

A PROSPECTIVE OBSERVATIONAL STUDY TO EVALUATE THE INCIDENCE OF POSTOPERATIVE NAUSEA AND VOMITING IN PATIENTS PROVIDED WITH PREOPERATIVE CARBOHYDRATE DRINK

Anupriya Joseph*¹ and Mallie Abraham²

¹Assistant Professor, Department of Anaesthesia, Karuna Medical College, Palakkad.

²Senior Consultant, Department of Anaesthesia, VPS Lakeshore, Cochin.

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*Corresponding Author

Anupriya Joseph

Assistant Professor, Department
of Anaesthesia, Karuna Medical
College, Palakkad.

ABSTRACT

Objective: To determine whether the preoperative carbohydrate drink 2 hours before surgery will decrease the incidence of PONV in patients undergoing elective surgeries of less than 3 hours duration, using a PONV Impact scale. To measure the residual gastric volume in the same group of patients. **Patients and methods:** The study was undertaken in The Department of Anesthesia at Lakeshore Hospital and Research Centre, Kochi, Kerala. The study was conducted from September 2018 to December 2019 Hundred patients admitted for surgeries of less than three hours duration under general anesthesia belonging ASA1 and 2 grades were selected. These were the cases of 2 surgical consultants one who advised preoperative clear fluids (black tea, black coffee or water) and the other prescribing carbohydrate drinks (carboload). Post operatively they were evaluated for the presence of nausea and vomiting using PONV impact score at 1 hour, 6 hours and 24 hours. Also the gastric residual volume was measured using a 14G Ryles tube which was inserted after induction of anesthesia. **Results:** PONV impact score and gastric residual volume was found to be less for the patients administered carbohydrate drink (carboload) compared to the other patients who were administered clear fluids. **Conclusion:** The incidence of postoperative nausea and vomiting was less and gastric residual volume was not increased in patients provided with carbohydrate drink 2 hours prior to surgery.

KEYWORDS: PONV, carboload, preoperative fasting.

INTRODUCTION

Preoperative surgical care is undergoing a paradigm shift. Traditional practice of patients fasting from midnight on the night before elective surgeries is found to be more harmful than useful. Preoperative fasting should be kept to a minimum as excessive fasting leads to metabolic stress that together with surgical stress manifest as acute phase response and also to insulin resistance which ultimately leads to increased postoperative morbidity and mortality. Carbohydrate drinks in preoperative period could decrease insulin resistance.

It is to prevent aspiration at the time of induction that patients are advised fasting for 6 hours before induction of anesthesia. Gastric volume of patients who were on overnight fasting for elective surgery is found to be less than 25ml and pH value less than 2.5.^[1] Recent studies have shown that oral intake of clear liquids until 2-4 hours before the surgery does not have any effect on gastric content and gastric acidity. A minimum of 200ml of residual volume is needed for regurgitation and pulmonary aspiration. In most patients, the preoperative mean gastric fluid volume is found to be in the range of

10-30 ml and 120 ml is rarely exceeded even with intake of clear fluids. Roger Maltby gave evidence that fluids can be safely taken till two hours before elective surgery, with no increase in the aspiration risk.^[2] Gastric emptying of commercial carbohydrate drinks are the same as clear liquids. So they can also be taken till 2 hours prior to surgery.

In recent years carbohydrate rich drinks have been designed to increase gastric emptying, reduce postoperative thirst, hunger, dehydration, headache, nausea and vomiting. This has led to early discharge from hospital, early return of bowel function, less impact in the catabolic & immunologic response to surgery and thus enhanced postoperative recovery.^[3] It forms an important part of the ERAS protocol.

Post operative nausea and vomiting (PONV) is a common complication after anesthesia which occurs in 20-40 % of patients even with prophylactic measures. It can lead to electrolyte imbalance, dehydration, infections, aspiration and can also delayed recovery and prolonged hospitalization. Pre - operative carbohydrate

loading has been able to decrease the incidence of postoperative nausea and vomiting.^[4]

Our study was to find whether the incidence of PONV was decreased in patients who were given preoperative carbohydrate drink 2 hours before elective surgeries which were of less than 3 hours duration, using a PONV Impact scale.

MATERIALS AND METHODS

1) Study Setting

The Department of Anaesthesia at Lakeshore Hospital and Research Centre, Kochi, Kerala.

2) Study Design

A prospective observational study.

