Original Research Article

# A double-blind study comparing incidence and severity of post operative nausea and vomiting in general Anaesthesia versus spinal Anaesthesia

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## Abstract

**Background:** Postoperative nausea and vomiting (PONV) is one of the complex and significant problems in anesthesia practice, with growing trend toward ambulatory and day care surgeries. PONV is influenced by multiple factors which are related to the patient, surgery, and pre-, intra-, and post-operative anesthesia factor The risk of PONV can be assessed using a scoring system such as Apfel simplified scoring system which is based on four independent risk predictors The factors considered are female sex, age <60 years, nausea in the postanesthetic care unit, prior history of PONV, and postoperative opioid administration.. The purpose of this study was to comparing incidence and severity of post operative nausea and vomiting in general anesthesia versus spinal anesthesia in patients with known risk factors for PONV. **Methods:** A double blinded comparative study will be conducted on 200 (100 patients in each group) patients of age group of 17 to 60 of both male and female of ASA grade I or II undergoing emergency or elective surgery. They will be randomly divided in to 2 groups. Group A, group B patients receive general anesthesia and spinal anesthesia respectively. general anesthesia and Spinal anesthesia will be performed using standard anesthesia protocols. All patients will be monitored post operatively for occurrence and severity of post operative nausea and vomiting for 48 hour at interval of 2hour, 4hour, 8hour, 12hour, 24hour, 36hour 48hour. Ondansetron 4 mg given preoperatively and before completion of surgery, as an antiemetic prophylaxis. Fentanyl 1mc/kg administered at the end of surgery for postoperative pain management. Incidence and severity of postoperative nausea and vomiting, requirement of rescue treatment, additional antiemetic, and patient satisfaction were recorded for 48 h after operation. **Results:** Incidences of PONV and rescue treatment requirement were significantly lower in group B. Rate of PONV was 30% in group A and 20% in group B. Among them 80 patients (80%) required rescue treatment in group A and 46 patients (46%) in group B (p value < 0.05). Additional antiemetic required in 36 patients (36%) in group A and in 12 patients (12%) of group B. Mean NVS score was significantly higher (1.86 + 1.15) in group A compared with group B (0.74 + 0.91) (p value <0.05). Patient satisfaction score is better with group B, 2.6 + 0.61 vs. 2. 2 +0.78 in group A (p value < 0.05). **Conclusion:** Surgery done under spinal anesthesia can reduce incidence and severity of PONV significantly in high risk patients as compare to under general anaesthesia.

**Key words:** PONV, spinal anesthesia, general anesthesia, antiemetic,

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## INTRODUCTION

Postoperative nausea and vomiting (PONV) is an unpleasant complication affecting about a third of the 10% of the population undergoing general anaesthesia each year. Postoperative nausea and vomiting (PONV) is the most frequent side-effect after anaesthesia with overall incidence up to 30% of unselected patients and up to 70-80% in high risk patients with no antiemetics.[1] It results in discomfort to patient, delayed recovery, prolonged hospital stay, increases cost and sometimes serious complications like aspiration pneumonitis.[2,3]

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Apfel *et al* constructed scoring system to predict high risk factors for postoperative nausea and vomiting which are female sex, history of motion sickness/postoperative nausea and vomiting, non smoker, postoperative opioid treatment[4].Other high risk factors are anesthetic factors like administration of inhalational anesthetic agents, abdominal and laparoscopic surgeries etc. Now a days, so many antiemetics are available like $5HT_3$ antagonists (Ondansetron, granisetron, ram isetron), dopamine antagonists (metoclopramide, domeperidone), antihistamines (cyclizine, promethazine), dexamethasone etc. at many centers multimodal antiemetic strategy is being used combining more than one antiemetic to reduce postoperative nausea and vomiting, improve quality of recovery and patient satisfaction.[1] These antiemetics can cause side effects like drowsiness, dry mouth, fatigue, constipation, tinnitus, muscle spasm, restlessness etc.Many invasive and non-invasive non-pharmacological interventions are being investigated to control postoperative nausea and vomiting which include acupressure at p6 acupoint, transcutaneous electrical stimulation (TAES), acupuncture, electro-acupuncture, laser stimulation, capsicum plaster in the patients undergoing surgery.[1,5] Type of anesthesia (general>regional, volatile>total intravenous anesthesia, and nitrous oxide use)efect on postoperative nausea and vomiting, Lower incidences of PONV are seen in patients who had peripheral, and to a lesser extent, central neuraxial blockade. Considering these facts we have decided to conduct this study to evaluate the effectiveness of spinal anesthesia versus general anesthesia along with an antiemetic on incidence of PONV.

