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Effect of Supplemental Pre-Operative Fluid on the Incidence of Postoperative Nausea and Vomiting Among Patients Undergoing Laparoscopic Cholecystectomy at Tripura medical College and DR. B.R. Ambedkar Teaching Hosptal

[1]Aditi Bhattacharya, [2]Dipanka Debnath, [3]Ambhrin Saha and [4]Sourav Saha

[1-4]*Department of Anaesthesiology, Tripura Medical College and Dr. B.R. Ambedkar Memorial Teaching Hospital, Hapania, Agartala, Tripura 799014, India*

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Corresponding Author
Sourav Saha,
Department of Anaesthesiology, Tripura Medical College and Dr. B.R. Ambedkar Memorial Teaching Hospital, Hapania, Agartala, Tripura 799014, India
dip93.2010@gmail.com

Author Designation
[1-3]Assistant professor

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ABSTRACT

Following anesthesia and surgery, patients may experience the uncomfortable and upsetting side effect of postoperative nausea and vomiting. Postoperative nausea and vomiting can lead to wound dehiscence, bleeding, electrolyte imbalance, dehydration, and stomach contents aspiration in the lungs, in addition to raising patient costs. To determine whether the rate of postoperative nausea and vomiting in patients undergoing a laparoscopic cholecystectomy under general anesthesia is impacted by the administration of additional fluids before surgery. This study was an interventional, prospective, randomized, double-blind trial. This study was carried out for a year at the DR BRAM Teaching Hospital in Hapania, Agartala and the Department of Anaesthesia at TMC. This investigation involved a total of sixty patients. We observed that, Duration of Anaesthesia was lower in Group-B [64.2000±17.4403] compared to Group-A [65.6667±20.8960] but this was not statistically significant (p = 0.7689). It was found that, 0-5 No Nausea/ Vomiting was most in Group-I [.5333±.5074] compared to Group-A [.2000±.4068] p = 0.0068 indicates that this was statistically significant. We examined that, 0-5 Nausea without Vomiting was higher in Group-A [.3333±.4795] compared to Group-B [.3000±.4661] but this not statistically significant (p = 0.7858). We observed that, 5-24 No Nausea/Vomiting was more in Group-B [.6333±.4901] compared to Group-A [.2667±.4498] so this was statistically significant (p = 0.0038). Our study showed that, 5-24 Nausea Without Vomiting was less in Group-B [.2333±.4302] compared to Group-A [.4000±.4983] but this was not statistically significant (p = 0.1708). Despite improvements in management and prevention, postoperative nausea and vomiting remains the most problematic adverse event seen in the postanesthesia care unit (PACU). This randomized interventional experiment aims to investigate if supplying additional fluids before to surgery could lower the incidence of postoperative nausea and vomiting.

INTRODUCTION

Postoperative nausea and vomiting is an unpleasant and distressing side effect that patients encounter after anesthesia and surgery. Dehydration, wound dehiscence, bleeding, electrolyte imbalance, stomach contents aspirating into the lungs, delayed hospital discharge and higher patient expenses are all possible outcomes of postoperative nausea and vomiting. PONV, or postoperative nausea and vomiting, is the most disagreeable side effect of day surgery. After general anesthesia, it affects 30 to 40% of the general population and, in some high-risk groups, peaks at 75 to 80%[1]. even with the use of more sophisticated anesthetic methods, anesthetics with a shorter half-life and more modern antiemetics. Because of the possible adverse effects of antiemetics, the value of routine preventive antiemetic medicine has been questioned[2]. Unplanned hospitalization after scheduled day case surgery is primarily caused by minor PONV, which can lead to increased resource usage, low patient satisfaction and delays in hospital discharge. Patients should prioritize PONV prevention above post-operative pain management.

Studies reveal significant variations in the incidence of postoperative nausea and vomiting (PONV) between inpatient and outpatient settings. In particular, it is demonstrated that the incidence of vomiting varies between 12-26%, whilst the incidence of nausea ranges from 22% to 38%. The prevalence of PONV is significantly higher in high-risk patients (60-70%). Up to 55% of patients experience post-discharge nausea and vomiting (PDNV), which is defined as occurring 24-72 hrs after discharge. It seems that there are differences in the risk factors for PONV and PDNV[3]. Post-operative nausea and vomiting (PONV) has been associated with a number of factors, including opioids, anesthetic medications, anesthetic procedures, pain, anxiety, sex, obesity and motion sickness.

