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Can we optimize PONV?

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Abstract

Background: Post-operative nausea and vomiting (PONV) are common anesthetic and surgical side effects after any surgery. This can be more distressing to patients than post - operative pain. The present study was con ducted to find the risk factors & prevalence of PONV.

Material & Methods: This clinical retrospective cross-sectional study was conducted at Dr PDMMC Medical College, Amravati, M.S. India to assess the prevalence and risk factors for PONV on 100 subjects posted for the cesarean section from March 1 2021 to 28 February 20 22.

Results: In the present study, out of 100 subjects, the majority, i.e., 46 (46%) subjects were in the 31-35 years age group followed by 34 (34%) subjects in the 26-30 years age group while 20 (20%) subjects were in <30 years age group.

The majority, i.e., 64 (64%) subjects were primipara while 36 (36%) were multipara.

In the majority, i.e., in 55 (55%) subjects, exteriorization of the uterus was done, 54 (54%) subjects were <30 years of age, 34 (34%) subjects had nausea or vomiting in the first trimester, 28 (28%) subjects had a history of motion sickness, 21 (21%) subjects had spinal hypotension while 20 (20%) subjects were primipara.

22 (22%) subjects had nausea at 0-2 hours, 9 (9%) sub jects had nausea at 2-24 hours, 16 (16%) subjects had vomited at 0-2 hours, 8 (8%) subjects had vomiting at 2-24 hours, while 16 (16%) subjects had both nausea & vomiting 0-24 hours.

Conclusion: A combination of different antiemetic agents should be preferred for the prevention & treatment of PONV. It is most effective in preventing intra operative and post operative nausea and vomiting for patients undergoing cesarean section.

Keywords: Post-operative, Nausea, Vomiting, antie metics, pro phylaxis, Caesarean section, Prevention, Management, PONV, Prophylaxis

Abbreviations

PONV-Postoperative nausea, and vomiting; IONV-Intra-operative nausea, and vomiting; NV-Nausea and vomiting; CS-Cesarean section

Introduction

Postoperative nausea and vomiting (PONV) are defined as any nausea or any desire to vomit, or vomiting or both that occurs during the first 24–48 h postoperative period

in patients undergoing surgery.[1]

Cesarean section under spinal anesthesia is the most commonly performed surgery. Regional anesthesia is used in 80% of cesarean sections.[2]

The mechanism of PONV is multifactorial. It includes the chemoreceptor triggering zone (CTZ), reflex afferent pathways from the cerebral cortex, the vagal mucosal path way in the gastro intestinal system, neuronal path ways from the vestibular system, and midbrain afferents. Stimulation of these pathways activates the vomiting center via dopaminergic, histaminergic, cholinergic, or serotonergic receptors.[3]

With modern techniques, the incidence of PONV is high. The incidence of vomiting is 30%. The incidence of nausea is 50%. In high-risk patients, it is 80%.[4]

In patients undergoing cesarean section under spinal anesthesia, nausea, and vomiting during the procedure cause dis comfort to the patient and impair surgical con ditions. It can cause aspiration gastritis, enhanced intra- and postoperative pain, and bleeding or surgical trauma.[5]

PONV after cesarean section cause delayed mother-to-baby bonding and the pulmonary aspiration of the gastric contents in anesthetized patients, metabolic alkalosis, the risk of oesophageal rupture, bleeding, and decreased patient satisfaction. Increased abdominal pressure during vomiting may cause pressure on suture lines opening sutures and cause incisional hernias [6]

Risk factors of PONV-7

- Female sex
- History of PONV or motion sickness
- Non-smoking
- Younger age
- General anesthesia
- Use of volatile anesthetics and nitrous oxide
- Postoperative opioids
- Longer anesthesia

Nausea and vomiting in cesarean section patients can develop due to intraoperative shivering, intraoperative hypotension & hypoxia, oxytocin use as uterotonic, more duration of uterine exteriorization, emergency surgery, and in primiparous patients.[8]