## MATERIALS AND METHODS

After getting approval from Institutional Ethics committee, 200 patients scheduled for elective and emergency surgeries under general anaesthesia and spinal anesthesia, in the routine operation lists of GMERS medical collage and Hospital, Junagadh were enrolled for the study. Thorough preoperative examination done on the day before surgery. We have included ofboth sex, aged between 17-60 years, ASA physical status I or II. Patients with ASA grade III or IV, h/o alcohol or drug abuse, were excluded from the study.in spinal anesthesia Exclusion criteria were patients with deformities of spine, coagulopathies, infection at local site of injection, cardiac or neurological disorders, compromised fetus, PIH in pregnancy. Written as well as verbal informed consents were taken from all patients. The patients were divided randomly into two groups: Group A and group B, each group consisting of 100 patients. In patients of group A general anesthesia and in group B spinal anesthesia given. Patients were kept nil by mouth from 10:00 pm on the day before surgery. Standard anaesthesia protocols followed. On the arrival in operation theatre peripheral venous line was secured and I.V. fluid started. All the monitor gadgets cardio scope, non-invasive blood pressure, $SpO_2$ applied and monitored continuously. All patients were premedicated with Inj. Midazolam 1 mg, Inj. Glycopyrrolate 0.2 mg; Inj. Ranitidine 50 mg; Inj. Ondansetron 4 mg. General anaesthesia administered with Inj. Propofol 2-2.5 mg/kg IV, Inj. Fentanyl 1 mcg/kg IV and Inj. Succinylcholine 1.5-2 mg/kg IV and endotracheal intubation done. Maintenance of anaesthesia done with oxygen 30-40%, nitrous oxide 60-70%, Sevoflurane 2-2.5% and Inj. Atracurium IV. End tidal carbon dioxide ($EtCO_2$) maintained between 35-40 mmHg. Before the completion of surgery, Inj.Fentanyl 1mcg/kg IV and Inj.Ondansetron 4mg IV administered. At the end of surgery, all anaesthetic agents stopped, 100% oxygen given and residual neuromuscular block was reversed with Inj. Neostigmine 2.5 mg IV and Inj. Glycopyrrolate 0.4 mg IV. After regaining adequate respiration, adequate muscle tone, spontaneous eye opening extubation done. All patients shifted to post anaesthesia care unit. Intravenous line secured and Adequate preloading done with 500-1000 ml of ringer lactate in all patients in spinal anesthesia .Premedication given with glycopyrrolate 0.2 mg, ranitidine 50 mg, ondansetron 4 mg and metoclopramide 10 mg slow intravenous.after aseptic and antiseptic precaution spinal anesthesia give with 25G BDspinal needle,injbupivecan heavy 0.5%,volume 2 to 3cc.All patients were observed for presence or absence and severity of PONV for 48 hours. At least one episode of nausea, retching or vomiting during this observation period is considered presence of PONV. Person monitoring patient postoperatively was blinded to the group of patient. Severity of PONV was recorded as per nausea vomiting scale (NVS: 0-no complaints, 1-mild nausea, 2-moderate nausea, 3-frequent vomiting, 4-severe vomiting).[7] Rescue therapy was given with Inj. Ondansetron 4 mg, when NVS is >1. Additional antiemetic given in the form of Inj. Metoclopramide 10 mg when NVS is >3. At the end point of the study i.e. at 48 hours, severity of nausea and vomiting, requirement of rescue therapy and additional antiemetic administration, patient satisfaction were recorded. Patient satisfaction was assessed using verbal rating scale (1-dissatisfied, 2-satisfied, 3-highly satisfied).

### STATISTICAL ANALYSIS

For statistical analysis data was enter in Microsoft excel and analysis done with the help of Microsoft office excel Version 2007. Data expressed as mean and standard deviation otherwise indicated. Parametric values compared using independent Student t-test. Categorical values compared using $x^2$ test. P value > 0.05 considered statistically significant.

## RESULTS

A total two hundred patients were enrolled for the study and completed the study. Each group consists of 100 patients. All the patients in both groups were male, females, age 17-60 under general anaesthesia and spinal anesthesia. So, time of surgery, anaesthetic drugs, antiemetic prophylaxis and opioid for postoperative pain management were same in both groups. Table I shows patient profile of both groups are almost similar. Other demographic characteristics like age, body weight, height, surgical time, no of patients with history of PONV or motion sickness, ASA grading were not different significantly in both groups as per shown in table I.

**Table 1:** Demographic characteristics: Gr A General anaesthtia, Gr B – Spinal anaesthetia

| Parameter | Group A (n=100) | Group B (n=100) | P value (<0.05 significant) |
|---|---|---|---|
| Age (yrs) | 39.6±15.2 | 42.6±15.6 | 0.179 |
| Sex M/F | 46/54 | 50/50 | 0.571 |
| Body weight (kg) | 58.1 ±5.7 | 59.3± 4.7 | 0.12 |
| Height (cm) | 154.8 ±6.0 | 156.1± 5.9 | 0.12 |
| Surgical time (min) | 49.9±9.6 | 53.1± 10.3 | 0.03 |
| H/o PONV or motion sickness | 30 | 20 | 0.102 |
| ASA gr I/II | 28/72 | 34/66 | 0.35 |

ASA=American Society of Anaesthesiologists; Data are mean ± SD otherwise indicated.

