Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 04, 2023

JUDGING THE ROLE OF 5% DEXTROSE ADMINISTERED PERIOPERATIVELY IN REDUCING POSTOPERATIVE NAUSEA AND VOMITING IN LAPAROSCOPIC HYSTERECTOMY SURGERY

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Conflict of Interest: None
Type o study: Original Research Paper

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ABSTRACT

Introduction: One of the major concerns in subjects undergoing laparoscopic surgeries is PONV (Postoperative nausea and vomiting). The use of intravenous dextrose to reduce PONV has controversial data in the literature.

Aim: To judge the role of 5% dextrose administered perioperatively in reducing postoperative nausea and vomiting in laparoscopic surgeries.

Methods: In 120 female subjects undergoing laparoscopic hysterectomy surgery under general anesthesia were randomly divided into two groups having 60 subjects each at beginning of the start of surgical closure Group I received saline for 2 hours at 125ml/hour and Group II received 5% dextrose at 125ml/hour. For all subjects, analgesic consumption, total rescue antiemetic, and hemodynamic parameters, and PONV scores were assessed.

Results: Rescue antiemetics were needed in 63.3% (n=38) of study subjects of Group I and 26.66% (n=16) subjects of Group II. On arrival to PACU, PONV was significantly higher in Group I, 63.3% (n=38) subjects compared to dextrose group, 36.6% (n=22) subjects (p=0.03). However, at 30 minutes, 6.66% (n=4) of subjects in Group II had PONV compared to no subject in Group I (p=0.17). At 6 hours, PONV incidence was similar in both the groups with 20% (n=12) subjects each with p=1.000. At 2 and 12 hours, PONV incidence was higher in Group I where saline was used

Conclusion: The study concludes that 5% dextrose administration perioperatively decreases the PONV incidence and antiemetics consumption in subjects undergoing laparoscopic hysterectomy surgery under general anesthesia.

Keywords: Dextrose, Laparoscopic Hysterectomy Surgery, Postoperative Nausea, Vomiting

INTRODUCTION

One of the major challenges encountered by the subjects undergoing laparoscopic hysterectomy surgery is PONV (postoperative nausea and vomiting). This can lead to acid-base imbalances, electrolyte disbalances, water disbalance, wound dehiscence, raised the cost

of hospital stay, more stay in PACU (post-anaesthesia care unit), dehydration, and aspiration pneumonia. The PONV incidence is nearly 30% in subjects undergoing surgeries with no prophylactic intervention.[1] However, in high-risk subjects, the incidence of PONV is increased to 80%, especially in laparoscopic surgeries in subjects with the postoperative use of opioids, PONV history, non-smoking, and female gender. With better anesthetic drugs and advanced techniques, PONV incidence is reduced by 30% nearly. PONV is the most reported complaint even more than postoperative pain. Hence, preventing PONV has more patient satisfaction, improved outcomes, economical, and vital.[2]

Both non-pharmacological and pharmacological methods have been used in the prevention of PONV. PONV prophylaxis is usually done with droperidol, dexamethasone, and serotonin $5HT_3$ receptor antagonist like antiemetic medications. However, these drugs are expensive and have side effects including arrhythmias, dysphoria, oversedation, dry mouth, and/or hypertension.[3]

Fasting done in the postoperative period leads to hypovolemia further leading to hypoperfusion of the gastric mucosa which is a vital etiologic factor leading to PONV.[4] Previous literature data suggest that infusion of dextrose or IV fluid at perioperative interval can lead to decreased severity or frequency of PONV by reduction of hypovolemia, insulin resistance, and postoperative catabolism by preoperatively administering the load of carbohydrates. However, the existing literature data is scarce and shows controversial results for use of IV dextrose solution after surgery.[5]

Hence, assessing the prevention of PONV and its importance shows limiting data and conflicting results following administrating of the 5% dextrose. The present study aimed to assess the role of perioperative dextrose for PONV prophylaxis in laparoscopic hysterectomy surgery under general anaesthesia.

MATERIALS AND METHODS

The present prospective clinical study aimed to assess the role of perioperative dextrose for PONV prophylaxis in laparoscopic surgeries under general anesthesia. The study population was comprised of the subjects from the Department of surgery and Obstetrics and Gynaecology of the institute.

The study included 120 female subjects undergoing laparoscopic hysterectomy surgery under general anesthesia. The inclusion criteria were subjects in the age range of 18-60 years, undergoing the elective laparoscopic procedure, under general anesthesia, ASA-I subjects, and subjects willing to participate. The exclusion criteria were subjects with sustained perioperative hypotension, inability for venous cannula insertion, >2 hours surgery, study fluid allergy, pregnant females, diabetics, hepatic/renal dysfunction, cardiac disease, motion sickness, PONV history, and subjects who did not give consent for study participation.