Postoperative nausea and vomiting continues to be the most troublesome adverse event observed in the postanesthesia care unit (PACU), despite advancements in therapy and prevention. According to certain theories, giving patient's adequate oxygenation after surgery lowers the risk of nausea and vomiting and guards against mild intestinal ischemia brought on by anesthesia or surgery. However, oxygen by itself might not be helpful if the patient is in a poor perfusion state. Surgical patients who have hypovolemia a condition brought on by extended fasting and inadequate preoperative fluid replacement are more likely to experience postoperative nausea and vomiting[4].

It has been shown that providing IV fluids to patients who were fasting before surgery reduces the incidence of postoperative nausea and vomiting (PONV) overall and the need for rescue antiemetic medications in the first 72 hours after surgery. In most patients, lower PONV was correlated with higher preoperative fluid intakes. IV fluid treatment has been widely suggested because of its impact on PONV, cost-effectiveness and lack of side effects when used in surgery.

On the prevention of postoperative nausea and vomiting, numerous research have been conducted. Still, not much research has been done to ascertain whether preoperative fluid therapy and patient's postoperative health are related[5]. Anon investigates the possibility that providing extra fluids (lactated Ringer's solution) to patients undergoing laparoscopic cholecystectomy prior to surgery may lessen the incidence of postoperative nausea and vomiting in her randomized interventional research.

MATERIALS AND METHODS

Postoperative nausea and vomiting remained the most troublesome adverse event encountered in the Post Anaesthesia Care Unit (PACU) despite advances in prevention and treatment. A randomized interventional study was conducted to determine whether preoperative supplemental fluids could decrease the incidence of postoperative nausea and vomiting. A total of 60 patients of either sex were selected for the study and divided into 2 groups (Group A and Group B). Group A received 2 mL kg^{-1} of intravenous ringer lactate solution while Group B received 12 mL kg^{-1} of intravenous Ringer Lactate solution one hour before the surgical procedure. The patients were asked by the blinded investigator to report the occurrence of nausea and vomiting based on the score 0 = No nausea or vomiting, 1 = Nausea without vomiting, 2 = <3 vomiting/day, 3= >3 vomiting/day. Statistical analysis was performed using the chi-square test and independent sample t-test. A $p>0.05$ was considered significant.

Study design: This study was a prospective randomized double blinded interventional study.

Study setting: This study was conducted in the Department of Anaesthesia, TMC and DR BRAM Teaching hospital, Hapania, Agartala.

Study duration: This study was conducted over a period of 1 year after obtaining IEC approval.

Study population: All patients undergoing Laparoscopic cholecystectomy under general anesthesia fulfilling the inclusion criteria was enrolled.

Inclusion criteria:

- Patients with American Society of Anaesthesiologists (ASA) physical status I or II aged 18-70 years of both sexes
- Has signed an informed written consent form

Exclusion criteria:

- Patients with ASA grade III and IV
- Patients who did not consent to participate in the study
- Patients who were clinically ill with intestinal, liver or renal disease
- Patients who were pregnant or menstruating
- Patients with psychiatric disorder
- Patients with history of motion sickness and PONV
- Patients who took antiemetic drugs 24 hrs preoperatively
- Patients who received cancer chemotherapy within past 4 weeks and emetogenic radiotherapy within past 8 weeks
- Patients who developed hypotension or significant blood loss (requiring blood transfusion) intra-operatively

RESULTS

In Group-A, 20 (66.7%) patients had Grade 1 and 10 (33.3%) patients had Grade 2, In Group-B, 10(63.3%) patients had Grade 1 and 11 (36.7%) patients had Grade 2. In Group-A the mean MRD of patients was 56320.9000± 53470.7624, In Group-B, the mean MRD of patients was 41148.0333± 33707.5289. In Group-A, the mean Surgery (Min) of patients was 57.5000± 20.5691, In Group-B, the mean Surgery (Min) of patients was 56.3333± 16.6575. In Group- A, the mean Duration of Anaesthesia of patients was 65.6667± 20.8960, In Group-B the mean Duration of Anaesthesia of patients was 64.2000±17.4403.

In Group-A, the mean 0-5 No Nausea/ Vomiting of patients was .2000±.4068. In Group-B, the mean 0-5 No Nausea/ Vomiting of patients was .5333±.5074, In Group-A the mean 0-5 Nausea without Vomiting of patients was .3333±.4795. In Group-B the mean 0-5 Nausea without Vomiting of patients was .3000±.4661, In Group-B the mean 5-24 No Nausea/Vomiting of patients was .6333±.4901, In Group-A the mean 5-24 Nausea without Vomiting of patients was .4000±.4983, In Group-B the mean 5-24 Nausea without Vomiting of patients was .2333±.4302.