**Table 2:** Comparison of Risk factors to actual occurrence of PONV for Gr A

| Risk factors for NV | Post OT Occurrence of NV (N=30) | No Occurrence of NV (N=70) | P value (<0.05 significant) |
|---|---|---|---|
| Age (yrs) | 30±11.1 | 43.7±14.9 | 0.001 |
| Sex M/F | 10/20 | 36/34 | 0.96 |
| Body weight (kg)/Obesity | 57.2±5.74 | 58.5±5.76 | 0.309 |
| Surgical time (min) | 22 (73.3%) | 44 (62.9%) | 0.31 |
| > 45 min | | | |
| H/O Opoids | 22 (73.3%) | 44 (62.9%) | 0.31 |

**Table 3:** Comparison of Risk factors to actual occurrence of PONV for Gr B

| Risk factors for NV | Post OT Occurance of NV (N=20) | No Occurance of NV (N=80) | P value (<0.05 significant) |
|---|---|---|---|
| Age (yrs) | 30.5±16.7 | 45.6±13.9 | 0.001 |
| Sex M/F | 4/16 | 46/34 | 0.003 |
| Body weight (kg)/Obesity | 56.9±2.85 | 59.9±4.9 | 0.011 |
| Surgical time (min) | 16 (80%) | 40 (50%) | 0.015 |
| > 45 min | | | |
| H/O Opoids | 6 (30%) | 14 (17.5%) | 0.211 |

Data are mean ± SD otherwise indicated.

Incidence of PONV was30 % in group A and 20% in group B which is significantly lower. Rescue treatment and additional antiemetic treatment required in 8O(80%) and 46(46%) patients and 36(36%) and 12(12%) patients in group A and B respectively, suggests significant less requirement ofgroup B. Severity of PONV was evaluated by NVS score. Mean NVS score was 1.86 in group A and 0.74 in group B which is significantly higher in group A. As far as satisfaction from patient side there was statistically significant difference between both groups. Patient satisfaction score was 2.2 in group A and 2.6 in group B, suggestive of better patient satisfaction in group B(Table 4).

**Table 4**

| | Group A(n=100) | Group B(n=100) | P value(<0.05 significant) |
|---|---|---|---|
| NVS score | 1.86± 1.15 | 0.74± 0.91 | 0.001 |
| Rescue treatment | 80 (80%) | 46 (46%) | 0.001 |
| Additional antiemetic | 36 (36%) | 12 (12%) | 0.001 |
| Patient satisfaction score | 2.2± 0.78 | 2.6± 0.61 | 0.001 |

ASA=American Society of Anaesthesiologists

## DISCUSSION

ability of so many newer antiemetics and use of single or in combination targeting different site of actions, PONV is still most common complication of anaesthesia and question of major concern for anesthesiologists.[1] If not treated adequately it interferes with patient comfort and early discharge especially in day care surgeries and sometimes may lead to serious complications like electrolyte imbalance, dehydration, aspiration pneumonitis.[2,3,7] Several studies demonstrated effectiveness of spinal anesthesia in reducing PONV and improving overall patient satisfaction.[1,5,6,8] In addition to reducing PONV, spinal anesthesia has other advantages like it reduce opoids requierment, reduces anxiety and reduces severity of postoperative pain[9]. spinal anesthesia associated with complications like hypotension if higher block, postdural puncturer hedache. In our study, all the patients in both groups, were comparable with respect to age, sex, body weight, ASA group, type and duration of surgery and anaesthesia. These factors may influence the outcome of the study. We have selected the patients which are high risk for occurrence of PONV as it is stated by the investigators that spinal anesthesia reduces PONV in patients with thouree or more risk factors are present [8]. Thus, we could show from the results of our study that spinal anesthesia for 24 hours is effective in reducing early as well as late PONV. It reduces incidence, severity, total number of episodes, requirement of rescue treatment and additional antiemetic. Patient satisfaction and comfort is significantly better in spinal anesthesia.There are some limitations in our study. We have not studied incidence of nausea and vomiting separately. No pre study power analysis done. So further studies are required to evaluate the effectiveness ofspinal anesthesia on postoperative nausea and vomiting separately.

## CONCLUSION

In conclusion, spinal anesthesia for 48 hours can reduce incidence and severity of PONV in patients with risk factors for PONV and also improves patient satisfaction, when used as an adjunct to antiemetic prophylaxis.

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