3) Study Population

100 patients(50- control group and 50-study group), in the ASA 1 and II category, belonging to the age group 18-60 years ,who were undergoing short surgery (of duration < 3 hours) from September 2018 to December 2019.

4) Inclusion Criteria

- Surgeries <3 hours duration
- Patients in ASA I & II grades
- 18- 60 years of age

5) METHODOLOGY

After obtaining written informed consent, the patients who satisfied the inclusion criteria, were recruited into the study. The patients underwent pre anaesthetic evaluation on the day prior to surgery when they were explained about the study and educated about the PONV impact scale, which was used for assessment in the post operative period. Patients in group A were administered a carboload sachet (50g) dissolved in 350ml of water 2 hours before surgery. Group B patients were given 350 ml of clear fluids (black tea, black coffee or water according to patient choice) preoperatively 2 hours prior to the surgery. Immediately after induction the gastric contents were measured using a 14 G Ryles tube.

Patients were assessed by the primary investigator after 1 hour, 6 hours and 24 hours using a PONV Impact Scale.

PONV IMPACT SCALE

Q1.Did you vomit or dry retch ?

- 0- No
- 1- Once
- 2- Twice
- 3- Thrice/more

Q2.Did you feel nauseated (an urge to vomit) ?Is it interfering with daily activities such as unable to get out of bed, unable to walk normally or eat & drink?

- 0- Not at all
- 1- Sometimes
- 2- Often or most of the time

3- All of the time

A score > 5 indicate clinically important PONV

6) Data Analysis

Data was entered in excel sheet after coding. SPSS software version 18 was used for analysis of the data.

- Qualitative variables were summarized using percentage and quantitative variables were summarized using mean and standard deviation.
- Statistical analysis was done using independent t – test.
- A p value of less than 0.05 was considered significant.

RESULTS

Age (years)

Fluid given	Carboload	Clear fluid
N	50	50
Mean	45.20	44.00
Std . Deviation	10.39	11.23
Minimum	19	19
Maximum	64	69

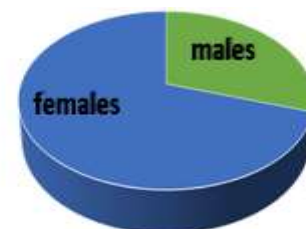
The mean age for the study group was 45.20(standard deviation of 10.39) with a minimum age of 19 and maximum of 64. The mean age of the control group was 44.00(standard deviation of 11.23) with a minimum of 19 and maximum of 69.

So there is no statistically significant difference between study group and control group.

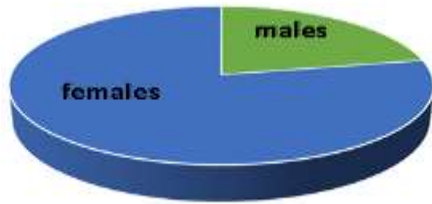
Gender distribution

Fluid given	Sex	Frequency	Percent
Carboload (group A)	Male	15	30%
	Female	35	70%
Clear fluid (group B)	Male	11	22%
	Female	39	78%

Out of the 50 administered carboload sachet 15 were males (30%) and 35 were females (70%)



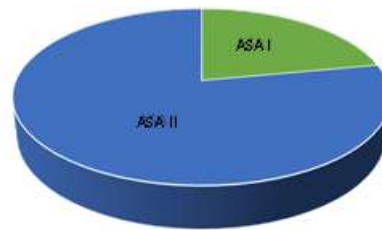
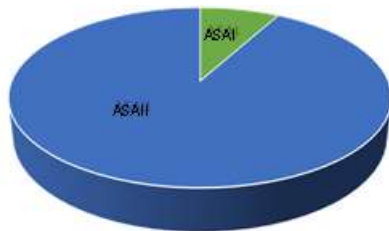
Out of the 50 administered clear fluids 11 were males (22%) and 39 were females (78%).



ASA GRADE

ASA Grade	Fluid given (250ml)	
	Carboload (Group A)	Clear fluid (Group B)
I	4(26.7%)	11(73.3%)
II	46(54.1%)	39(45.9%)
Total	50	50

