

How to Cite:

Nayak, K. B., Sahoo, A. K., & Panigrahi, S. (2022). Efficacy of ringer's solution and 5% dextrose in preventing post-operative nausea and vomiting score in laparoscopic cholecystectomy. *International Journal of Health Sciences*, 6(S2), 13150–13155.
<https://doi.org/10.53730/ijhs.v6nS2.8473>

Efficacy of ringer's solution and 5% dextrose in preventing post-operative nausea and vomiting score in laparoscopic cholecystectomy

Dr. Kalyani Bala Nayak

Associate Professor, Dept. Of Anaesthesiology and Critical care, SCB Medical college and Hospital, Cuttack
Email : Sanket.jena@gmail.com

Dr Arun Kumar Sahoo

Assistant Professor, Dept. Of Anaesthesiology and Critical care, SCB Medical college and Hospital, Cuttack
Email: draks.ane79@gmail.com

Dr Subhadipta Panigrahi

Assistant Professor, Dept. Of Anaesthesiology and Critical care, SCB Medical College and Hospital, Cuttack
Corresponding author email: Panigrahi.subhadipta@gmail.com

Abstract---Background: Post-operative nausea and vomiting (PONV) is the most common problem after anaesthesia and surgery, with a prevalence of about 30%. The present study assessed efficacy of dextrose in preventing PONV in laparoscopic cholecystectomy patients. Materials & Methods: 120 patients scheduled for LC under general anesthesia were divided into 2 groups. In group I, patients received an infusion of 500 cc lactated Ringer's solution and in group II, patients received 5% dextrose in lactated Ringer's solution over a period of 30 minutes. Nausea and vomiting intensity was recorded using the verbal rating scale immediately at post-anaesthesia care unit arrival; 60 and 120 minutes after arriving at the PACU and 12 and 24 hours after surgery. Results: Group I received lactated Ringer's solution and group II received 5% dextrose. There were 25 males and 35 females in group I and 20 males and 40 females in group II. Nausea score at 60 minutes (N1) was 5.5 in group I and 1.2 in group II, N2 was 4 in group I and 0.83 in group II, N3 was 2.56 in group I and 1.36 in group II and N4 was 0.1 in group I and 0.2 in group I. The difference was significant ($P < 0.05$). The mean vomiting score T1 was 5.12 in group I and 1.3 in group II, T2 was 1.42 in group I and 0.83 in group II, T3 was 2.40 in group I and 1.20 in group II and T4 was 1.34 in group I and 0.94 in group II. The difference was significant ($P <$

0.05). Conclusion: Administration of IV dextrose before anaesthesia induction may be recommended as an effective and safe method for the prophylaxis of post-operative nausea and vomiting after laparoscopic cholecystectomy.

Keywords---dextrose, nausea, laparoscopic cholecystectomy.

Introduction

Post-operative nausea and vomiting (PONV) is the most common problem after anaesthesia and surgery, with a prevalence of about 30%.¹ In postoperative unit, PONV is the unpleasant experience that leads to substantial discomfort and dissatisfaction to patient. PONV can lead to electrolyte imbalance, dehydration, pulmonary aspiration, acid base disturbances & wound dehiscence, and this leads to rise in health care cost due to lengthen hospital stay. Hence identifying the patient at increased risk of PONV and initiating the PONV prophylaxis is of paramount importance.² While several factors contribute in higher risk of PONV, cholecystectomy and laparoscopic surgery are associated with higher PONV incidence.³ The reported incidence rate of PONV in laparoscopic cholecystectomy has ranged from 40% to 75%, so increasing attention should be given for PONV prophylaxis to these groups of patients.³

PONV incidence is higher after laparoscopic cholecystectomy (LC) than after other types of surgery. Propofol use in maintaining anesthesia also reduces PONV. Patients administered propofol to induce anesthesia have a lower incidence of PONV after LC than do those administered thiopentone/halothane for anesthesia.⁴ Different pharmacological and non-pharmacological approaches have been used for preventing PONV. Results have been presented for perioperative fluid therapy and dextrose administration, two proposed strategies for preventing PONV.⁵ The present study assessed efficacy of dextrose in preventing PONV in laparoscopic cholecystectomy patients.

