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Early oral feeding versus traditional feeding after transanal endorectal pull-through procedure in Hirschsprung's disease

Bahar Ashjaei, MD[a], Afshar Ghamari Khameneh, MD[a,b,*], Gisoo Darban Hosseini Amirkhiz, MD[a], Niloofar Nazeri, MD[b]

Abstract

Our study questioned whether the outcome of postoperative early oral feeding is different from traditional postoperative feeding in children with Hirschsprung's disease who underwent transanal endorectal pull-through.

This was an observational and comparative study. Patients were allocated into 2 groups. Age, gender, fever, surgery-related infectious, abdominal distension, bowel obstruction, need for reoperation, peritonitis, anastomosis leak, and abscess formation were assessed. IV fluids and antibiotics usage were recorded. A Chi-square test, independent sample unpaired Student *t* test and Mann–Whitney test were used. *P*-value < .05 was considered statistically significant.

Infections occurred in no patient in group 1 and 1 patient in group 2. Stenosis occurred in 3 patients in group 1 and 2 patients in group 2. Abdominal distension occurred in 4 patients in group 1 and 3 patients in group 2. Fever occurred in 2 patients in group 1 and 1 patient in group 2 within the first 24 hours and it occurred in 13 and 17 patients, respectively, within 48 hours. All patients of group 1 (n = 15) were treated with antibiotics and intravenous fluid administration; 1 patient for 24 hours, 12 patients for 48 hours, and 1 for 72 hours, respectively. All patients of group 2 (n = 18) were treated with antibiotics and intravenous fluid administration for 5 days. We noted a significant difference regarding the duration of antibiotic treatment and intravenous fluid administration after 72 hours.

This study showed that there was no difference between the outcomes of early and traditional postoperative feeding. Due to a significant difference in the antibiotics and IV fluid administration intervals between these 2 groups which cause a prolonged hospital stay and higher costs, it seems that early postoperative feeding is superior to traditional strategy.

Abbreviations: HD = Hirschsprung's disease, NPO = nil per os, TERP = transanal endorectal pull-through.

Keywords: Hirschsprung's disease, nil by mouth, pediatric, postoperative early feeding, transanal endorectal pull-through

1. Introduction

Traditionally postoperative oral feeding following abdominal surgery started after passage of flatus or bowel movement (clinical evidence for resolution of postoperative ileus).[1,2] The justification for this approach is to prevent postoperative complications and avoid putting stress on the surgical site.[3] Nonetheless, the benefits and safety of deferring oral feeding are not completely clear, especially in children. Because they cannot tolerate more than 2 to 3 days fasting and it has its own complications. Although supporting evidence for postoperative early feeding has been increasingly obtained in adults, convincing evidence for children is lacking.

The safety and benefits of early oral feeding are shown in adults[3] and few studies in children.[2] Also, early oral feeding stimulates the gastrointestinal tract and produces propulsive peristalsis which shortens the periods of postoperative ileus.[4–6] It also improves wound healing, reduces postoperative infectious complications, and hospital stay in adults.[7,8]

Usefulness and safety of early oral feeding have been shown in the postoperative management of patients who underwent upper gastrointestinal surgery.[2,9–11] The European Society of Anesthesiologists proposed early oral fluids begins in most of the pediatric patients (within 3 hours postoperation).[12] Although there is evidence from studies that traditional postoperative care may bring even worse outcome when compared to early feeding.[13–16]

Hirschsprung's disease (HD) is a developmental disorder caused by congenital absence of ganglion cells in the muscular wall of the distal colon resulting in functional constipation.[17]

Resection of the aganglionic segment and anastomosis is the basic principle for definitive surgical treatment for this disease (pull-through procedures). Various surgical techniques have been proposed for the treatment including, Swenson procedure,[18] single stage transanal endorectal pull-through (TERP),[19] Duhamel procedure,[20] Soave technique,[21] laparoscopic pull-through,[22] and so on.

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[a] Tehran University of Medical Sciences, Department of Pediatric Surgery, Tehran, [b] Department of Radiology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

[*] Correspondence: Afshar Ghamari khameneh, Khorasan Razavi, Mashhad, Shahid Rajaei Boulevard, Shahid Rajaei 37, Bahman 2 (Afraa), 504 B2, Postal code: 9188659653, Islamic Republic of Iran (e-mail: ghamarika961@mums.ac.ir).