In Group-A the mean 0-5 (<3 vomiting) of patients was .3000± .4661. In Group-B, the mean 0-5 (<3 vomiting) of patients was .1333±.3457. In Group-A, the mean 0-5 (>3 vomiting) of patients was .1667±.3790, In Group-B, the mean 0-5 (>3 vomiting) of patients was .0333±.1826. In Group-A, the mean 0-5 Res Antiemetic of patients was .4667±.5074, In Group-B, the mean 0-5 Res Antiemetic of patients was .1667±.3790. In Group-A the mean 5-24 No Nausea/Vomiting of patients was .2667±.4498. In Group-A, the mean 55-24 (<3 Vomiting) of patients was .2000±.4068. In Group-B the mean 5-24(<3 Vomiting) of patients was .1000±.3051. In Group-A the mean 5-24(>3 Vomiting) of patients was .1333±.3457, In Group-B the mean 5-24 (>3 Vomiting) of patients was .0333±.1826. In Group-A, the mean 5-24 Res Antiemetic of patients was .3793±.4938, In Group-B the mean 5-24 Res Antiemetic of patients was .1333±.3457.

DISCUSSIONS

This research was a prospective, randomized, double-blind interventional investigation. This study was conducted for a full year at the TMC Department of Anaesthesia and the DR BRAM Teaching Hospital in Hapania, Agartala. In all, sixty patients were involved in this study.

Menjie 1 *et al*.[4] conducted Using standardized interview questions, a cohort study was conducted with patients from the surgery, gynecology, and orthopedics wards who were scheduled for various treatments. The higher incidence rate (67.67%) was recorded by female patients. Onyando In this prospective, randomized, controlled clinical study, 60 adult female patients undergoing gynecological surgery in ASA classifications 1 and 2 were involved.

Despite the fact that women outnumbered men in the population, we discovered that this difference was not statistically significant. (p = 0.2733). Al-Nema *et al*.[5] conducted a multicenter, cross-sectional study conducted at the teaching hospitals in Al-Yarmouk, Al-Karama and Baghdad. The 120 patients, 35 of whom were male and 85 of whom were female, ranged in age from 10-90. The patients were chosen based on the fact that group A (65 patients, 17 male and 48 female, ages 10-80) did not get IV fluids before to surgery. Group B (55 patients, ages 10-90) got IV fluids (2 mL kg^{-1}/hr) prior to surgery.

Even though the 60 patients in our study ranged in age from 21 to 30, this difference was not statistically significant. (p=0.0891). The mean age difference between Group B and Group A was found to be higher, but not statistically significant (p = 0.3588). Amireh *et al*.[2] conducted an investigation including sixty ASA I-II patients having laparoscopic cholecystectomy procedures.

Bondoc *et al*.[6]carried out a randomized, double-blind, placebo-controlled study. Sixty-two nonsmoking, nondiabetic, ASA class I or II outpatients with scheduled hysteroscopic and laparoscopic gynecologic procedures were enrolled. Our analysis revealed that while Group A had a higher percentage of ASA Grade 1 patients than Group B, this difference was not statistically significant. (p = 0.7866). The mean weight difference between Groups A and B did not

Table 1: Association between ASA: Group

	Group		
ASA	Group-A	Group-B	Total
Grade 1	20	19	39
Row%	51.3	48.7	100.0
Col%	66.7	63.3	65.0
Grade 2	10	11	21
Row%	47.6	52.4	100.0
Col%	33.3	63.7	35.0
Total	30	30	60
Row%	50.0	50.0	100.0
Col%	100.0	100.0	100.0

Table 2: Distribution of mean MRD, Surgery (min) and Duration of Anaesthesia: Group

MRD	No.	Mean	SD	Minimum	Maximum	Median	p-value	T Statistic
Group A	30	56320.9000	53470.7624	10154.0000	255301.0000	29321.5000	0.1938	1.3148
Group-B	30	41148.0333	33707.5289	14753.0000	118564.0000	28008.0000		
Surgery (Min)								
Group-A	30	57.5000	20.5691	35.0000	115.0000	53.5000	0.8101	0.2414
Group-B	30	56.3333	16.6575	35.0000	95.0000	50.0000		
Duration of Anaesthesia								
Group-A	30	65.6667	20.8960	40.0000	125.0000	60.0000	0.7689	0.2951
Group-B	30	64.2000	17.4403	40.0000	105.0000	59.0000		