Co-loading during neuraxial anesthesia decreases intra operative hypotension, and therefore one of the main reasons for nausea and vomiting. In the prevention of hypo tension, colloid infusion provides better pro phy laxis.[9]

To reduce PONV during Cesarean section, the antiemetic prophylaxis agents include serotonin antagonists like on dansetron, granisetron, palonosetron, tropisetron, metoclo pramide, and dexamethasone.[10]

Metoclopramide 10 mg prophylaxis is effective and safe to reduce IONV and PONV in women undergoing CS under regional anesthesia.[10]

An assessment to detect and minimize factors exacer bating PONV should be performed. For the surgical patient, the use of regional anesthesia, propofol infusions, avoidance of nitrous oxide and other inhalational ane sthetics, decreased use of perioperative opioids, and sufficient hydration should be done.[11]

Women having a CS should be given regional Anesth esia.[12]

Women having a CS should be given antiemetics to reduce PONV during CS.[12]

Aims & Objectives

To evaluate the risk factors of PONV in patients undergoing Cesarean section

To estimate the prevalence of PONV in patients undergoing Cesarean section

Material & methods

A retro spective cross-sectional analytic survey was con ducted at Dr. PDMMC Medical College, Amravati, M.S. India to assess the prevalence and risk factors for PONV

in 100 subjects undergoing cesarean section under spinal anesthesia from 1 March 2021 to 28 February 2022. All partici pants signed a written informed consent to partici pate for 24 hours after the cesarean section.

Inclusion criteria

- Low-risk pregnant women undergoing cesarean section under spinal anesthesia
- Pregnant women willing to participate in the study

Exclusion criteria

Another technique of anesthesia than spinal or combined anesthesia

All subjects in our study received intravenous On dan setron 8 mg & 40 mg of Pantoprazole during the cesarean section. Intravenous metoclopramide 10 mg was given if needed. No post operative prophylactic antiemetic was given. Bupi vacaine and morphine doses in spinal anes thesia varied at the discretion of the anesthesiologist.

Outcomes

PONV was defined as nausea, vomiting (or retching), or both up to 24 hours after the cesarean section.

Intraoperative Nausea or Vomiting (IONV)

was defined as nausea, vomiting, or both prior to spinal anesthesia up to the skin closure.

PONV was assessed retrospectively by asking about nausea and vomiting & the medications used during the first 24 hours.

We divided PONV during the first two hours as early PONV & from 2 hours to 24 postoperative hours as late PONV.

Statistical analysis

Data were analyzed with the STATA, version 10.1 (2011) by Stata Corp, Texas, USA.

The proportion of awareness was estimated in percentage & 95% Confi dence Intervals.

Results

Table 1: Age distribution of study subjects n=100

Age distribution of study subjects	No. of subjects	Percentage
< 25 years	20	20%
26-30 years	34	34%
31-35 years	46	46%

In the present study, out of 100 subjects, the majority, i.e., 46 (46%) subjects were in the 31-35 years age group followed by 34 (34%) subjects in the 26-30 years age group while 20 (20%) subjects were in <30 years age group. (Table 1)

Table 2: Parity of study subjects n=100

Parity of study subjects	No. of subjects	Percentage
Primi	64	64%
Multi	36	36%

In the present study, out of 100 subjects, the majority, i.e.,64 (64%) subjects were primipara while 36 (36%) were multipara. (Table 2)

Table 3: Predictors of study subjects n=100

Predictors of study subjects	No. of subjects	Proportion in % (95% CI)
H/o motion sickness	28	28% (19.5 -37.9%)
H/o first-trimester nausea/ vomiting	34	34% (24.8 -44.1%)
Younger age	20	20% (12.7 -29.2%)
Primi	20	20% (12.7 -29.2%)
Spinal hypotension	21	21% (13.5 -30.3%)
Exteriorization of uterus	55	55% (44.7 -64.9%)
Longer Anesthesia	7	7% (3.11 –13.35%)