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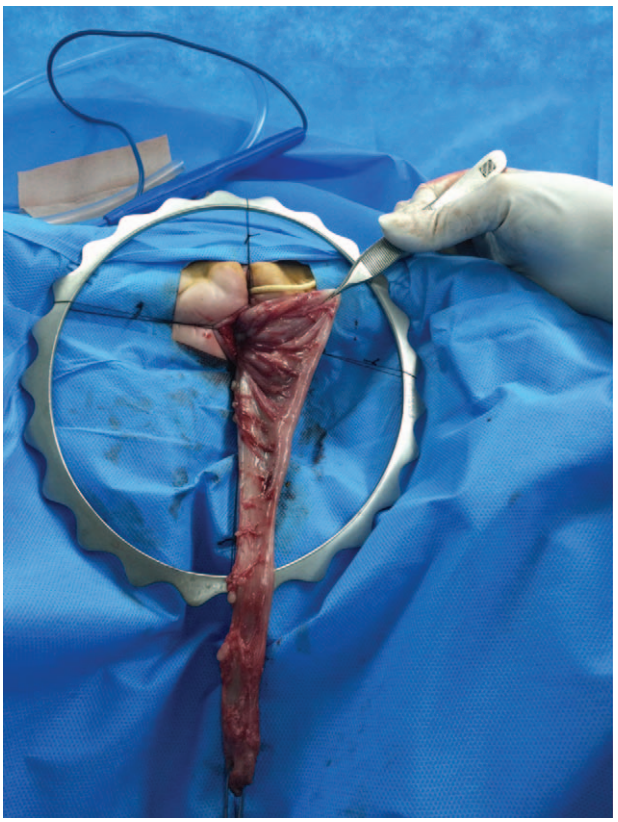

Figure 1. Transanal endorectal pull through.

Our study questioned whether the outcome of postoperative early oral feeding is different from traditional postoperative feeding in children with HD who underwent TERP.

2. Materials and methods

2.1. Study design and participants

This was an observational and comparative study conducted over a period of 1 year (March 2016 to March 2017) at the Pediatric Center of Excellence Tehran University of Medical Sciences (academic hospital).

Inclusion criteria were children aged <18 years with HD (approved by full thickness biopsy and histopathology) who had undergone TERP (Fig. 1).

Exclusion criteria were coexisting disease, syndromic patients, and patients operated with other methods.

Twenty patients excluded from the study (due to using other surgical procedure) and the data for the 33 patients were analyzed. (They satisfied the inclusion criteria.)

2.2. Grouping patients

Patients were allocated into 2 groups using a computer-generated code. Oral feeding was started in the first-day postoperation in group 1 (as soon as they could tolerate) and between days 3 to 5 in group 2. After surgery, regular visits were performed by the surgeon who was blinded to the study groups. Postoperative care was similar for all of these patients in 2 groups and modified according to the individual circumstances. Nasogastric tube was discharged as soon as possible after surgery and oral feeding started within the first-day in group 1. Group 2 remained nil per os (NPO) until days 3 to 5 and then oral feeding started. Group 1 represents early postoperative feeding and group 2 represents traditional postoperative feeding.

2.3. Feeding

Feeds were initiated with the liquid diet and if well tolerated, it was increased every 4 hours depending on appropriate feed for age and individual circumstances. In older children, liquid diet was replaced by a soft diet and if a soft diet was tolerated, regular diet started and was modified by the patient desire. Patients were discharged or transferred to the nonsurgical unit after complete toleration of per os diet.

2.4. Variables

Age, gender, fever (axillary temperature over 37.5 centigrade), surgery-related infectious (infection within 30 days post operation), abdominal distension (outward expansion beyond the normal girth of the stomach and waist), bowel obstruction (disruption of the normal movement of the products of digestion), need for reoperation, peritonitis, anastomosis leak (any extra luminal enteric contents detection), and abscess formation were assessed.

Daily monitoring of patients was done and data were collected. IV fluids and antibiotics usage were recorded.

2.5. Statistical analysis

Statistical analyses were performed by using the IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

A Chi-square test was applied to evaluate categorical variables. After conducting a normality test (Shapiro–Wilk), independent sample unpaired Student *t* test and Mann–Whitney test was used for compared means in quantitative variables.

P-value < .05 was considered statistically significant.

3. Results

Table 1 shows the patients' characteristics. Regarding the fact that the demographic variables of age (mean) and gender do not show significant differences between the 2 groups, it seems that

Table 1

Demographic features and baseline characteristics of patients.

Variables	Group 1 (n = 15)	Group 2 (n = 18)	X^2	*T*	*P*
Sex					
Male n (%)	11 (73.3)	12 (66.6)	0.172		.678
Female n (%)	4 (26.6)	6 (33.3)			
Age, yr					
Mean	6.5	9.72		−1.714	.096

Group 1 = early postoperative feeding, Group 2 = traditional postoperative feeding.

Table 2

Postoperative complications.

	Group 1 (n = 15)	Group 2 (n = 18)	X^2	P
Infections	0	1 (5.5)	0.859	.354
Stenosis	3 (20)	2 (11)	0.490	.484
Abdominal Distention	4 (27)	3 (17)	0.503	.478
Fever				
24 h	2 (13)	1 (5.5)	3.123	.210
48 h	13 (87)	17 (95)	3.123	.210
Obstruction	0	0	N/A	N/A
Peritonitis	0	0	N/A	N/A
Reoperation	0	0	N/A	N/A
Abscess	0	0	N/A	N/A
Leak	0	0	N/A	N/A

The data are presented as n (%).
Group 1 = early postoperative oral feeding, Group 2 = traditional postoperative feeding, N/A = not applicable.

the matching of the groups is appropriate and there are no confounding factors in the study in the terms of demographic variables.

