



DOES INTRA-OPERATIVELY ADMINISTERED INTRAVENOUS 5.0% DEXTROSE FURTHER REDUCE POST OPERATIVE NAUSEA AND VOMITING IN PATIENTS ON STANDARD GRADED PROPHYLAXIS.

Anaesthesiology

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ABSTRACT

Objective: Post operative nausea and vomiting (PONV) following general anesthesia, is the second most common unfavorable complication. In this randomized control trial, we attempted to determine whether IV 5.0% dextrose administered intra operatively, will further help to reduce the incidence of nausea and vomiting post operatively, in patients receiving standard prophylaxis against PONV. **Material And Methods:** In this double blinded RCT, 160 non-diabetic patients were enrolled and were risk stratified as per Apfel scoring for PONV into four classes. Following induction of general anesthesia, the standard prophylactic drugs for PONV were administered as per the patient's risk class. Study group D received 5.0% dextrose infusion and control group received normal saline (NS) infusion over 20-30 minutes. Blood glucose level was measured using a point of care device pre-operatively and post-operatively. PONV was assessed with a simple yes or no question in the first 24 hours post-surgery. **Results:** There was no significant intergroup difference in the overall incidence of PONV (16.0% in group D vs. 15.0% in group NS; "p-value" = 0.9). The pre-operative blood glucose levels were statistically insignificant between the two groups. However, the post-operative blood glucose level was higher in group D when compared to group NS was found to be statistically significant ("p-value" < 0.001). **Conclusion:** Intraoperative administration of 5.0% dextrose was not effective in further reducing the incidence of PONV following general anaesthesia in patients already receiving standard prophylaxis for PONV.

KEYWORDS

Apfel score, 5% dextrose, general anaesthesia, post operative nausea and vomiting.

INTRODUCTION

PONV following general anesthesia, is the second most common unfavorable complication, with a general incidence of 50.0% for nausea and 30.0% for vomiting. It can reach as high as 80.0% in high-risk patients^[1]. PONV is very distressing and unpleasant to the patients and can lead to complications such as dehydration, aspiration pneumonia, electrolyte imbalance, wound dehiscence and delayed wound healing. Furthermore, it increases the economic burden to the patient by prolonging the duration of hospitalization.

There are several approaches (viz. pharmacological and non-pharmacological) for the prevention of PONV. However, none of these approaches are completely efficient in preventing PONV. One such prophylactic agent for PONV under evaluation is 5.0% dextrose. It is a crystalloid solution that is frequently used in the peri-operative period for fluid replacement, prevention and treatment of intracellular dehydration, to provide adequate calories and for IV drug administration. It is easily available and economical.

The actual mechanism of PONV is complex and unclear. Few studies have indicated that the occurrence of PONV could be due to post-operative insulin resistance and increased gastric contraction due to increased gastric acid secretion. These can be reduced by intravenous administration of 5.0% dextrose in the peri-operative period and therefore potentially prevent PONV.^{[2][3][4]}

There is a scarcity of evidence supporting the effectiveness of peri-operative IV 5.0% dextrose in reducing the incidence of PONV. Therefore, in this randomized control trial we attempted to determine whether IV 5.0% dextrose administered intra operatively, will help to further reduce the incidence of nausea and vomiting post operatively, in patients receiving standard prophylaxis against PONV.

MATERIAL AND METHODS

All ASA (American Society of Anesthesiologists) 1 and 2 non-diabetic patients aged 18 years to 65 years who underwent surgeries under general anesthesia satisfying the inclusion criteria were enrolled for this double-blinded randomized controlled study which was conducted in the Department of Anaesthesiology in Manipal Hospital, Bengaluru after obtaining approval of hospital ethics committee which supervised the data collection and safety issues. (The Ethics Committee of Manipal Hospitals, Bangalore is organized and operates as per the ICH-GCP and Schedule Y guidelines.)

A senior anesthesia consultant who was the guide for the study and not a part of the peri-operative care of the patients allotted the patients into

two groups via a computer-generated random number table. Study group D (received IV 5.0% dextrose with standard prophylaxis) or the control group 2 NS (received normal saline with standard prophylaxis).

All patients were assessed for the risk factors for post-operative nausea vomiting and were scored as per Apfel et al scoring for PONV and stratified into four classes as shown in (Table 1a and 1b)

Following anesthesia induction, the standard prophylactic drugs for PONV were administered as per the patient's risk class (Table 2). Study group D received 5.0% dextrose infusion (500ml) intravenously and patients of control group NS received an infusion of normal saline (500ml) over 20-30 minutes respectively. In both the groups balanced salt solution (kabilyte, plasmalyte) was used as the maintenance fluid Intra-operatively. All patients were shifted to post anesthesia care unit (PACU) to assess for PONV, post-operative blood glucose level, monitor the vital parameters before the patients could be shifted safely to their respective wards. Post-operative analgesia in both the groups was either IV paracetamol 1gm or inj. Fortwin 0.3mg/kg IV. PONV was assessed with a simple yes or no question immediately, at 30 minutes, 60 minutes, 90 minutes, 120 minutes on arrival at PACU and 6 hours, 12 hours and 24 hours post-surgery. The first line and second line rescue anti-emetics were inj. Palonosetron 0.075mg IV and inj. Metoclopramide 10mg IV.