In the present study, out of 100 subjects, in the majority, i.e., in 55 (55%, (95% CI 44.7 -64.9%) subjects, exterior zation of the uterus was done, 34 (34%, 95% CI 24.8 - 44.1%) subjects had nausea or vomiting in the first & third trimester, 28 (28%, (95% CI 19.5 -37.9%) subjects had motion sickness, 21 (21%, (95% CI 13.5 -30.3%) subjects had spinal hypotension while 20 (20% 95 % CI 20 (20%, 95% CI 12.7 -29.2%) subjects were <25 years of age & primipara. (Table 3)

Table 4: Predictors of study subjects & their association with PONV

Predictors of study subjects & their association with PONV	No. of subjects	No. of subjects having PONV	The proportion of subjects with PONV (95% CI)	P value (Z test for proportion)
H/o motion sickness	28	18	64.3% (45.5 -80.2%)	0.1306, Not Significant
H/o first or third-trimester nausea/vomiting	34	20	58.8% (41.9 -74.3%)	0.3035, Not Significant
Younger age	20	13	65% (42.7 -83.2%)	0.1797, Not Significant
Primi	20	16	80% (58.5 -93.3%)	0.0073, Significant
Spinal hypotension	21	15	71.4% (49.8 -87.5%)	0.0495, Significant
Exteriorization of uterus	55	22	40% (27.7 -53.3%)	0.1380, Not Significant
Longer Anesthesia	7	4	57.1% (216 –87.7%)	0.7055, Not Significant

Significant at 0.05 level of significance for Primipara & Spinal hypotension.

In the present study of 100 subjects, out of 55 (55%) subjects where exteriorization of the uterus was done, 22 (40%, 95% CI 27.7 -53.3%) subjects had PONV, out of 20 (20%) subjects who were <25 years of age, 13 (65%, 95% CI 42.7 -83.2%) subjects had PONV, out of 34 (34%) subjects who had nausea or vomiting in the first or third trimester, 20 (58.8%, 95% CI 41.9 -74.3%) subjects had PONV, out of 28 (28%) subjects who had a history of motion sickness, 18 (64.3%, 95% CI 45.5 - 80.2%) subjects had PONV, out of 21 (21%) subjects who had spinal hypotension 15 (71.4%,95% CI 49.8 - 87.5%) subjects had PONV, out of 20 (20%) subjects who were primipara, 16 80% 95% CI (58.5 -93.3%) subjects had PONV while out of 7 (7%) subjects who had longer anesthesia for CS, 4 57.1% (95% CI 216 –87.7%) subjects had PONV.

More than one predictor was present in most of the subjects.

Predictors like smoking, General anesthesia, use of volatile anesthetics and nitrous oxide, and postoperative opioids were not present in our study.

Two predictors, Primi gravida status and Spinal hypotension of study subjects were found to be significantly associated with PONV. (Table 4)

Table 5: Prevalence of IONV & PONV n=100

Prevalence of IONV & PONV n=100	No. of subjects	Percentage
Nausea 0-2 hours	22	22%
Nausea 2-24 hours	9	9%
Vomiting 0-2 hours	16	16%
Vomiting 2-24 hours	8	8%
PONV 0-24 hours	16	16%

In the present study, out of 100 subjects, 22 (22%, (95% CI)) subjects had nausea 0-2 hours, 9 (9%, (95% CI))

subjects had nausea 2-24 hours, 16 (16%, (95% CI)) subjects had vomiting 0-2 hours, 8 (8%) subjects had nausea 2-24 hours, while 16 (16%) subjects had both nausea & vomiting 0-24 hours. (Table 5)

Discussion

In the present study, out of 100 subjects, the majority, i.e., 46 (46%) subjects were in the 31-35 years age group followed by 34 (34%) subjects in the 26-30 years age group. (Table 1)