Table 2 shows postoperative complications in each group. Infections occurred in no patient in group 1 and 1 patient in group 2. Stenosis occurred in 3 patients in group 1 and 2 patients in group 2. Abdominal distension occurred in 4 patients in group 1 and 3 patients in group 2. Fever occurred in 2 patients in group 1 and 1 patient in group 2 within the first 24 hours and it occurred in 13 and 17 patients, respectively, within 48 hours. No bowel obstruction, peritonitis, need for reoperation, abscess formation, or leak from anastomosis occurred in 2 groups.

We did multivariate logistic regression. *P*-value for the infection, stenosis, abdominal distension, and fever was 1, 0.59, 0.54, and 0.31, respectively.

There were no statistically significant differences between the 2 groups regarding complications.

Table 3 shows the antibiotics and IV fluids administration following TERP. All patients of group 1 (n = 15) were treated with antibiotics and intravenous fluid administration; 1 patient for 24 hours, 12 patients for 48 hours, and 1 for 72 hours, respectively. All patients of group 2 (n = 18) were treated with antibiotics and intravenous fluid administration for 5 days. We noted a significant difference regarding the duration of antibiotic treatment and intravenous fluid administration after 72 hours.

4. Discussion

According to the results of our study, there is no significant difference in the incidence of postoperative complications of patients with HD in 2 groups (early and traditional feeding) and there is no more complication due to early postoperative feeding.

Table 3

Postoperative antibiotics and IV fluids usage.

	Group 1 (n = 15)	Group 2 (n = 18)	*P*-value
24 h	15	18	1
48 h	13	18	.115
72 h	1	18	<.001
120 h	0	18	<.001

The data are represented as the numbers of patient treated with antibiotic or IV fluids administration during that period of time.
Group 1 = early postoperative feeding, Group 2 = traditional feeding.

It means that the long-term NPO maintains no effect on the reduction of complications and it just causes more hospital costs.

Infants and younger children have high metabolic demands and limited glycogen storage which make them vulnerable to prolonged fasting.[23] Furthermore, prolonged fasting can result in increased patient's discomfort, especially in children. They poorly understand the justification for NPO order.[23,24]

In animals, fasting reduced the collagen contents in anastomotic tissues and disrupt healing. It also has been shown that feeding confronts mucosal atrophy and makes higher anastomotic strength.[25–28]

Fever was the most frequent complication in 2 groups of our study but we showed that infectious complications do not have any significant difference in early and traditional feeding. It may be because of chemical components stimulation such as cytokine during surgery and inflammation and it does not represent an infectious process. It is also shown in the previous studies that early postoperative feeding may provide gut integrity and prevent bacterial and endotoxin translocation.[29–31] These studies claimed that early feeding decreases the infectious complications but we could not show this benefit in our study.

The traditional belief is "nil by mouth" in postoperative period prevent abdominal distention and protect intestinal surgical sites[13,32] but in our study, early feeding did not induce these complications.

The randomized clinical trial, considering patients following abdominal emergency surgery, support our findings and showed that the early oral feeding does not increase the complications rate and it is safe for them.[33]

Our study showed that antibiotic and IV fluid usage makes a significant difference between early and traditional postoperative feeding which mean longer hospital staying and more costs in traditional feeding. This outcome is compatible with a few studies that were done in the pediatric population. They also showed early enteral feeding in children following anastomosis in intestine and colon is safe and reduced hospital stay and stimulated bowel movements.[2,34–36]

On the other hand, no major complication including bowel obstruction, peritonitis, abscess formation, or leak from anastomosis occurred in 2 groups of our study. None of the patients needed reoperation. The absence of these outcomes also confirms the safety of early oral feeding after the operation.

Several limitations in our study should be discussed. Our study represents a retrospective and none randomized clinical trial. The retrospective study design is hampered by a number of potential biases. Also a relatively small sample size and single hospital design were other limitations. All of our children underwent surgery by 1 surgeon. Further large multicenter studies are required to confirm our findings; however, the result of this study provide valuable insight into feeding after TERP procedure.

In conclusion, this study showed that there was no difference between outcomes of early and traditional postoperative feeding. Due to a significant difference in the antibiotics and IV fluid administration intervals between these 2 groups which cause a prolonged hospital stay and higher costs. It seems that early postoperative feeding is superior to traditional strategy.

Author contributions

Conceptualization: Bahar Ashjaei, Afshar Ghamari Khameneh.
Data curation: Afshar Ghamari Khameneh.
Formal analysis: Gisoo Darban Hosseini Amirkhiz.
Investigation: Afshar Ghamari Khameneh.

Methodology: Afshar Ghamari Khameneh.
Project administration: Afshar Ghamari Khameneh.
Software: Afshar Ghamari Khameneh.
Supervision: Afshar Ghamari Khameneh.
Validation: Afshar Ghamari Khameneh.
Visualization: Bahar Ashjaei.
Writing – original draft: Afshar Ghamari Khameneh.
Writing – review and editing: Afshar Ghamari Khameneh, Niloofar Nazeri.

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