Original Research Paper

Volume - 13 | Issue - 02 | February - 2023 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Anaesthesiology

TO ESTIMATE THE INCIDENCE OF INTRAOPERATIVE NAUSEA AND VOMITING AND ITS ASSOCIATION WITH CAUSATIVE FACTORS IN LSCS UNDER SPINAL ANAESTHESIA

Dr. Shaik Mohammad Irshad*	MBBS, Junior Resident. Department of Anaesthesiology, Dr. D.Y. Patil Medical College, Hospital and Research Institute, Kolhapur.*Corresponding Author
Dr. Anupama Sahasrabudhe	MBBS MD Anaesthesiology, Associate Professor, Department of Anaesthesiology, Dr. D.Y. Patil Medical College, Hospital and Research Institute, Kolhapur.
Dr. Zaeba Shah Alam.	MBBS, Junior Resident. Department of Anaesthesiology, Dr. D.Y. Patil Medical College, Hospital and Research Institute, Kolhapur.

ABSTRACT **Introduction:** Spinal anaesthesia is the injection of local anaesthetic into the subarachnoid space and is anaesthesia of choice for LSCS. Associated hypotension, uterotonic drugs, level of spinal anaesthesia, are the main cause of intraoperative nausea and vomiting which could lead to patient discomfort and protrusion of the abdominal viscera that disturbs the surgical procedure. [4] **Objectives-**To study the incidence of intraoperative nausea and vomiting among the patients undergoing LSCS under spinal anesthesia and its association with causative factors. Material and methods: The cross-sectional observational study was performed for the duration of 18 months at Dr. D. Y. Patil medical college hospital, and research Institute, Kolhapur from April 2021 to September 2022 after explaining the study and taking written consent from the participants. In this study, we use a 40% proportion to calculate the sample size and included 368 consecutive parturients, operated during the study period. **Result:** The average age of the participant was 24.98±4.076 years ranging from 19 to 40 years. The significant findings of the study were the incidence of IONV was found to be 24.18%. Among the included subjects,25.8%(n=95) of the patients had a history of LSCS. Previous history of IONV was present in 19.6% (n=72) participants. IOH was noted in 41.6% (n=153) of patients whereas it was absent in 58.4%(n= 215) of subjects. The incidences of IONV were found to be present in 17.02%, 62.5%, and 44.64% of the patients who were administered with only oxytocin, oxytocin + carboprost, and oxytocin + methyl ergometrine as a Uterotonic respectively. In n=23 subjects, the level of anaesthesia was T5, among these subjects n=18 subjects had IONV.Out of 344 subjects with T6 anaesthesia level, n=70 subjects had IONV. A subject with a T7/8 level of anaesthesia had IONV. **Conclusion-** There was 24.18% incidence of IONV among 368 subjects. IONV was significantly associated with the previous history of IONV and predictive factors, IOH, type of UTs used, and level of anaesthesia

KEYWORDS : IONV, Spinal Anaesthesia, LSCS, Intraoperative hypotension, Nausea & Vomiting

INTRODUCTION

Spinal anaesthesia is the injection of local anaesthetic into the subarachnoid space and is anaesthesia of choice for LSCS. It is a simple technique that can be used to provide surgical anaesthesia for procedures involving the abdomen, pelvis, and lower limbs and is anaesthesia of choice for LSCS. [1] Intraoperative nausea and vomiting are common intraoperative events by which parturient feel discomfort and disturbed after spinal anaesthesia. With an incidence of up to 80%, intraoperative nausea and vomiting after spinal anaesthesia are highly common and unpleasant occurrences.[2]

A cesarean section (CS) in spinal anaesthesia has become increasingly popular in recent days and is now commonly performed under spinal anaesthesia. Due to spinal anaesthesia, consciousness allows the patient to enjoy early intimate contact with the newborn child but the procedure may be associated with various problems like hypotension, nausea, and vomiting. A common problem during the caesarean section is intraoperative and post-operative vomiting which may affect the well-being of the mother and baby. [3]

Associated hypotension, uterotonic drugs, and level of spinal anaesthesia, are the main cause of intraoperative nausea and vomiting which could lead to patient discomfort and protrusion of the abdominal viscera that disturbs the surgical procedure. [4] Hormonal changes during pregnancy are postulated to alter lower oesophageal sphincter function making it incompetent. The large gravid uterus contributed to the manifestations of upper gastrointestinal symptoms by mechanically compressing the stomach and alterations in small bowel transit times in the third trimester had also been found to potentially contribute to intraoperative nausea and vomiting. [5]

Intraoperative nausea and vomiting deserve more attention due to some consequences which may occur as dehydration, electrolyte imbalance, wound dehiscence, venous hypertension and bleeding, rupture of the esophagus, airway obstruction, and aspiration pneumonia.[6]Intraoperative nausea and vomiting (IONV) have many risk factors like raised intragastric pressure, stretching of the peritoneum (exteriorization of the uterus), excessive surgical manipulation and visceral stimulation, using opioids, uterotonic agents and the patient's mental status. Hypotension associated with spinal anaesthesia is an important contributing factor to intraoperative nausea and vomiting. [6]

