine subtype 3 receptors, ondansetron, a commonly used SRA, selectively suppresses emetogenic stimuli during anaesthesia and surgery. Metoclopramide, a dopamine receptor antagonist that operates on the CTZ to create its anti- emetic effect, is another highly researched medication. While metoclopramide is less expensive, it is associated with extrapyramidal symptoms, drowsiness, and cardiac dysrhythmias. Given these factors, the study's goal was to determine the efficacy and safety of a single dose of ondansetron and metoclopramide in avoiding PONV in patients undergoing elective laparoscopicsurgery. Such research is critical for improving post-operative care and patient outcomes.

II. LITERATURE REVIEW

In 2017, Isazadehfar K et al conducted a comparison study of the preventive dosages of ondansetron and metoclopramide for the prevention of postoperative nausea and vomiting in 60 patients undergoing laparoscopic cholecystectomy. The frequency of nausea and vomiting was the same in both groups. Ondansetron, on the other hand, was found to be more effective than metoclopramide in preventing motion sickness.9
In a 2017 study, Muhammad Ilyas et al. discovered that intravenous ondansetron was a more effective treatment choice than intravenous metoclopramide for preventing postoperative nausea and vomiting after laparoscopic surgery.10

SHRESTHA RK et al. examined the efficacy of metoclopramide and ondansetron in reducing surgical nausea and vomiting after general anaesthesia in a 2019 study. In this study, metoclopramide and ondansetron were compared as preventive intravenous therapies for nausea and vomiting in patients having vent laparoscopic cholecystectomy under general anaesthesia. He concluded that utilising ondansetron as a prophylactic measure works better than using metoclopramide during cholecystectomy.11 Dr. G. Madhavi and colleagues published a study in 2016 on the use of intravenous antiemetic prophylaxis during major gynaecological

surgery. Ondansetron and Metoclopramide in a Randomised Double-Blind Comparative Study. He stated that after major gynaecological surgery under general anaesthesia, nausea scores in group A (Ondansetron) were considerably lower than in group B (metoclopramide) in all four assessment periods of a prospective double-blind study.

Randomised trial comparing the antiemetic efficacy of Ondansetron, a 5HT3 receptor antagonist, and metoclopramide, a Benzamide antiemetic, in the prevention of nausea and vomiting. Despitethe fact that there were no emetic events in the Ondansetron group, 32% of patients in themetoclopramide group had them during the evaluation periods (P 0.5). However, no groupreported any clinically relevant drug-related adverse effects. In patients undergoing majorgynaecological surgery under general anaesthesia, Ondansetron, in his opinion, inhibits PONVbetter and more effectively than metoclopramide.13 Dalhat S., Mohammad AD et al. (2018)discovered that ondansetron provided greater prophylaxis againstPONV in day-casegynaecological surgery compared to metoclopramide in a study on the prophylaxis ofpostoperative nausea and vomiting following laparoscopic surgery.2 SHANTHI PONNUSAMYet al. investigated the anti-emetic effects of dexamethasone and ondansetron in patientsundergoing major gynaecological surgery in a prospective, randomised, double-blindexperiment. In terms of the use of antiemetic rescue medications, he stated that it was critical toevaluate the anti-emetic efficacy of dexamethasone and ondansetron in patients who hadundergone substantial gynaecological procedures. In his study, 8 mg of dexamethasoneoutperformed 4 mg of ondansetron in preventing PONV after major gynaecological surgeries.17

III. MATERIALS AND METHODS

Following clearance from the ethics committee and getting written, informed consent from each patient, the study was carried out in the Department of Anaesthesiology at Maharishi Markandeshwar Institute of Medical Science and Research, Mullana, Ambala.

The study involved two groups of patients: 50 patients who received injections of Ondansetron 4mg and 50 patients who received injections of Metoclopramide 10mg. These individuals were chosen from a group of 100 adult patients with ASA I or II, aged 18 to 60, and undergoing elective laparoscopic surgery.

Certain exclusion criteria were used to guarantee that the study groups were homogeneous. Patients with ASA grades III and IV, as well as those with a BMI greater than 30 kg/m2 and a history of motion sickness, were excluded from the trial. Patients with upper gastrointestinal pathologies such as acid peptic disease or reflux esophagitis, a history of substance misuse, or those using anti-emetic, anti-psychotic, or chemotherapy medications within 24 hours of surgery were also excluded. Patients who had known allergies to the research medicines, as well as those who were menstruation or pregnant, were also removed from the trial to reduce confounding factors and ensure the correctness of the data. The study aimed to achieve a well-defined and representative sample of patients undergoing laparoscopic surgery by adhering to these inclusion and exclusion criteria, allowing for a comprehensive comparison of the efficacy of Ondansetron and Metoclopramide for post-operative nausea and vomiting prophylaxis.

IV. STATISTICAL TECHNIQUES AND ANALYSES

Patients in this study were admitted to the hospital the day before surgery, and the institution's Pre-Anaesthesia Clinic performed a pre-anaesthesia evaluation. Patients were kept off meals and beverages for six hours before surgery while relevant investigations for co-morbid conditions were noted. As soon as the patient entered the operating room, an 18 gauge IV cannula was put in the non-dominant hand, and perioperative monitoring commenced. Pulse oximetry, non- invasive blood pressure readings every 5 minutes, capnography, and a continuous 3-lead ECG were all performed. The maintenance fluid throughout the perioperative period was Ringer Lactate solution. All of the materials were made by a fully competent anaesthetic OT technician who was not involved in the study.

