

Early post-operative oral fluid intake in paediatric surgery under general anaesthesia: A randomised controlled clinical study

INTRODUCTION

Post-operative distress is common among paediatric patients. The cause can be multifactorial such as thirst, hunger, pain, post-operative vomiting and emergence delirium.^[1,2] In paediatric patient <6 years, differentiation between these causes is very difficult, leading to inappropriate treatment, including administration of opioids. This may increase the incidence of post-operative nausea and vomiting (PONV).^[2-4]

Therefore, we conducted a randomised controlled study to assess the early post-operative liberal oral fluid intake on the incidence of post-operative distress and PONV in children undergoing surgery under general anaesthesia. The primary objective of the study was to assess the role of early oral fluid intake after surgery on PONV in children.

METHODS

This is a prospective, randomised, controlled trial. The institutional ethics committee approved the study and it was registered prospectively with the Clinical Trials Registry of India (CTRI/2018/01/011505). A total of 200 paediatric patients aged between 1–6 years belonging to the American Society of Anesthesiologists (ASA) grade I-II posted for elective infraumbilical extraperitoneal surgery were included from January 2018 to September 2019. Paediatric patients having known digestive pathology (hiatal hernia and gastro-oesophageal reflux) and predisposition to PONV were excluded.

All subjects received standardised general anaesthesia according to the institutional protocol. Before reversal, all the patients were scored by post-operative vomiting in children risk (POVOC) score (strabismus surgery[0–1], age ≥ 3 years[0–1], duration of surgery >30 min[0–1], history of POV-[0–1]).^[5] Paediatric patient having post-operative vomiting in

children risk score ≥ 3 received antiemetic prophylaxis with dexamethasone 0.15mg/kg.

After completion of the surgery, all patients were transferred to the post-anaesthesia care unit (PACU).

In PACU, subjects were randomised to one of the following groups—Control group (CG) and Liberal group (LG).

Face Legs Activity Cry Consolability score (FLACC) score^[6] was calculated at every 15 min interval, till the patient was shifted to the ward. Patients in LG with a FLACC ≥ 4 were given 10mL/kg of 10% D/W. If after consuming the fluid, the FLACC score remained ≥ 4 , the institutional post-operative i.v. analgesic protocol was applied. At no time were children in the LG forced to consume liquid. Patients in CG with a FLACC score ≥ 4 were given morphine 0.05 mg/kg and drinking was allowed after returning to the ward [Figure 1]. Paracetamol 15 mg/kg IV was given 8-hourly in both groups. Upon the second episode of POV or at parent request ondansetron 0.15 mg/kg was given.

Collected data included patient characteristics, duration of preoperative fasting, evaluation of the patient baseline risk for PONV (POVOC risk score), total surgical duration and anaesthesia, the total dose of intraoperative and post-operative opioids, total volume of intraoperative and post-operative

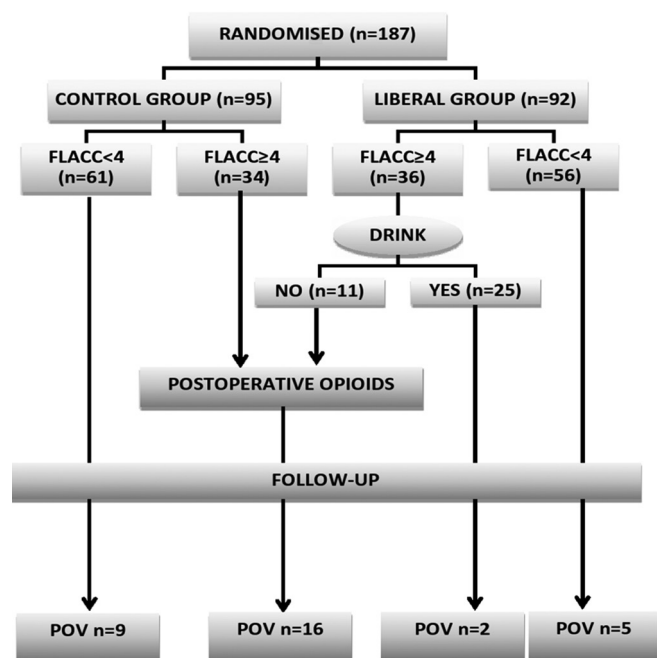


Figure 1: Distribution of the post-operative vomiting episodes across groups

fluids, antiemetic prophylaxis, PONV, post-operative pain (FLACC) on arrival in the PACU and every 15 min thereafter, emergence delirium^[7] on arrival in the PACU and at 20 min interval and total duration of stay in the PACU. The patient was shifted out of PACU once the modified Aldrete score was above 9 as per our institutional protocol. After surgery, on day 1 and day 3 the degree of pain, analgesic treatment, POV and occurrence of adverse events were recorded.