IONV during spinal anaesthesia had multiple etiologies, including hypotension, vagal hyperactivity, visceral pain, intravenous opioid supplementation, h/o previous IONV, NBM status, the timing of premedication and uterotonic agents but the specific etiology is not clear. Despite strict control of the causative factors, IONV still affects most of the parturients undergoing elective or emergency caesarean delivery, and prophylaxis was ineffective under the studied circumstances. Therefore, the present study was undertaken to estimate the incidence of IONV and cumulative evaluation of causative factors for it in LSCS under spinal anaesthesia.

Aim and objectives

Aim-To estimate the incidence of intraoperative nausea and vomiting and its association with causative factors for it in LSCS under spinal anaesthesia.

Objectives-

Primary objective- To study the incidence of intraoperative nausea and vomiting among the patients undergoing LSCS.

Secondary objectives-To study the duration of premedication to assess the association with IONV, to study episodes of intraoperative hypotension and its timing, to determine the time of nausea and vomiting, and to study the association of nausea & vomiting with Intraoperative medications and uterotonics and also to study the level of spinal anaesthesia. Cumulative evaluation of all causative factors.

Material and methods-

The present cross-sectional observational study was performed for the duration of 18 months at Dr. D. Y. Patil medical college hospital, and research Institute, Kolhapur from April 2021 to September 2022 after institutional ethical approval. In this study, we use a 40% proportion to calculate the sample size and included 368 consecutive parturients,

operated during the study period. Whereas, subjects who converted to general anaesthesia, were uncooperative, had eclampsia, and refused participation were excluded from the study. Written and verbal informed consent was obtained from each study participant after a clear explanation of the study.

After meeting the inclusion criteria, women were included in the study. After taking their informed written consent, detailed history of previous surgery, type of anaesthesia given for previous surgery, any history of previous IONV, motion sickness, or hyperemesis during the first trimester was taken. Data was collected regarding premedication used, no of hours of nil per oral, and any other diseases the study participant was suffering from. Indication of LSCS was noted. Data regarding the level of spinal anaesthesia achieved, episodes, and time of intraoperative nausea and vomiting were noted and documented. Episodes and timing of intraoperative hypotension were noted. Usage of uterotonics were also noted.

Routine premedication
Pantoprazole injection 40 mg (IV), and Metoclopramide injection 10 mg (IV) were given to all parturients.
If intraoperatively nausea and vomiting developed 4mg ondansetron IV is used.

Uterotonics- Oxytocin injection 15-20 IU (IV) over 20-30mins, Methylergometrine injection (IV), Carboprost injection (IM).
Depending on the uterine contraction after the initial oxytocin (15 IU) injection in an IV drip, either injection methylergometrine 0.2mg IM or Slow IV or injection Carboprost 250mcg IM were given if asked by surgeon.

Drugs used for sedation-
1-2mg midazolam IV and Fentanyl injection of 50 mcg.

Patient and their relatives were explained about the spinal anaesthesia procedures. Informed verbal and written consent is taken. The preoperative checklist was done and confirmed. The patient is taken into the operating room, all mandatory monitoring equipment (NIBP, ECG, Pulse Oximetry) are attached and baseline vital parameters are recorded. IV access is checked for patency and confirmed, if not patent then fresh IV access is established with 18G/20G IV cannula. IV Fluids crystalloids co-loading started and the patient is asked to sit. Spinal anaesthesia was given at L3-L4 level in a sitting position using 1.8-2.5ml of 0.5% hyperbaric bupivacaine. All the subjects received crystalloids and were lying in an approximate 15º-20º left lateral position to reduce the chances of hypotension with a wedge being provided. The level of spinal anaesthesia was checked. The parameters such as intraoperative BP are recorded every 3mins from the time of spinal anaesthesia given. The time & no of episodes of IOH occurring is recorded and noted for every 3-minute interval. The time & no of episodes of IONV occurring is recorded and noted for every 3-mins interval. The severity of nausea and vomiting was assessed using a numerical rating scale. Patients were followed till the procedure ends. Patients developing nausea and/or vomiting were treated with IV 4mg of ondansetron intraoperatively. Hypotension was treated with a crystalloid solution bolus of 100 ml and if needed inj. mephenteramine 6mg IV given. Once the baby is delivered inj oxytocin 15U were given IV and inj. Methylergometrine 0.2 mg slow IV or Inj. Carboprost 250mcg IM is given if requested by the surgeon. Inj. midazolam 1mg + inj. fentanyl 50mcg given IV to all patients after the delivery of baby.