Materials & Methods

The present study was conducted on 120 patients scheduled for LC under general anesthesia. Patients were informed regarding the study and written consent was obtained. Data such as name, age, gender etc. was recorded. They were divided into 2 groups. In group I, patients received an infusion of 500 cc lactated Ringer's solution and in group II, patients received 5% dextrose in lactated Ringer's solution over a period of 30 minutes. All the patients received general anaesthesia using the same protocol. As for pre-medication, all patients received IV midazolam (0.02 mg/kg) and fentanyl (2µg/kg) before anaesthesia induction. Nausea and vomiting intensity was recorded using the verbal rating scale immediately at post-anaesthesia care unit arrival; 60 and 120 minutes after arriving at the PACU and 12 and 24 hours after surgery. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

Results

Table I Distribution of patients

Groups	Group I	Group II
Agent	Ringer's solution	5% dextrose
M:F	25:35	20:40

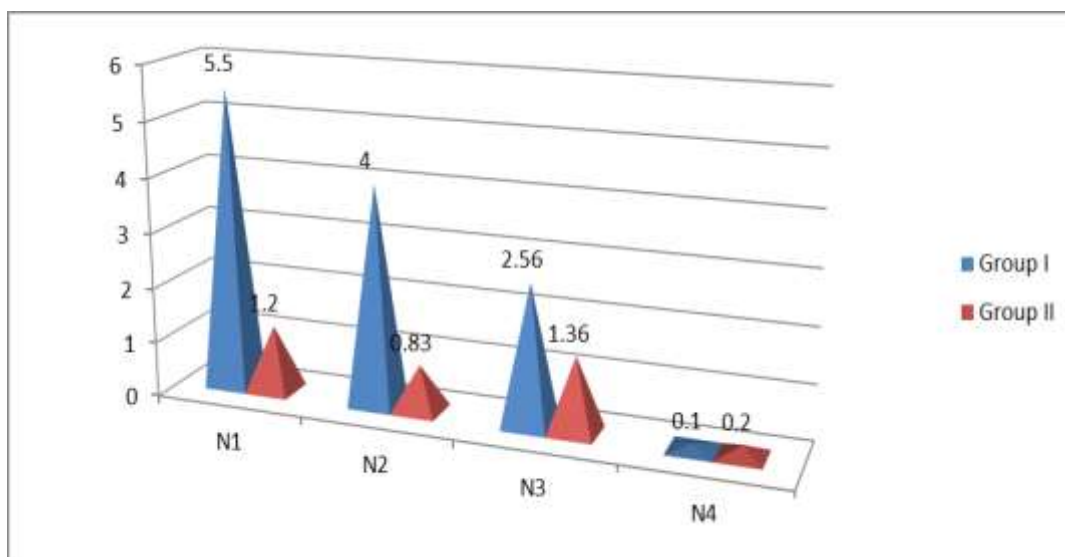
Table I shows that group I received lactated Ringer's solution and group II received 5% dextrose. There were 25 males and 35 females in group I and 20 males and 40 females in group II.

Table II Nausea score in both groups

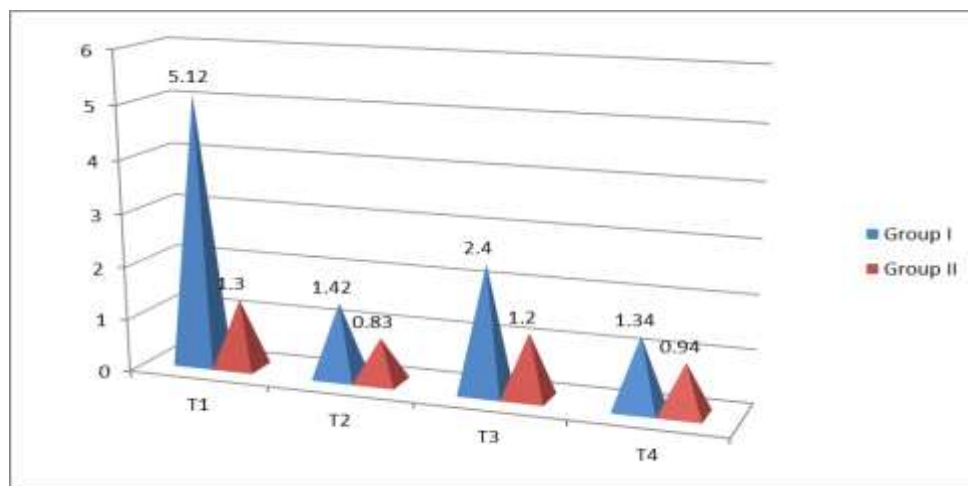
Nausea	Group I	Group II	P value
N1	5.5	1.2	0.01
N2	4.0	0.83	
N3	2.56	1.36	
N4	0.1	0.2	