Table 3: Distribution of mean 0-5, 5-24 No Nausea/Vomiting and 0-5, 5-24 Nausea without Vomiting: Group

0-5 No Nausea/ Vomiting	No	Mean	SD	Minimum	Maximum	Median	p-value	T Statistic
Group A	30	.2000	.4068	0.0000	1.0000	0.0000	0.0068	2.8072
Group-B	30	.5333	.5074	0.0000	1.0000	1.0000		
5-24 No Nausea/Vomiting								
Group-A	30	.2667	.4498	0.0000	1.0000	0.0000	0.0038	3.0190
Group-B	30	.6333	.4901	0.0000	1.0000	1.0000		
0-5 Nausea Without Vomiting								
Group-A	30	.3333	.4795	0.0000	1.0000	0.0000	0.7858	0.2730
Group-B	30	.3000	.4661	0.0000	1.0000	0.0000		
5-24 Nausea Without Vomiting								
Group-A	30	.4000	.4983	0.0000	1.0000	0.0000	0.1708	1.3868
Group-B	30	.2333	.4302	0.0000	1.0000	0.0000		

Table 4: Distribution of mean 0-5, 5-24 (<3 vomiting) and 0-5, 5-24 (>3 vomiting): Group

0-5 (<3 vomiting)	No.	Mean	SD	Minimum	Maximum	Median	p-value	T Statistic
Group A	30	.3000	.4661	0.0000	1.0000	0.0000	0.1212	1.5730
Group B	30	.1333	.3457	0.0000	1.0000	0.0000		
5-24 (<3 Vomiting)								
Group-A	30	.2000	.4068	0.0000	1.0000	0.0000	0.2859	1.0770
Group-B	30	.1000	.3051	0.0000	1.0000	0.0000		
0-5(>3 Vomiting)								
Group-A	30	.1667	.3790	0.0000	1.0000	0.0000	0.0879	1.7358
Group-B	30	.0333	.1826	0.0000	1.0000	0.0000		
5-24 (>3 Vomiting)								
Group-A	30	.1333	.3457	0.0000	1.0000	0.0000	0.1666	1.4009
Group-B	30	.0333	.1826	0.0000	1.0000	0.0000		

Table 5: Distribution of mean 0-5 and 5-24 Res Antiemetic: Group

	No.	Mean	SD	Minimum	Maximum	Median	p-value	T Statistic
0-5 Res Antiemetic								
Group-A	30	.4667	.5074	0.0000	1.0000	0.0000	0.0120	2.5944
Group-B	30	.1667	.3790	0.0000	1.0000	0.0000		
5-24 Res Antiemetic								
Group-A	29	.3793	.4938	0.0000	1.0000	0.0000	0.0302	2.2226
Group-B	30	.1333	.3457	0.0000	1.0000	0.0000		

reach statistical significance in our investigation. (p = 0.7993). We discovered that while Group B's mean MRD was lower than Group A's, there was no statistically significant difference between the two. (p=0.1938).

Menjie1 *et al*.[4] conducted Using standardized interview questions, a cohort study was conducted with patients from the surgery, gynecology, and orthopedics wards who were scheduled for various treatments. Our research revealed that while Group A's mean Surgery (Min) was higher than Group B's, there was no statistically significant difference between the two groups. (p = 0.8101).

Ali *et al*.[10]conducted preoperative In a prospective, double-blind, randomized controlled trial, the effect of fluid load on postoperative nausea and vomiting was examined. Hartmann's solution was injected intravenously just before anesthesia was induced. While Group B's mean anesthesia duration was lower than Group A's, we found that this difference was not statistically significant. (p = 0.7689). Lambert *et al*.[8] a planned preoperative fluid bolus on

postoperative nausea and vomiting (PONV) in patients undergoing laparoscopic gynecologic surgery was evaluated through a randomized clinical trial.

Amireh *et al*.[2] conducted sixty ASA I-II patients undergoing laparoscopic cholecystectomy operations were included in the study. Merely 8 patients (27%) from group B (supplemental fluid group) experienced nausea and vomiting within the first 24 hrs following surgery, in contrast to 21 patients (70%) from group A. Menjie1 *et al*.[4] conducted a cohort research using structured interview questions among patients scheduled for various procedures from the orthopedics, gynecology and surgery wards. Early, middle and late postoperative periods saw an incidence rate of post-operative nausea and vomiting in the exposed group of 35.45 and 19.35, 29.03 and 6.45 and 29.03 and 6.45 in the non-exposed group, it was 67.24 and 65.52, 68.97 and 46.55, 37.93, and 17.24.