Statistical analysis-
Data was entered in the Ms-Excel and then imported into SPSS for analysis. Data were evaluated using SPSS V 1.2.5001 software. Continuous variables were shown in mean ±SD whereas, categorical variables were presented in percentage and frequency. Bivariate and multivariate binary logistic regressions were conducted to see the existence of the association between dependent and independent variables. Student's T-test or Wilcoxon rank sum test was applied to compare means based on normality of distribution. The Chi-square test or Fisher's exact test was applied to compare proportions. P<0.05 was considered statistically significant.

Result-
Demographical variables
The average age of the participant was 24.98±4.076 years ranging from 19 to 40 years. The majority of the patients had an age ≤30 years (n=332, 90.21%). A significant association was found between age ≤30 years and IONV (P<0.01). The average height, weight, duration of fasting, and duration of surgery of subjects were 161.93±5.229 cm,61.87±6.351 kg, 4.75±0.990 hrs, and 54.68±3.786 min respectively. The detailed distribution of participants based on their demography is illustrated in table no 1.

Table no 1. Different demographical variables used for the study

Demographical Variables	Minimum (n)	Maximum (n)	Mean ±SD
Age (years)	19	40	24.98±4.076
Height (cm)	145	175	161.93±5.229
Weight (kg)	45	95	61.87±6.351
Duration of fasting (hrs)	3	8	4.75± 0.990
Surgery duration (mins)	50	69	54.68±3.786

Previous history of LSCS
Among the included subjects,25.8%(n=95) of the patients had a history of LSCS. Whereas, 74.2% (n=273) of the subject had no previous history of LSCS (table no 2 and figure no 1).

Table no 2. Distribution of subjects according to the previous history of LSCS

Previous LSCS	Frequency(n)	Percentage (%)
NO	273	74.2
Yes	95	25.8
Total	368	100.0

Figure no 1. Distribution of subjects according to the previous history of LSCS.

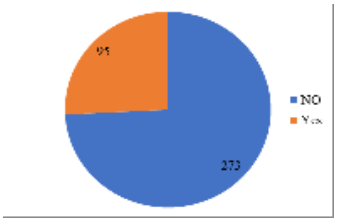
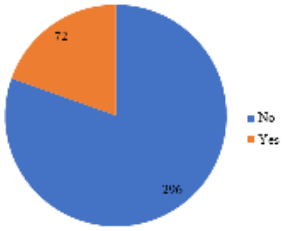


Figure no 2. Distribution of subjects according to the previous history of IONV/Motion sickness/Hyperemesis gravidarum.

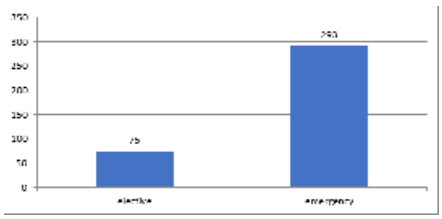


Most of the participants had no previous history of IONV (80.4%, n=296) whereas it was present in 19.6% (n=72) participants (figure no 2).

Type of caesarean section delivery-
Table no 3. Distribution of subjects according to the type of CS

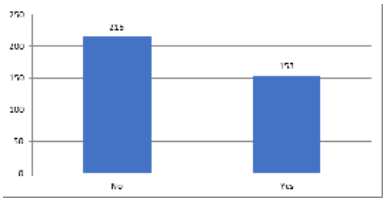
Type of CS	Frequency(n)	Percent (%)
Elective	75	20.4
Emergency	293	79.6
Total	368	100.0

Figure no 3. Distribution of subjects according to the type of CS.



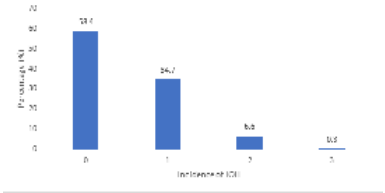
The most common type of caesarean section delivery in recruited subjects was emergency LSCS (79.6%, n=293) followed by elective LSCS (20.4%, n=75) (table no 3 figure no 3).

Figure no 4. Distribution of subjects according to IOH Episodes.



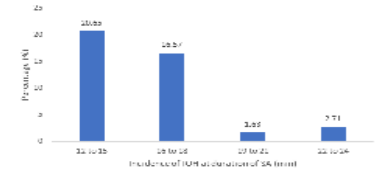
IOH was noted in 41.6% (n=153) of patients whereas it was absent in 58.4%(n= 215) of subjects (figure no 4).

Figure no 5. Distribution of subjects according to IOH episodes.



215 subjects (58.4% n=215) had 0 episodes of IOH. Among those who had IOH, most of the subjects (34.7%, n=128) had 1 episode of IOH followed by 6.6%, and 0.3% of subjects had 2, and 3 IOH episodes respectively (figure no 5).