After final inclusion, detailed history was recorded followed by examination and pre-anesthetic evaluation. Informed consent was taken in both written and verbal form. The intensity of PONV was rated on VDS (visual descriptive scale). Subjects fasted for a minimum of 6 hours for solid food and 2 hours for clear fluid before surgery. Included 120 subjects were randomly divided into two groups having 60 subjects each were at beginning of the start of surgical closure Group I received saline for 2 hours at 125ml/hour and Group II

received 5% dextrose at 125ml/hour. The study solution was given by one anesthesia provider and another anesthetist collected the data.

Hemodynamic parameters were assessed at baseline along with CBG (capillary blood glucose) levels. CBG was also recorded before anesthesia induction, 15 minutes following infusion, and 12 hours following induction. No prophylactic anti-emetics were given to study subjects to avoid bias. An infusion pump was used to infuse the fluid, either dextrose or saline at a fixed rate of 125ml/hour in 30 subjects each at beginning of the surgical closure start. The standard surgical protocols were used to perform surgery as applicable. Labeled opaque bags were used to deliver normal saline as placebo fluid and dextrose as study fluid. Anesthesia technique and agents were standard with general anesthesia and standard techniques where 0.5 mg/kg atracurium was used to facilitate intubation and maintenance, 2 mcg/kg fentanyl to attenuate stress response and analgesia, and 5 mg/kg for induction thiopentone sodium in IV form to facilitate maintenance and intubation.

Postoperatively, at 0, 30, 60, and 120 minutes, and at 6, 12, and 24 hours PONV was assessed using the verbal descriptive scale (VDS) was used having a score of 0 showing no PONV with no complaint of nausea and vomiting, 1 with mild PONV with nausea and no antiemetic treatment, 2 with moderate PONV having nausea and allowing antiemetic treatment, and 3 with severe PONV having nausea with emesis episodes of vomiting and retching needing treatment. Ondansetron 4mg IV was used as a rescue antiemetic in subjects with scores of 3 or more, Ringer's lactate of 2ml/kg/hr, and 5L/min supplemental oxygen was given for 4 hours using facemasks for postoperative 24 hours. Within 24 hours of surgery, data collection was completed.

The collected data were subjected to statistical evaluation using SPSS version 20, Chicago Inc., USA, ANOVA test, Fischer's extract test, and Chi-square tests. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at $p<0.05$.

RESULTS

The present prospective clinical study aimed to assess the role of perioperative dextrose for PONV prophylaxis in laparoscopic surgeries under general anesthesia. The study included 120 female subjects undergoing laparoscopic hysterectomy surgery under general anaesthesia in the age range of 18-60 years. The mean age of the study subjects in Group I and II were 35.1±11.91 years and 37.14±12.03 years respectively which was non-significant with p=0.545. The surgery duration was 88.3±34.21 and 96.8±34.52 minutes respectively for Group I and II which was also non-significant with p=0.343. Other demographics at baseline including BMI, height, and weight also showed non-significant differences between the two study groups with respective p-values of 0.553, 0.355, and 0.792 respectively (Table 1).

Concerning PONV incidence in two groups of study subjects at a different time intervals, it was seen that on arrival at PACU, PONV was significantly higher in Group I where saline was given to 63.3% (n=38) subjects compared to the dextrose group (Group II) with the incidence of 36.6% (n=22) subjects (p=0.03). However, at 30 minutes, 6.66% (n=4) of subjects in Group II had PONV compared to no subject in Group I (p=0.17). At 60 minutes and 24 hours postoperative, no subject has PONV incidence (p=1.000). At 6 hours, PONV incidence was similar in both the groups with 20% (n=12) subjects each with p=1.000. At 2

and 12 hours, PONV incidence was higher in Group I where saline was used. However, the difference was statistically non-significant with p=0.07 and 0.145 respectively (Table 2).

On assessing the need for rescue antiemetics incidence in two groups of study subjects at different time intervals, it was noted that rescue antiemetics were needed in 63.3% (n=38) study subjects and were not needed in 36.66% (n=22) study subjects. In Group II subjects where dextrose was used, rescue antiemetics were needed in 26.66% (n=16) study subjects and were not needed in 73.3% (n=44) study subjects as shown in Table 3.

For capillary blood glucose levels (mg/dl) in the study subjects, before induction, it was 95.5±12.7008 and 97.5±15.3106 mg/dl in Group I and II respectively which was non-significant between the two groups with p=0.582. A similar non-significant difference between the two groups was seen 15 minutes after study fluid stoppage and 12 hours following induction with respective p-values of 0.432 and 0.425 respectively as depicted in Table 4.