RESULTS

We used SPSS-15.0 as our statistical tool to calculate the results of the study.

1. Normally distributed data were presented as mean and standard deviation.
2. Continuous data between the two groups were compared using student's t-test.
3. Categorical data were presented as numbers (percentage).
4. Categorical data between the two group were compared using chi-square or Fischer exact test.
5. "p-value" < 0.05 was considered significant.

There was no statistically significant difference between the participants of group D and group NS with respect to the demographic data, pre-operative and post-operative vital parameters. 14 patients of group D (16.0%) experienced PONV whereas 11 patients of group NS (15.0%) experienced PONV. This was found to be statistically insignificant between the two groups with a "p-value" of 0.9 (Table 3). There was no significant difference in the requirement of rescue anti-emetics between the two groups. The pre-operative blood glucose

levels were statistically insignificant between the two groups (“p-value” 0.32). However, the post-operative blood glucose level was higher in group D when compared to group NS but within normal range and this was found to be statistically significant (“p-value” <0.001. “p-value” by chi square test.)

DISCUSSION

Despite receiving the recommended multimodal prophylaxis [5] for PONV many patients still complain of nausea and vomiting in the postoperative period which adds to the discomfort of the patients and might delay the recovery of the patients thus exposing them to more anti-emetics with undesirable side effects.

From various studies it has been identified that dehydration and hypovolemia after prolonged fasting causes gastric mucosal hypoperfusion which is an important etiological factor for [4][6] PONV.

Dextrose is nothing but simple sugar glucose. There are few hypotheses suggesting the mechanism by which glucose reduces PONV. Administration of glucose containing solutions in the peri-operative period reduces the peri-operative stress, maintains hepatic glycogen and increases the insulin sensitivity [4] of the tissues. Hyperglycemia following administration of glucose inhibits the vagal cholinergic pathway thereby reducing the gastric acid secretion which diminishes gastric contractions and nausea. It also increases the plasma cholecystokinin level. Through its function within the brain, cholecystokinin modulates pain and anxiety thus reducing the post-operative pain and opioid consumption in turn decreases PONV [7]. 5.0% dextrose provides hydration and causes hyperglycemia thereby decreasing PONV.

Pre-operative blood glucose levels were comparable between Group D and Group NS patients and were not statistically significant with a p value 0.3. However, the post-operative blood glucose level being within normal range in Group D, it was found to be significantly higher when compared to that of group NS. (“p-value” <0.001 Table-3) similar to the findings of study by Firouzian et al [4].

The primary objective was to assess whether intravenous 5.0% dextrose administered intraoperatively added any benefit over the standard prophylaxis in reducing post-operative nausea and vomiting following general anesthesia.

In our study we found out that 14 (4 patients had only nausea and 10 patients had vomiting) out of 87 patients analysed of group D (16.0%) had PONV whereas 11 (2 patients had only nausea and 9 patients had vomiting) out of 72 patients analysed of group NS (15.0%) had PONV proving to be statistically insignificant (“p-value” = 0.9). Unlike other studies [2,6,7,8,9] where they have found either reduction [2][8] or no change in the incidence of PONV [6][7][8] with administration of 5.0% dextrose without graded prophylaxis, in our study all our patients in both the groups received standard [5] anti-emetic prophylaxis.

CONCLUSION

Hence, we can conclude that patients receiving standard prophylaxis do not get any additional benefit in prevention of PONV with administration of 5.0 % dextrose.

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Conflict Of Interest

There is no conflict of interest with any journal or any institution with respect to the current study

List of Tables

Table 1a: Apfel et al scoring for PONV

RISK FACTORS	SCORES
female gender	1
non-smoker	1

h/o PONV or motion sickness	1
post operative opioids	1
total score	0-4

Table 1b: Apfel et al scoring for PONV

SCORES	RISK CLASS
0-1	1
2	2
3	3
4	4

Table 2: standard anti-emetic prophylaxis given after induction of anaesthesia

CLASS	STANDARD PROPHYLACTIC DRUGS
0-1	inj ondansetron 4 mg
2	inj ondansetron 4 mg + inj dexamethasone 0.05-0.1mg/kg
3	inj ondansetron 4 mg + inj dexamethasone 0.05-0.1mg/kg + tiva with propofol
4	inj ondansetron 4 mg + inj dexamethasone 0.05-0.1mg/kg + tiva with propofol+ inj scopolamine 0.3-0.6mg iv

Table 3: incidence of PONV (nausea and vomiting) in patients receiving 5.0% Dextrose vs NS infusion intra-operatively.

	GROUP D(n=87)	GROUP NS(n=72)	“p-value”
PONV	14 (16.0%)	11(15.0%)	0.9
No PONV	73 (84.0%)	61 (85.0%)	

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