Figure no 6. Distribution of subjects according to post-spinal anaesthesia duration of IOH incidence



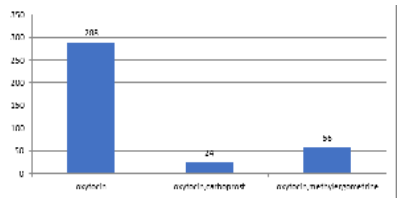
In most of the cases the incidence of IOH was observed at 12-15th (20.65%) minute time interval post-spinal anaesthesia. Followed by 16.57%, 1.63%, and 2.71% of the patients had incidence of IOH at 16-18 min, 19-21 min, and 22-24 min post spinal anaesthesia respectively. The distribution of subjects according incidence of IOH at post spinal anaesthesia duration is shown figure no 6.

Type of uterine tonic used-

Table no 4. Distribution of subjects according to UT type

UT type	Frequency(n)	Percentage (%)
Only Oxytocin	288	78.3
Oxytocin,carboprost	24	6.5
Oxytocin,methylergometrine	56	15.2
Total	368	100.0

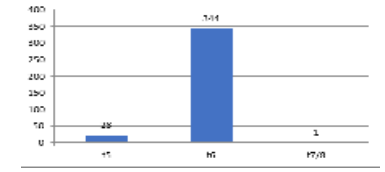
Figure no 7. Distribution of subjects according to UT type



All patients were given uterotonics. The most common type of uterotonic (UT) used was oxytocin only (78.3%, n=288), followed by oxytocin and methylergometrine (15.2%, n=56), and oxytocin and carboprost (6.5%, n=24) (table no 4, figure 7).

Levels of anaesthesia

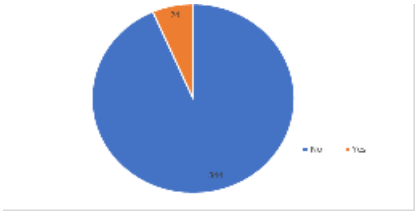
Figure no 8. Distribution of subjects according to anaesthesia level



In most of the cases (93.47%, n=344) anaesthesia was induced at T6 followed by at T5 (6.26%, n=23) and at T7/8 (0.27%, n=1) (figure no 8).

Incidences of nausea alone.

Figure no 9. Distribution of subjects according to nausea alone



Among all subjects, only nausea was seen in 6.52% (n=24) of patients. The detailed distribution of subjects according to nausea is demonstrated in figure no 9.

Incidences of IONV

IONV was present in 24.2% of patients and it was absent in 75.8% of patients. Detailed distribution was illustrated in figure no 10.

Figure no 10. Distribution of subjects according to incidence of IONV.

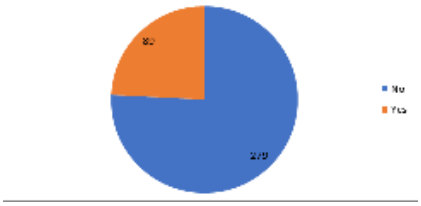
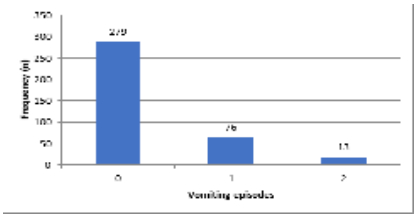
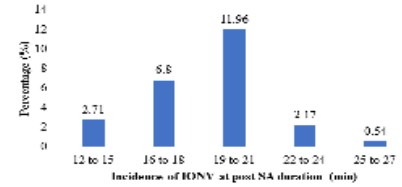


Figure no 11. Distribution of subjects according to IONV episodes Post spinal anaesthesia.



In 20.64% (n=76) of subjects 1 episode of IONV was observed whereas, 2 episodes of IONV were seen in 3.55% of patients respectively (Figure no 11).

Figure no 12. Distribution of subjects according Post spinal anaesthesia duration at incidence of IONV occurred



In most of the cases (11.96%, n=44), the incidence of IONV was observed at 19-21 min post spinal anaesthesia. Whereas, in 6.80%(n=25), 2.17% (n=8), 2.71%(n=10), and 0.54% (n=2) of subjects it was at 16-18 minutes, 22-24 minutes, 12-15 minutes, and 25-27 minutes respectively (Figure no 12).

Duration of premedication-

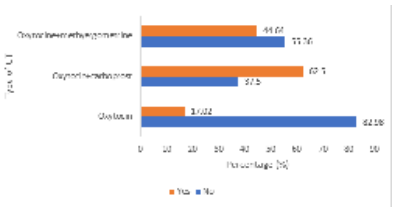
Table no 5. Distribution of subjects according to premedication

Premedication duration (minutes)	Frequency(n)	Percent (%)
30	244	66.3
60	124	33.7
Total	368	100.0

Figure no 13. Distribution of subjects according to premedication duration.

In most of the subjects (66.3%, n=244) premedication was given 30 minutes before surgery and in 33.7% of subjects, it was given 60 minutes before surgery. (Figure no 13)

Figure no 14. Distribution of IONV according to type of UT used



The incidences of IONV were found to be present in 17.02%, 62.5%, and 44.64% of the patients who were administered with only oxytocin, oxytocin + carboprost, and oxytocin + methyl ergometrine as a Uterotonic respectively. Incidences of IONV were significantly less in a patient who were administered oxytocin alone compared to other UT types (P=0.00147). Detailed distribution of incidence of IONV according to UT type is depicted in figure 14 and the incidence of IONV was maximum in the oxytocin + carboprost group.