Sankarrao DVG et al found that the mean age was 23.86 years in group M and 24.18 years in group O.[13]

Jonai N et al found that the subjects had a median age of 31 (range 19-42) years.[14]

In the present study, out of 100 subjects, the majority, i.e.,64 (64%) subjects were primipara. (Table 2)

Jonai N et al found that out of 80 patients, 41 underwent a cesarean section for the first time, and 39 underwent repeat cesarean sections.[14]

In the present study, out of 100 subjects, in the majority, i.e., in 55 (55%) subjects, exteriorization of the uterus was done, 54 (54%) subjects were <30 years of age, 34 (34%) subjects had nausea or vomiting in the first trimester, 28 (28%) subjects had a history of motion sickness, 21 (21%) subjects had spinal hypotension. (Table 3)

Magalhaes G et al found that out of 250 patients, Odds ratio for PONV of < 25 years: 2.9 [1.49−5.96], lower spinal bupivacaine dose (< 13 mg, inf [2.4-inf]), lower spinal morphine dose (< 80 mg, 0.03 [0−0.97]). History of motion sickness (2.5 [1.27−5.25]), nausea during the first trimester (0.3 [0.16−0.64]), intraoperative nausea and vomiting (8.2 [3.67−20.47]), and lower gestational age (< 38 weeks, 2.0 [1.01−4.08]) were statistically signifi cant.[15]

In the present study of 100 subjects, out of 55 (55%) subjects where exteriorization of the uterus was done, 22 (40%, 95% CI 27.7 -53.3%) subjects had PONV, out of 20 (20%) subjects who were <25 years of age, 13 (65%, 95% CI 42.7 -83.2%) subjects had PONV, out of 34 (34%) subjects who had nausea or vomiting in the first or third trimester, 20 (58.8%, 95% CI 41.9 -74.3%) subjects had PONV, out of 28 (28%) subjects who had a history of motion sickness, 18 (64.3%, 95% CI 45.5 - 80.2%) subjects had PONV, out of 21 (21%) subjects who had spinal hypotension 15 (71.4%,95% CI 49.8 - 87.5%) subjects had PONV.

More than one predictor was present in most of the subjects. Two predictors, Primi gravida status and Spinal hypo tension of study subjects were found to be significantly associated with PONV. (Table 4)

Sharma A et al found that the prevalence of postoperative nausea, retching, and vomiting was 10%, 8%, and 6% of patients, respectively. In Group GD 6% of patients had nausea and 4% of patients had retch and vomiting in Group PD during 0–6 hours, 7–12 h, and 13–24 h. Thus, the incidence of postoperative nausea, retching, and vomiting was less in group PD than in Group GD during 0–24 h period. The difference was not statistically significant ($P > 0.05$).[16]

Ashagrie HE et al found that spinal-induced hypotension was an independent risk factor for intraoperative nausea and vomiting (95% CI = 2.098–7.432).[17]

In the present study, out of 100 subjects, 22 (22%) subjects had nausea 0-2 hours, 16 (16%) subjects had vomiting 0-2 hours, while 16 (16%) subjects had both nausea & vomiting 0-24 hours. (Table 5)

Kappen TS et al found that there were no differences in the incidence of PONV between the intervention group 41% & care-as-usual group 43%; odds ratio, 0.97; 95% CI, 0.87–1.1. Risk-dependent odds ratio, 0.92; 95% CI, 0.80–1.1). Intervention-group required more prophylactic antiemetics (rate ratio, 2.0; 95% CI, 1.6–2.4) and more

risk-tailored than the care-as-usual–group (risk-dependent rate ratio, 1.6; 95% CI, 1.3–2.0).[18]

Conclusion

The prevalence of PONV is quite less in our study. Intra & Post-operative care & prophylaxis helped.

Prophylaxis for PONV prevention should be considered for all patients undergoing cesarean section. A multi modal approach by ondansetron, dexamethasone, Dexme detomidine, and metoclopramide should be preferred.

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