The sample size calculation was done based on the incidence of POV in our paediatric surgery post-operative care unit in the last 5 years which was between 22.5–28.9% in the year 2012–2017. To detect a decrease of 50% in the incidence of POV in the LG, the number of patients required was 100 in each group (type 1 error 5% and power 80%).

The data were compiled and subjected to statistical analysis using the Statistical Package for Social Sciences (Window version 23.0 SPSS INC, Chicago, IL, USA) package. For quantitative data, percentage, mean and standard deviations were computed. For the significance of the difference of means, *t*-test for independent samples was used and analysis of variance (ANOVA) was used to test the difference among groups. Data were summarised as proportions for categorical variables and Chi-square test was performed to judge independence of attributes. In addition to this, the percentage was calculated. The tests were applied at a 95% confidence interval, that is, *P* value less than 0.05 was taken as significant.

RESULTS

A total of 200 patients were randomised into two groups on arrival in PACU. Of these, 13 parents refused permission to participate. Thus, 187 patients were included in the final analysis and 92 children in LG and 95 children in CG were enrolled. There were no statistically significant differences between the two groups, with respect to patient characteristics, surgical procedure and anaesthesia data. POVOC scores and FLACC score in PACU were also similar in the two groups.

The episode of POV in several patients was 10 (10.87%) in LG which was significantly less as compared to POV in CG, 22 (23.16%) (*P*-value - 0.007)[Table 1]. An opioid analgesic was needed in 12 (13.04%) out of 92 patients in the LG and 34 (35.79%) out of 95 patients in the CG, whereas the total dose of opioid used per patient was

Table 1: Incidence of post-operative vomiting, opioid use and duration of stay in PACU in the two groups

Clinical variables	Liberal Group (n =92)	Control Group (n = 95)	Probability
POVOC Score (%)			
0	40.22	40.00	0.862
1	56.52	55.78	0.429
2	2.17	3.16	0.214
3	1.09	1.05	0.102
PONV (%)	10.87	23.16	0.007
Post-operative opioids			
% of patients requiring opioid	13.04	35.79	0.005
Dose (mg/kg)	0.07	0.093	0.002
PACU time (min)	65.82	77.16	0.002

PACU- post-anaesthesia care unit; POV-post-operative vomiting; POVOC-post-operative vomiting in children risk

0.070 mg/kg in LG, and 0.093 mg/kg per patient in the CG; both the differences were statistically significant with *P* value 0.005 and 0.002, respectively. The mean PACU stay was 65.82 min in LG, which was significantly shorter as compared to 77.16 min of mean PACU stay in CG (*P*-value - 0.002). There were no statistically significant differences between LG vs CG for signs of agitation or emergence delirium in PACU. There were no complications related to early oral intake.

DISCUSSION

Our study aimed to evaluate the role of early post-operative feeding on the incidence of POV and in reducing the requirement of opioids after paediatric surgery. We had a very encouraging result of a decrease in the incidence of PONV from CG to LG by 12.29% and also a reduction in post-operative opioid use by 22.75% when liberal oral intake was allowed in the post-operative period. A study published by Chauvin *et al.*^[8] also showed similar results. They had an incidence of POV 23.93% in CG and 11.40% in LG and reduction in post-operative opioid use by 68% in the LG.

Studies are suggesting that forced oral fluid intake in the post-operative period increases the incidence of PONV.^[9] However, our study shows a contrary result. Children should be encouraged to consume liquids and not forced. The discrimination of maladaptive behaviours in children <7 years remains difficult even with the use of observational scales. The causes of early post-operative maladaptive behaviours after general anaesthesia are many such as emergence delirium, thirst, pain, anxiety, and to develop a single scale for discriminating it remains

technically challenging.^[10] Somaini and colleagues reported difficulty in using different available scales to discriminate it.^[11] Thus any behavioural change should not be thought of as pain. Indiscriminate use of opioids should be avoided.

There were some limitations to the study. Firstly, we were not able to differentiate between the various causes of post-operative maladaptive behaviours. Children may refuse to drink for several reasons, including fear of strange persons, dislike of dextrose taste, or they may be feeling nauseated. Secondly, the intervention could not readily be blinded; the PACU staffs were aware of the group assignment.

We conclude that early post-operative oral fluid can be offered to children between 1–6 years of age with FLACC scores ≥ 4 before administration of opioids. This could reduce the use and dose of opioid administration without increasing any significant adverse events and it also decreases the incidence of POV and PACU stay without increasing any adverse events.

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Conflicts of interest

There are no conflicts of interest.

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