Association between the previous history of IONV and IONV

Out of n=72 subjects with a previous history of IONV, n=31 had IONV. A significant association was found between the previous history of IONV and IONV (P=0.001) (table no6).

Table no 6. Association between the previous history of IONV and IONV

IONV Prev. IONV	Yes	NO	Total	P value
Yes	31	41	72	0.00 1
No	58	238	296	
Total	89	279	368	

Association between IOH and IONV

A total of n=153 subjects had IOH among which n=63 had IONV. Whereas, IONV when distributed according to the presence of IONV suggested that n=63 out of n=89 subjects had IOH. There was a statistically significant association between IOH and IONV (P=0.0018) (table no 7).

Table no 7. Association between IOH and IONV

IONV IOH	Yes	No	Total	P value
Yes	63	90	153	0.0018
No	26	189	215	

Association between the type of UT used and IONV

In a total of n=288 patients, only oxytocin was given, among which n=49 subjects had IONV. In n=24 patients treated with oxytocin and carboprost, n=15 had IONV. Whereas, n=25 out of n=56 patients treated with oxytocin and methylergometrine had IONV. A significant association was found between the type of UT used and IONV (P=0.0000) (table no 8).

Table no 8. Association between the type of UT used and IONV

IONV UT type	Yes	No	Total	P value
Oxytocin	49	239	288	0.0000
Oxytocin, carboprost	15	9	24	
Oxytocin, methylergometrine	25	31	56	
Total	89	279	368	

Association between anaesthesia levels and IONV

In n=23 subjects, the level of anaesthesia was T5, among these subjects n=18 subjects had IONV. Out of 344 subjects with T6 anaesthesia level, n=70 subjects had IONV. A subject with a T7/8 level of anaesthesia had IONV. A significant association was found between the IONV and anaesthesia levels (P=0.01) (table no 9).

Table no 9. Association between anaestheisa levels and IONV

IONV anaesthesia level	Yes	No	Total	P value
T5	18	5	23	0.001
T6	70	274	344	
T7/8	1	0	1	
Total	89	279	368	

Discussion

The study aimed to estimate the incidence of IONV and its association with causative factors for it in LSCS under spinal anaesthesia. The study was performed on 368 participants for 18 months. The significant findings of the study were the incidence of IONV was found to be 24.18%. Causative factors such as the previous history of IONV, IOH, type of UT used, and anaesthesia level were found to be significantly associated with IONV.

Independent risk factors

In this study, the mean age of the patients was 24.98±4.076 years. Most of the participants had an age ≤30 years (n=332, 90.21%). Moreover, a significant association was observed between maternal age and IONV (P<0.05). Similarly, Chekol B. et al. and Guimarães GM showed an association between the younger age of parturient and IONV. [9, 11] Further, literature also suggested that maternal age >30 years has 6 times more risk of development of IONV. [9, 11-16] However, some studies suggested IONV is less frequent in advanced maternal age due to reduced oestrogen concentration.

Incidences

The overall incidence of IONV in LSCS under spinal anaesthesia was up to 80%, based on anaesthesia techniques used such as spinal, epidural, or combined spinal-epidural and the preventive and therapeutic measures taken. [3,5,10, 17-23] Endalew ES. et al. showed the incidence of IONV in emergency LSCS under spinal anaesthesia in 39.4%, and 27.3% of the non-prophylactic patients. [24] Ashagrie HE. et al. showed the incidence of IONV in 18.5% of the patients. [2] In the current study, the incidence of IONV was found to be 24.18%. The difference in the results may be due to the different inclusion criteria, type of study, ethnicity, etc.

Association between previous LSCS and IONV

In this study, most of the participants had an emergency caesarean section (n=293, 79.6%) followed by elective caesarean section n=75, 20.4%). Among these, 25.8% (n=95) of the subjects had a previous history of LSCS. There was no significant association between previous LSCS and IONV. These findings are comparable with previous reports (table 20). [2, 9]

Table 20. Comparison between the studies

Similar studies	Previous LSCS	
	Yes (%)	No (%)
Ashagrie HE. et al.[2]	30	70
Chekol B. et al. [12]	19.5	80.5
Present study	25.8	74.2

Association between the previous history of IONV and IONV-

In this study we found that out of n=368 subjects, n=72 (19.6%) of the patients had a previous history of IONV which was reported in n=27 patients by Chekol B. et al. [9] Moreover, a significant association was found between the previous history of IONV and IONV (P=0.001). These findings suggest that the previous history of IONV and patients with h/o motion sickness or the parturient with h/o Hyperemesis gravidarum should be considered a confounding factor in patients undergoing LSCS using spinal anaesthesia.