In the study group 4 were ASA I and 46 were ASA II



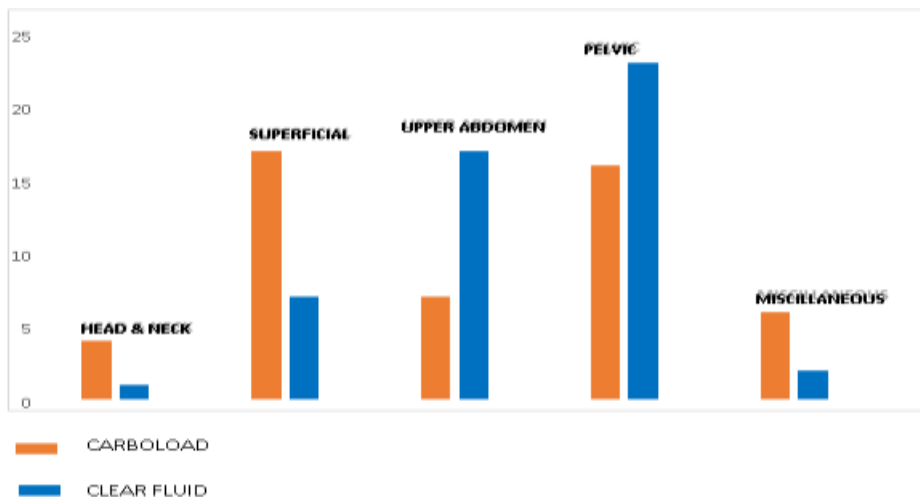
In the control group 11 were ASA I and 39 were ASA II.

TYPE OF SURGERY

	CARBOLOAD	CLEAR FLUID
HEAD AND NECK	4	1
SUPERFICIAL	17	7
UPPER ABDOMINAL	7	17
PELVIC	16	23
MISCILLANEOUS	6	2

Majority of the surgeries in the test and control group were pelvic surgeries which included hysterectomies, pectopexies.

Patients for superficial surgeries like MRM received most number of carboload sachet while, clear fluids were given in most numbers to patients for upper abdominal surgeries like lap cholecystectomies.



The mean PONV impact scale at 1 hour for carboload group was 1.54(std deviation 0.97) and clear fluid group 2.90 (standard deviation 1.22). The difference was statistically significant.(A p value of < 0.001).

Test(PONV 1 * Fluid Given).

PONV -1	CARBOLOAD (50)	CLEAR FLUID (50)
Mean	1.54	2.90
Std . Deviation	0.97	1.22
Std error mean	0.14	0.17
T	-6.17	
Df	98	
Significance (p value)	<0.001	

After 6 hours of the surgery the mean PONV impact scale at for carboload group was 0.48(std deviation 0.58) and of clear fluid group 1.48(std deviation 1.22) with a p value of < 0.001. The difference was found to be statistically significant.

PONV @ 6 hours	CARBOLOAD (50)	CLEAR FLUID (50)
Mean	0.48	1.48
Std . Deviation	0.58	1.22
Std error mean	0.17	0.17
T	-5.25	
Df	98	
Significance (p value)	<0.001	

24 hours post operatively the mean PONV impact scale for carboload group was 0.14(std deviation 0.35) and that of clear fluid group was 0.70(std deviation 0.93) with a p value of < 0.001. The difference was found to be statistically significant.

PONV @ 24 hours	CARBOLOAD(50)	CLEAR FLUID (50)
Mean	0.14	0.70
Std . Deviation	0.35	0.93
Std error mean	0.05	0.13
T	-3.98	
Df	98	
Significance (p value)	<0.001	

The total mean PONV impact scale for carboload group was 2.16(std deviation 1.37) and of clear fluid group was 5.08 (std deviation 2.59), with a p value of < 0.001. The difference was found to be statistically significant.

PONV total	CARBOLOAD (50)	CLEAR FLUID (50)
Mean	2.16	5.08
Std. Deviation	1.38	2.59
Std error mean	0.19	0.37
T	-7.03	
Df	98	
Significance (p value)	<0.001	

The mean gastric residual volume of Group A was 10.32(Std deviation 4.41) and that of Group B was 13.46 (Std deviation 5.38). The difference was statistically significant as the p value was 0.002.

GASTRIC RESIDUAL VOLUME	CARBOLOAD (50)	CLEAR FLUID (50)
Mean	10.32	13.46
Std . Deviation	4.41	5.38
Std error mean	0.62	0.76
T	-3.19	
Df	98	
Significance (p value)	0.002	

DISCUSSION

The incidence of Post operative nausea and vomiting (PONV) is high being the second most common complaint after surgery, pain being the first. It can lead to prolonged hospital stay, delayed recovery from illness, wound dehiscence, dehydration and pulmonary aspiration PONV prophylaxis can thus decrease the incidence of PONV, less patient distress and reduced health care expenses.