Table II, graph I shows that nausea score at 60 minutes (N1) was 5.5 in group I and 1.2 in group II, N2 was 4 in group I and 0.83 in group II, N3 was 2.56 in group I and 1.36 in group II and N4 was 0.1 in group I and 0.2 in group I. The difference was significant ($P < 0.05$).

Graph I Nausea score in both groups



Graph II Vomiting score in both groups



Graph II shows that mean vomiting score T1 was 5.12 in group I and 1.3 in group II, T2 was 1.42 in group I and 0.83 in group II, T3 was 2.40 in group I and 1.20 in group II and T4 was 1.34 in group I and 0.94 in group II. The difference was significant ($P < 0.05$).

Discussion

Post-operative nausea and vomiting (PONV) is a common and distressing complication after anaesthesia and surgery. The true incidence of PONV is difficult to determine because of the lack of a single stimulus of onset as well as the range of possible etiologies. In the absence of antiemetic treatment, the incidence of PONV is estimated to be 25% to 30% for all surgical interventions and patient populations.⁶ Although PONV is usually self-limiting and non-fatal, it is unpleasant and leads to considerable post-operative discomfort and dissatisfaction. For most surgical patients, PONV is a greater concern than is post-operative pain and patients continues to rank PONV as the most unfavourable complication.⁷ The present study assessed efficacy of dextrose in preventing PONV in laparoscopic cholecystectomy patients.

We found that group I received lactated Ringer's solution and group II received 5% dextrose. There were 25 males and 35 females in group I and 20 males and 40 females in group II. Apfel et al⁸ in their study in 5000 patients demonstrated that the benefit of a range of antiemetic interventions, including ondansetron, dexamethasone, and droperidol, was similar, with a relative risk reduction of 20% compared with the absence of that intervention, equating to an absolute reduction of 15-20% points on a typical baseline PONV rate in the range 60-70%. This magnitude of benefit has been seen with many antiemetics in separate, placebo-controlled trials, including ondansetron.

We observed that nausea score at 60 minutes (N1) was 5.5 in group I and 1.2 in group II, N2 was 4 in group I and 0.83 in group II, N3 was 2.56 in group I and 1.36 in group II and N4 was 0.1 in group I and 0.2 in group I. Firouzian A et al⁹

evaluated the effect of intravenous (IV) dextrose administration for the prophylaxis of PONV after LC. In a double-blind, randomised controlled trial, a total of 150 female patients who were scheduled for elective LC were randomly assigned into two groups (A and B). Thirty minutes before induction of anaesthesia, patients received an infusion of 500 cc lactated Ringer's solution (Group A) and 5% dextrose in lactated Ringer's solution (Group B) and over a period of 30 min. All patients rated their nausea and vomiting intensity using the verbal rating scale immediately at post-anaesthesia care unit (PACU) arrival; 30, 60, 90 and 120 min after arriving at the PACU and 6, 12 and 24 hours after surgery. There was a statistically significant time trend and group effect along with significant differences in time/group interaction effect in both groups for nausea and vomiting scores ($P < 0.05$). A low negative correlation coefficient was found ($r = -0.394$, $P < 0.001$) between blood glucose levels and nausea scores upon PACU arrival. Dextrose administration reduced the odds of vomiting events compared to placebo.