Association between IOH and IONV-

IOH during neuraxial anaesthesia is among the most crucial risk factors for IONV.[12]In this study IOH was seen in 41.6% (n=153) of the patients, out of these subjects, n=63 had IONV. Most of the subjects

(34.7%, n=128) had 1 episode of IOH and the incidence ranged from 12th minute to 27th minute. A significant association was found between the IOH and IONV (P=0.0018). Similarly, Ashagrie HE. et al. showed a significant association between IOH and IONV. [2] Moreover, Magni BJ. et al. reported the incidence of IOH in 33% of the patients and its association with IONV. [8] A study in Egypt showed that the incidence of IONV was higher in the placebo group with frequent episodes of hypotension than in the ketamine infusion group. [25] A review of the high-risk parturients concluded that prevention of intra-operative hypotension was effective for the reduction of IONV. [26]

Association between the type of UT used and IONV-

The incidence of nausea and vomiting following oxytocin administration was reported to be 29% and 9% respectively. [3] Whereas, the incidence was even more in the subjects treated with ergot alkaloids (46%). [27] This might be due to the hypotensive action of UTs. [12, 3] Moreover, literature also suggests that the severity of hypotension induced by the uterotonic also depends on the dose, route, rate of administration, type, and dose of anaesthetic drug. [28, 29] In this study majority of the participants were administered oxytocin (78.3%, n=288), followed by oxytocin and methylergotamine (15.2%, n=56), and oxytocin and carboprost (6.5%, n=24). Among oxytocin-treated patients, 17.01% of the patients had IONV whereas, in oxytocin + carboprost and oxytocin + methylergotamine-treated subjects 62.5% and 44.64% of the patients had IONV respectively. There was a statistically significant association between the types of UT used and IONV (P=0.0000). Similarly, Chekol B. et. al. showed a significant association between the use of oxytocin and IONV (P=0.001). [9] The mechanism of UTs-induced hypotension is evidenced by animal studies as it is mediated by endothelial receptors causing NO2 release and also by the release of the atrial natriuretic peptide from vasculature, heart, kidney, and other tissues. [4-33]

Association between anaesthesia levels and IONV-

According to a previous report, along with various factors, the risk of IONV is depended upon dermatomal level. [32] In the current study, in the majority of the subjects, the level of anaesthesia was T6 (n=344, 93.5%) followed by T5 (n=23, 6.3%), and T7/8 (n=1, 0.3%). The incidence of IONV in these anaesthesia levels were 20.3%, 78.2%, and 100% respectively. A significant association was noted between the level of anaesthesia and IONV (P=0.001). These findings are similar to the findings of Magni BJ. et. Al. [8] However, Ashagrie HE. et al. suggested no significant association between the level of anaesthesia and IONV. [2] The difference in the results may be due to the type of the study and the inclusion criteria of the study.

The study indicated that the incidence of IONV of 24.18%. The previous history of IONV, IOH, type of UT used, and level of anaesthesia are the risk factors associated with IONV. The drawbacks of the study included the investigator was not blinded and being single-centered, all together could have led to some bias. The other important limitations like detailed patient-related factors were not assessed, a comparative study to investigate the exact factors that affect the incidence of IONV could be more informative. Further, a multicentre study with a sufficient sample size including all the variables is the further recommendation of the study.

Summary

The present cross-sectional observational study was performed for 18 months at Dr. D. Y. Patil hospital and research Institute, Kolhapur. The study aimed to estimate the incidence of intraoperative nausea and vomiting and the cumulative evaluation of causative factors for it in LSCS under spinal anaesthesia. In this study, a total of 368 consecutive parturients, operated during the study period who fulfilled inclusion criteria were recruited. Data was collected regarding the time of premedications given preoperatively, no of hours of nil per oral, H/o previous LSCS/Motion sickness/Hyperemesis gravidarum. Indication of LSCS was noted. Data regarding the level of spinal anaesthesia achieved, episodes and time of intraoperative nausea and vomiting were noted and documented. Episodes and timing of intraoperative hypotension were noted. Usage of uterotonics were also noted. The average age of the participant was 24.98±4.076 years ranging from 19 to 40 years. The majority of the patients had an age ≤30 years (n=332, 90.21%). Most of the participants had emergency CS (n=293, 79.6%) followed by elective CS (n=75, 20.4%). Among these, 25.8% (n=95) of the subjects had a previous history of LSCS. Out of n=368 subjects, n=72 (19.6%) of the patients had a previous history of IONV/Motion sickness/Hyperemesis gravidarum which was significantly associated with IONV. IOH was seen in 41.6% (n=153) of the patients, out of these subjects, n=63 had IONV. Most of them had 1 episode of IOH and the incidence ranged from 12 minutes to 24 minutes. A significant association was found between the IOH and IONV (P=0.0018). The majority of the participants were administered oxytocin (78.3%, n=288), followed by oxytocin, and methylergometrine (15.2%, n=56), and oxytocin and carboprost (6.5%, n=24). Among oxytocin-treated patients, 17.01% of the patients had IONV whereas, in oxytocin + carboprost and oxytocin + methylergotamine-treated subjects 62.5% and 44.64% of the patients had IONV respectively. There was a statistically significant association between the types of UT used and IONV (P=0.0000). In the majority of the subjects, the level of anaesthesia was T6 (n=344, 93.5%) followed by T5 (n=23, 6.3%), and T7/8 (n=1, 0.3%). The incidence of IONV in these anaesthesia levels were 20.3%, 78.2%, and 100% respectively. A significant association was noted between the level of anaesthesia and IONV (P=0.001). The overall incidence of IONV in the present study is 24.18%.