Ali *et al*.[10] Nine patients (23%) in the supplemental fluid group and 29 patients (73%) in the conservative fluid group experienced postoperative nausea and vomiting during the first 24 hrs following surgery (p ¼ 0.01). It was found that, mean 0-5 No Nausea/Vomiting (p = 0.0068) and mean 5-24 No Nausea/Vomiting (p = 0.0038) were significantly higher in Group-B compared to Group-A. Our study showed that, mean 0-5 Nausea without Vomiting (p = 0.7858) and 5-24 Nausea Without Vomiting (p = 0.1708) were higher in Group - A compared to Group-B which were not statistically significant.

In our study, mean 0-5 (<3 vomiting) and 5-24 (<3 Vomiting) (p = 0.2859) were lower in Group-B compared to Group-A which were not statistically significant. We found that, mean 0-5 (>3 Vomiting) (p = 0.0879) and 5-24 (>3 Vomiting) (p = 0.1666) were lower in Group - B compared to Group- A but these were not statistically significant.

Magner *et al*.[9] conducted a study in a total of 141 ASA I female patients undergoing elective gynaecological laparoscopy were randomized, in double-blind fashion, patients were randomly divided into two groups Group 10 and Group 30 whereas Group10 received 10 mL kg^{-1} (n = 71) compound sodium lactate and Group30 received 30mL kg^{-1} compound sodium lactate (n = 70 CSL-30 group) intravenously. The study determined that when compared to CSL 10 mL kg^{-1}, intravenous administration of CSL 30 mL kg^{-1} decreased the incidence of nausea and vomiting as well as the need for antiemetic medication in healthy women having day-care gynecological laparoscopy. Our study showed that, mean 0-5 Res Antiemetic (p = 0.0120) and 24 Res Antiemetic (p = 0.0302) were significantly higher in Group-A compared to Group-B.

CONCLUSION

Preoperative volume and hydration effectively reduce PONV and antiemetic requirement in critically ill patients. Lowering PONV can be achieved safely, affordably and effectively with preoperative Ringer Lactate supplementation. Preoperative hydration is a simple, inexpensive, risk-free and expedient method of preventing postoperative fluid loss (PONV). Patients can recuperate after surgery more swiftly and comfortably as a result, spending less time in the hospital.

REFERENCES

1. Onyando, AA., 2014. The effect of preoperative volume loading on the incidence of postoperative nausea and vomiting at kenyatta national hospital, URL:http://www.hdl.handle.net/11295/75354.Accessedjune 26,2015.
2. Amireh A.,M. and YAAl-ghoul, 2009. Preoperative intravenous fluid supplements: a simple and inexpensive method to reduce postoperative nausea and vomiting among patients underwent laparoscopic cholecystectomy JRMS., 16: 31-35.
3. Chandrakantan, A. and P.S.A. Glass, 2011. Multimodal therapies for postoperative nausea and vomiting, and pain. Br. J. Anaesth., 107: 127-140.
4. Menjie, K.,W. Tekeleselasie. and A. Alemu, 2013. Efficacy of intravenous fluid on prevention of post-operative nausea and vomiting at Ayder referral hospital mekelle university, northern Ethiopia. J. Anesth. Clin. Res., 4: 2-8.
5. Al-Nema, Z.,M.S.I. and Mohammed, 2011. Effect of administration of crystalloid iv fluids preoperatively on postoperative nausea and vomiting. Iraqi. J. Comm. Med., 24: 339-342.
6. Dabu-Bondoc, S., N. Vadivelu, C. Shimono, A. English and B. Kosarussavadi., 2012. Intravenous dextrose administration reduces postoperative antiemetic rescue treatment requirements and postanesthesia care unit length of stay. Anesthesia. Analg., 117: 591-596.
7. Lambert, K.,G. J.H. and Wakim, 2009. Effect of supplemental pre-operative fluid on postoperative nausea and vomiting. AANA. J., 77: 110-114.
8. Magner, J.J., C. McCaul, E. Carton, J. Gardiner and D. Buggy, 2004. Effect of intraoperative intravenous crystalloid infusion on postoperative nausea and vomiting after gynaecological laparoscopy: Comparison of 30 and 10 ml kg-1. Br. J. Anaesth., 93: 381-385.
9. Ali, S.Z., A. Taguchi, B. Holtmann and A. Kurz, 2003. Effect of supplemental pre-operative fluid on postoperative nausea and vomiting. Anaesthesia., 58: 780-784.