DISCUSSION

The present prospective clinical study aimed to assess the role of perioperative dextrose for PONV prophylaxis in laparoscopic hysterectomy surgery under general anesthesia. The study included 120 female subjects undergoing laparoscopic surgeries under general anesthesia in the age range of 18-60 years. The mean age of the study subjects in Group I and II were 35.1±11.91 years and 37.14±12.03 years respectively which was non-significant with p=0.545. The surgery duration was 88.3±34.21 and 96.8±34.52 minutes respectively for Group I and II which was also non-significant with p=0.343. Other demographics at baseline including BMI, height, and weight also showed non-significant differences between the two study groups with respective p-values of 0.553, 0.355, and 0.792 respectively. These demographics were comparable to the studies of Patel P et al[6] in 2013 and Rao V et al[7] in 2017 where authors assessed subjects having demographic data comparable to the present study.

For the assessment of the PONV incidence in two groups of study subjects at a different time intervals, it was seen that on arrival at PACU, PONV was significantly higher in Group I where saline was given to 63.3% (n=38) subjects compared to dextrose group (Group II) with the incidence of 36.6% (n=22) subjects (p=0.03). However, at 30 minutes, 6.66% (n=4) of subjects in Group II had PONV compared to no subject in Group I (p=0.17). At 60 minutes and 24 hours postoperative, no subject has PONV incidence (p=1.000). At 6 hours, PONV incidence was similar in both the groups with 20% (n=12) subjects each with p=1.000. At 2 and 12 hours, PONV incidence was higher in Group I where saline was used. However, the difference was statistically non-significant with p=0.07 and 0.145 respectively. These results were consistent with the studies of Atashkhoei S et al[8] in 2018 and Saleh AN et al[9] in 2019 where authors also reported a lesser incidence of PONV with the use of Dextrose.

Concerning the need for rescue antiemetics incidence in two groups of study subjects at different time intervals, it was noted that rescue antiemetics were needed in 63.3% (n=38) study subjects and were not needed in 36.66% (n=22) study subjects. In Group II subjects where dextrose was used, rescue antiemetics were needed in 26.66% (n=16) study subjects and were not needed in 73.3% (n=44) study subjects. These results were in agreement with

the findings of Firouzian A et al[10] in 2017 and Mishra A et al[11] in 2017 where lesser antiemetics were needed with Dextrose compared to saline use.

On assessing the capillary blood glucose levels (mg/dl) in the study subjects, before induction, it was 95.5±12.7008 and 97.5±15.3106 mg/dl in Group I and II respectively which was non-significant between the two groups with p=0.582. A similar non-significant difference between the two groups was seen 15 minutes after study fluid stoppage and 12 hours following induction with respective p-values of 0.432 and 0.425 respectively. These findings were in line with the results of Pareek A et al[12] in 2020 and Haentjens LL et al[13] in 2009 where authors reported no difference in capillary blood levels with the use of saline or dextrose as in the present study.

CONCLUSION

Considering its limitations, the present study concludes that 5% dextrose administration perioperatively decreases the PONV incidence and antiemetics consumption in subjects undergoing laparoscopic hysterectomy surgery under general anaesthesia. However, the present study had a few limitations including a small sample size, short monitoring time, and geographical area biases. Hence, more longitudinal studies with larger sample size and longer monitoring period will help reach a definitive conclusion.

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TABLES

Characteristics	Group I (saline)	Group II (Dextrose)	p-value
Age (years)	35.1±11.91	37.14±12.03	0.545
Surgery duration (minutes)	88.3±34.21	96.8±34.52	0.343
BMI (kg/m2)	24.55±2.63	24.15±2.68	0.553
Weight (kgs)	53.34±7.26	51.6±5.77	0.355
Height (cms)	147.24±6.46	146.5±9.92	0.792

Table 1: Demographic and disease characteristics of the study subjects

Incidence of PONV	Group I (saline) n=60 (%)	Group II (Dextrose) n=60 (%)	p-value
Post-anaesthesia care unit arrival	38 (63.33)	22 (36.6)	**0.03**
30 minutes	0	4 (6.66)	0.17
60 minutes	0	0	1.000
2 hours	6 (10)	0	0.07
6 hours	12 (20)	12 (20)	1.000
12 hours	14 (23.33)	6 (10)	0.145
24 hours	0	0	1.000

Table 2: Incidence of PONV in two groups of study subjects

Need for rescue antiemetics	Group I (saline) n=60 (%)	Group II (Dextrose) n=60 (%)	p-value
Yes	38 (63.3)	16 (26.66)	**0.002**
No	22 (36.66)	44 (73.3)	

Table 3: Need for rescue antiemetics within 24 hours in two groups of study subjects

Capillary Blood Glucose (mg/dl)	Group I (saline) n=60 (%)	Group II (Dextrose) n=60 (%)	p-value
Before induction	95.5±12.7008	97.5±15.3106	0.582
15 minutes after the study fluid stoppage	124.4±25.668	129.9±29.0354	0.432
12 hours following induction	119.6±12.6994	122.1±11.4988	0.425

Table 4: Perioperative CBG in two groups of study subjects