Conclusion-

The study was conducted to estimate the incidence of intraoperative nausea and vomiting and the cumulative evaluation of causative factors for it in LSCS under spinal anesthesia. There was 24.18% incidence of IONV among 368 subjects. IONV was significantly associated with the previous history of IONV and predictive factors, IOH, type of UTs used, and level of anesthesia. Further studies are required to confirm the present study findings.

REFERENCES-

1. Beecroft CL. Spinal anaesthesia. Anaesthesia & Intensive Care Medicine. 2015 Nov 1;16(11):563-5.
2. Ashagrie HE, Filatie TD, Melesse DY, Mustefa S. The incidence and factors associated with intraoperative nausea and vomiting during cesarean section under spinal anesthesia, July 2019. An institution based cross sectional study. International Journal of Surgery Open. 2020 Jan 1; 26:49-54.
3. Balki M, Carvalho JC. Intraoperative nausea and vomiting during cesarean section under regional anesthesia. International journal of obstetric anesthesia. 2005 Jul 1;14(3):230-41.
4. Voigt M, Frohlich CW, Huttel C, Kranke P, Mennen J, Boessneck O, Lenz C, Erbes T, Ernst J, Kerger H. Prophylaxis of intra-and postoperative nausea and vomiting in patients during cesarean section in spinal anesthesia. Medical science monitor: international medical journal of experimental and clinical research. 2013; 19:993.
5. Semiz A, Akpak YK, Yılanlıoğlu NC, Babacan A, Gönen G, ÇamGönen C, Asıliskender M, Karaküçük S. Prediction of intraoperative nausea and vomiting in cesarean delivery under regional anaesthesia. Journal of International Medical Research. 2017 Feb;45(1):332-9.
6. Griffiths JD, Gyte GM, Paranjothy S, Brown HC, Broughton HK, Thomas J. Interventions for preventing nausea and vomiting in women undergoing regional anaesthesia for caesarean section. Cochrane Database of Systematic Reviews. 2012(9):CD007579.
7. Amirshahi M, Behnamfar N, Badakhsh M, Rafiemanesh H, Keikhaie KR, Sheyback M, Sari M. Prevalence of postoperative nausea and vomiting: A systematic review and meta-analysis. Saudi journal of anaesthesia. 2020 Jan;14(1):48-56.
8. Magni BJ, Dyer RA, Van Dyk D, Van Nugteren J. Incidence of intraoperative nausea and vomiting during spinal anaesthesia for Caesarean section in two Cape Town state hospitals. Southern African Journal of Anaesthesia and Analgesia. 2016;22(5):131-4.
9. Chekol B, Zewudu F, Eshetie D, Temesgen N, Molla E. Magnitude and associated factors of intraoperative nausea and vomiting among parturients who gave birth with caesarean section under spinal anesthesia at South Gondar zone Hospitals, Ethiopia. Annals of Medicine and Surgery. 2021 Jun 1; 66:102383.
10. Harmon D, Ryan M, Kelly A, Bowen M. Acupressure and prevention of nausea and vomiting during and after spinal anaesthesia for caesarean section. British journal of anaesthesia. 2000 Apr 1;84(4):463-7.
11. Guimarães GM, Silva HB, Ashmawi HA. Risk factors for post-caesarean nausea and vomiting: a prospective prognostic study. RevistaBrasileira de Anestesiologia. 2020 Oct 30; 70:457-63.
12. Borgeat A., Ekatodramis G., Schenker C.A. Postoperative nausea and vomiting in regional anesthesia: a review. J. Am. Soc. Anesthesiol. 2003;98(2):530–547.
13. Dekkers G.W., Broeren M.A., Truijens S.E., Kop W.J., Pop V.J. Hormonal and psychological factors in nausea and vomiting during pregnancy. Psychol. Med. 2020;50(2):229–236.
14. Apfel CC, Roewer N. Risk assessment of postoperative nausea and vomiting. International anesthesiology clinics. 2003 Oct 1;41(4):13-32.
15. Murphy MJ, Hooper VD, Sullivan E, Clifford T, Apfel CC. Identification of risk factors for postoperative nausea and vomiting in the perianesthesia adult patient. Journal of perianesthesia Nursing. 2006 Dec 1;21(6):377-84.
16. George RB, McKeen DM, Dominguez JE, Allen TK, Doyle PA, Habib AS. A randomized trial of phenylephrine infusion versus bolus dosing for nausea and vomiting during Cesarean delivery in obese women. Canadian Journal of Anesthesia/Journal canadiend'anesthésie. 2018 Mar;65(3):254-62.
17. Pan P H, Moore C H. Comparing the efficacy of prophylactic metoclopramide, ondansetron and placebo in cesareansectionpatients given epidural anesthesia. J ClinAnesth 2001; 13:430–435.
18. Mercier FJ, Diemunsch P, Ducloy-Bouthors AS, et al.CAESAR Working Group 6% hydroxyethyl starch (130/0.4) vs Ringer's lactate preloading before spinal anaesthesia for Caesarean delivery: the randomized, double-blind, multicentre CAESAR trial. Br J Anaesth. 2014;113(3):459–467.
19. Hartmann B, Junger A, Klasen J, Benson M, Jost A, Banzhaf A, Hempelmann G. The incidence and risk factors for hypotension after spinal anesthesia induction: an analysis with automated data collection. Anesthesia& Analgesia. 2002 Jun 1;94(6):1521-9.
20. Yüksek A, Miniksar ÖH, Honca M, Öz H. Incidence and Causes of Failed Spinal Anesthesia. Dubai Medical Journal. 2020;3(2):50-4.
21. Akarapatima R. The Risk Factors for Spinal Anesthesia-induced Hypotension in Patients Undergoing Hip Fracture Surgery among the Elderly: A Retrospective Cohort Study. Thai Journal of Anesthesiology. 2021 Feb 3;47(2):85-92.
22. Lussos S A, Datta S, Bader A M. The antiemetic efficacy and safety of prophylactic