We found that mean vomiting score T1 was 5.12 in group I and 1.3 in group II, T2 was 1.42 in group I and 0.83 in group II, T3 was 2.40 in group I and 1.20 in group II and T4 was 1.34 in group I and 0.94 in group II. Several factors have been implicated specifically in laparoscopic cholecystectomy such as CO₂ insufflation, distension of the abdomen and irritation of the diaphragm and other abdominal viscera. In addition, other factors have also been associated such as female gender, history of motion sickness, obesity, length of surgery, post-operative pain, use of opioids, and use of inhalational anesthetics like halothane.¹⁰ The vomiting center is an indiscrete area located in the lateral reticular formation of the medulla, which is responsible for controlling and coordinating nausea and vomiting. The center receives a wide range of afferent inputs from receptors in the gastrointestinal tract, peripheral pain receptors, the nucleus solitarius, vestibular system, the cerebral cortex, and the chemoreceptor trigger zone.¹¹

Verma et al¹² assessed intravenous 2% dextrose in ringer lactate for prevention of PONV in 60 laparoscopic cholecystectomy patients age 20-55 years under general anaesthesia. Patients were randomly divided into two groups: group DRL received 2% dextrose in ringer lactate and group RL received ringer lactate. Allocate fluid was started at induction of anaesthesia and continued post-operatively up to 6hr. Incidence and severity of PONV was measured as a primary outcome. Secondary outcome includes comparison of blood sugar level, requirement of rescue antiemetic, time of oral acceptance of food & time of discharge between two groups. Incidence and severity of PONV was less in group DRL than group RL. Blood sugar level was higher in group DRL but within the normal range. Time of oral feed and time to discharge was early in group DRL.

Conclusion

Author found that administration of IV dextrose before anaesthesia induction may be recommended as an effective and safe method for the prophylaxis of post operative nausea vomiting after LC.

References

1. Arslan M, Çiçek R, Kalender HÜ, Yilmaz H. Preventing postoperative nausea and vomiting after laparoscopic cholecystectomy: A prospective, randomized, double-blind study. *Curr Ther Res Clin Exp* 2011; 72:1-12.
2. Gan TJ, Diemunsch P, Habib AS, Kovac A, Kranke P, Meyer TA et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg* 2014; 118:85-113.
3. Macario A, Weinger M, Carney S, Kim A. Which clinical anesthesia outcomes are important to avoid? The perspective of patients. *Anesth Analg* 1999; 89:652-8.
4. Chandrakantan A, Glass PS. Multimodal therapies for postoperative nausea and vomiting, and pain. *Br J Anaesth* 2011; 107: 27-40.
5. Fujii Y. Management of postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy. *Surg Endosc* 2011; 25:691-5.
6. Kovac AL. Update on the management of postoperative nausea and vomiting. *Drugs* 2013; 73:1525-47.
7. Naylor RJ, Inall FC. The physiology and pharmacology of postoperative nausea and vomiting. *Anaesthesia* 1994; 49: 2-5.
8. Apdel, Paxton LD, McKay AC, Mirakhur RK. Prevention of nausea and vomiting after day case gynaecological laparoscopy. A comparison of ondansetron, droperidol, metoclopramide and placebo. *Anaesthesia* 1995; 50:403-6.
9. Firouzian A, Kiasari AZ, Godazandeh G, Baradari AG, Alipour A, Taheri A, Zeydi AE, Montazemi M. The effect of intravenous dextrose administration for prevention of post-operative nausea and vomiting after laparoscopic cholecystectomy: A double-blind, randomised controlled trial. *Indian Journal of Anaesthesia*. 2017 Oct;61(10):803.
10. Anil, Agarwal A, Dhiraaj S, Tandon M, Singh PK, Singh U, Pawar S, et al. Evaluation of capsaicin ointment at the Korean hand acupressure point K-D2 for prevention of postoperative nausea and vomiting. *Anaesthesia* 2005; 60:1185-8.
11. Dagher CF, Abboud B, Richa F, Abouzeid H, El-Khoury C, Doumit C, et al. Effect of intravenous crystalloid infusion on postoperative nausea and vomiting after thyroidectomy: A prospective, randomized, controlled study. *Eur J Anaesthesiol* 2009; 26:188-91.
12. Verma et al. Effect of 2% dextrose in ringer lactate on incidence of nausea and vomiting in laparoscopic cholecystectomy-Pro prospective randomized control study. *IJCA* 2020; 583-88.