Medication is administered in identical syringes. Patients who joined up got sealed envelopes that were used for randomization before to anaesthesia. The study population was divided into two groups of 50 participants each. Group B received an intravenous injection of Metoclopramide 10mg diluted in 5ml of distilled water just prior to the commencement of anaesthesia, while Group A received an injection of Ondansetron 4mg.

As premedication, all patients received 0.04 mg/kg IV Midazolam and 0.1 mg/kg IV Nalbuphine.Induction of anaesthesia was performed using freshly produced solutions of Propofol 2-2.5 mg/kg IV slowly. Vecuronium 0.1 mg/kg IV was then provided for muscle relaxation, and an endotracheal tube of appropriate size was placed. To maintain anaesthesia, 60% N2O in oxygen and isoflurane 0.6-0.8 V/V% with closed circle breathing were utilised. During operation, more Vecuronium dosages were administered as needed.

To alleviate post-operative discomfort, PCM 15mg/kg was administered. After the surgery, the usage of cosmetic drugs was discontinued, and the neuromuscular blockade was treated intravenously with Neostigmine 0.05 mg/kg and Glycopyrrolate 0.01 mg/kg. The endotracheal tube was removed after careful suctioning of oropharyngeal secretions, and oxygen therapy was

continued while patients were transferred to the post-anesthesia care unit (PACU).

A resident anaesthetist followed patients in the PACU for postoperative nausea and vomiting for the first 24 hours after anaesthesia. The presence or absence of nausea and vomiting was determined and recorded every 30 minutes, 1 hour, 2 hours, 4 hours, 8 hours, 16 hours, and 24 hours as "yes" or "no." Vomiting was defined as the violent ejection of stomach contents from the mouth, whereas nausea wasdefined as an unpleasant post-operative sensation accompanied by the desire to vomit.

Hemodynamic parameters such as heart rate (HR), systolic blood pressure (SBP), diastolic bloodpressure (DBP), and SpO2 were collected intraoperatively. Any pharmaceutical side effects werealso recorded at the end of the trial.

The study's purpose was to apply this detailed technique to analyse the efficacy of Ondansetronand Metoclopramide in treating post-operative nausea and vomiting in patients undergoing elective laparoscopic surgery.

V. DISCUSSION

Postoperative nausea and vomiting (PONV) are a common and unpleasant consequence that people suffer following surgery. Because this syndrome can result in negative outcomes such as electrolyte imbalances and aspiration, it is critical for anaesthesiologists to effectively avoid and manage it. PONV in laparoscopic surgery is caused by causes such as increased intra-abdominal pressure from CO2 insufflation and the reverse Trendelenburg position, as well as postoperative pain, anxiety, and specific anaesthetic medicines such as N2O, opioids, and NSAIDs.

Several medicines have been used to prevent PONV, and ondansetron has been determined to be the most safe and effective with the fewest side effects, compared to other drugs with potential negative effects. In this study, we examined ondansetron with metoclopramide for nausea and vomiting prevention during laparoscopic surgery. When compared to metoclopramide, the results showed that ondansetron was more effective at avoiding PONV.

Other investigations on various surgical techniques, including caesarean sections, abdominal surgeries, and surgeries under general and spinal anaesthetic, have found similar results. The frequency and duration of nausea were greater in the metoclopramide group.

Compared to the ondansetron group, demonstrating that metoclopramide was not as effective inpreventing post-surgical nausea as ondansetron.

The number of vomiting episodes was also higher in the metoclopramide group, necessitating theuse of rescue anti-emetic medicines. We utilised dexona as a rescue anti-emetic medicine to relieve post-surgical nausea and vomiting. Furthermore, ondansetron had a better adverse effect profile than metoclopramide, with fewer cases of dizziness and headache.

While certain studies have shown contradictory findings on the efficacy of ondansetron and metoclopramide, the overall evidence suggests that ondansetron is a better choice for PONV prophylaxis in laparoscopic surgeries. The study emphasises the significance of choosing the mosteffective and well-tolerated antiemetic medicine to improve patient outcomes and reduce postoperative complications associated with PONV.

VI. CONCLUSION

To summarise, postoperative nausea and vomiting (PONV) is a significant problem that can havea negative impact on patient outcomes following surgery. Because to the increased intra- abdominal pressure and patient placement, laparoscopic operations involve distinct complications. We examined the efficacy of ondansetron and metoclopramide in avoiding PONVin patients undergoing elective laparoscopic surgery in this study.

The study's data clearly show that ondansetron outperforms metoclopramide in terms of prophylactic efficacy. Patients in the ondansetron group had considerably decreased postoperative nausea and vomiting, with fewer bouts of vomiting and a lower need for rescue anti-emetic medicine. Furthermore, ondansetron had a more favourable side effect profile, with fewer instances of dizziness and headache, demonstrating its safety and tolerability.

These findings are consistent with prior research on various surgical procedures, indicating that ondansetron is a safe and effective option for preventing PONV. The study emphasises the necessity of selecting the best antiemetic medicine for each patient in order to increase patient comfort, prevent problems, and improve overall postoperative recovery.

Because PONV plays such an important role in patient satisfaction and recovery, doctors must carefully assess the preventative strategy for each surgical case. Because to its efficacy, safety, and low side effects, ondansetron has emerged as a favoured option for perioperative care procedures.

This study assists anaesthesiologists in making educated decisions to optimise patient care during laparoscopic procedures by providing evidence-based insights. It emphasises the need of ongoing researchin refining perioperative treatment and improving patient outcomes.

VII. REFERENCES

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