Multimodal approach constitutes both pharmacological and non pharmacological therapies, which commences in the preoperative area and continues until discharge of the patient. It includes anxiolysis with benzodiazepines,^[5,6] preoperative dexamethasone,^[7] aprepitant (neurokinin 1 antagonist) administered before anesthesia^{40,41}, adequate IV fluid resuscitation,^[8,9] prehydration with oral carbohydrate drinks 2 hours before surgery, proper analgesia, intraoperative antiemetics.^[10]

Many national anesthetic clinics have changed their preoperative fasting practise and recommend oral intake of clear fluids until 2 hours pre-operatively. Exceptions to these recommendations are emergency surgery and motility disorders. Nutrients in which carbohydrate concentration is below 8 % produce an insulin response. In addition carbohydrate increases gastric emptying because its osmolarity is low and especially if it contains maltodextrin.

The study evaluated the effect that preoperative carbohydrate loading had on the incidence of post operative nausea and vomiting. Among 100 patients for surgeries of less than 3 hour duration under general anesthesia, 50 were administered 50 g carbohydrate sachet in 350 ml water (study group) and 50 were administered 350 ml of clear fluids (control group) 2 hours before surgery.

The incidences of nausea and vomiting were assessed after 1 hour, 6 hours and 24 hours using the PONV impact scale and analysed using independent T test. It was identified that the post operative nausea and vomiting incidence was uniformly less in the study group at 1 hour, 6 hours and 24 hours with a p value <0.005 which was statistically significant. The gastric residual volume also was found to be less in the study group. Our results were similar to the randomized control study by Hausel *et al.*^[11] Hausel *et al* randomized 172 patients undergoing laparoscopic cholecystectomy to either preoperative fasting, intake of carbohydrate drink , or placebo drink. Nausea and pain scores were evaluated and PONV episodes were recorded till 24 hours post operatively. PONV was more in the fasted group than the carbohydrate group. But the gastric residual volume was same in both the groups while in our study, we found that gastric residual volume was less in the group who received carboload sachet. Yagci *et al* compared preoperative fasting and preoperative carbohydrate loading (800ml of carbohydrate rich fluid day before the

surgery and 400ml of the same fluid 2 hours preoperatively on the day of surgery) on glucose metabolism and measured gastric contents in patients who underwent cholecystectomy / thyroidectomy.^[12] There was no statistical difference with respect to gastric residue contents or gastric pH. In another study by Nygren *et al*^[13] in 172 patients undergoing laparoscopic cholecystectomy it was found that gastric residual volume and pH value of gastric content did not differ between carbohydrate drink and and preoperative fasting. Differing from our study Lauwick *et al*^[14] in a study conducted on 200 patients undergoing thyroidectomy concluded that the incidence of PONV was similar with the study group who were given 400 ml carbohydrate drink 2 hours prior to surgery and control group who were fasting. But thirst, hunger and anxiety were lower and patient's comfort was higher in the carbohydrate group. Anxiety was higher in the pre –operative fasting group. Compared to other studies the volume and frequency of the carbohydrate drinks were less in our study as more than half of our patients were admitted on the morning of surgery.

Gastric residual volume is considered as an important factor to evaluate the incidence of gastric contents aspiration. Gastric volume or emptying can be evaluated using radiolabelled meals scintigraphy USG, MRI scanning, Antipyloroduodenal manometry, Impedance monitoring, Paracetamol absorption test, Wireless motility capsules.^[15] Of these aspiration of gastric contents using a 14 G Ryles tube was used in our study being simpler to adopt and cost effective. We acknowledge that the nasogastric tube may not be able to completely empty all compartments of the stomach.

In conclusion we found that preoperative oral intake of carbohydrate drink decreased the incidence of post operative nausea and vomiting as evidenced by a significant reduction in PONV score. Antiemetic prescription was also reduced. The gastric residual volume as measured was statistically less in those patients who received preoperative carbohydrate drink. None of our patients in either group exhibited any clinical features of aspiration.

CONCLUSION

Incidence of post operative nausea and vomiting was less in patients on preoperative carbohydrate drink and the gastric residual volume measured during anesthesia induction was less in the patients on preoperative carbohydrate drink. The authors with the present study would like to conclude that oral carbohydrate drinks can be safely given 2 hours before surgery as it does not affect gastric acidity and leaves the stomach in 90 minutes. It also has an added advantage by maintaining a better metabolic state in the immediate pre operative period. This carbohydrate containing drink also found to enhance postoperative recovery and also found to decrease the incidence of PONV.

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