metoclopramide for elective caesarean delivery during spinal anesthesia. RegAnesth 1992; 17: 126–130.
23. Mishriky BM, Habib AS. Metoclopramide for nausea and vomiting prophylaxis during and after Caesarean delivery: a systematic review and meta-analysis. British journal of anaesthesia. 2012 Mar 1;108(3):374-83.
24. Endalew ES, Gebremedhn EG, Gebreegzi AH, Kassahun HG, Kassa AA. Effectiveness of intravenous metoclopramide prophylaxis on the reduction of intraoperative and early postoperative nausea and vomiting after emergency caesarean section under spinal anaesthesia. J AnesthClin Res. 2018;9(809):2.
25. Tarkkila P. Complications associated with spinal anaesthesia. Available form: http://eknygos.lsmuni.lt/springer/598/149-166.pdf.
26. Shabana AM, Nasr ES, Moawad HE. Effect of ketamine on intraoperative nausea and vomiting during elective caesarean section under spinal anaesthesia: A placebo-controlled prospective randomized double blinded study. Egyptian Journal of Anaesthesia. 2012 Apr 1;28(2):169-74.
27. Dusitkasem S, Herndon BH, Somjit M, Stahl DL, Bitticker E, Coffman JC. Comparison of phenylephrine and ephedrine in treatment of spinal-induced hypotension in high-risk pregnancies: A narrative review. Frontiers in medicine. 2017 Jan 20 ;4:2.
28. McDonald SJ. Prophylactic ergometrine-oxytocin versus oxytocin for the third stage of labour. Cochrane database of systematic reviews. 2004(1): CD000201.
29. Pinder AJ, Dresner M, Calow C, Shorten GD, O'riordan J, Johnson R. Haemodynamic changes caused by oxytocin during caesarean section under spinal anaesthesia. International journal of obstetric anesthesia. 2002 Jul 1;11(3):156-9.
30. Pécora FS, Malbouisson LM, Torres MLSupplemental Oxygen and the Incidenceof Perioperative Nausea and Vomiting inCesarean Sections under SubarachnoidBlock. RevistaBrasileira de Anestesiologia. 2009; 59:558-69.
31. Gutkowska J, Jankowski M, Mukaddam-Daher S. Oxytocin is a cardiovascular hormone. Braz J Med Biol Res 2000; 33:625–633.
32. Jankowski M, Hajjar F, Kawas S A, et al. Rat heart: A site of oxytocin production and action. Proc Natl AcadSci (USA) 1998;95: 14558–14563.
33. Jankowski M, Wang D, Hajjar F, Mukaddam-Daher S, McCann SM, Gurkowska J. Oxytocin and its receptors are synthesized in therat vasculature. Proc Natl AcadSci (USA) 2000; 97: 6207–6211.
34. Gutkowska J, Jankowski M, Lambert C, Mukaddam-Daher S, Zingg H H, McCann S M. Oxytocin releases atrial natriuretic peptide by combining with oxytocin receptors in heart. Proc NatlAcadSci (USA) 1997; 94: 11704–11709.