

Evaluation of The Outcomes of Duhamel Procedure to Treat Megarectum In Children with Functional Constipation

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Abstract

Introduction: Functional constipation (FC) is a common problem in childhood. It is estimated that 0.7 to30 percent of children suffer from CF all over the world. However, if the conservative treatments had no effects on constipation or symptoms are lasted for several years' surgery could be suggested. Unfortunately, there is no international standard definition of what failure of medical treatment actually means and to the surgeons and gastrointestinal (GI) physicians, this may not be the same in different centers.

Materials and Methods: This is a descriptive-analytical study which was done in Isfahan University of Medical Science, Isfahan, Iran, 2020. The aim was evaluation of outcomes of Duhamel operation in treating the children with megarectum suffering FC who admitted to Imam Hossein Hospital. Data were collected through a 3-part checklist. The first part was about demographic data such as age, gender, age of operation, and use of drugs before and after operation. Part 2 was Rintala-hall scoring system and part 3 was PICS for constipation.

Results: In this study 40 children with FC suffering megarectum were studied and 38.1 percent (15) of children were boys. The mean± SD age of operation was 5.85± 2.92 years. The mean± SD score of incontinence were 10.85± 2.26 and 14.00± 2.38 before and after Duhamel, respectively. The mean score of constipation was 18.20± 3.00 before and 20.50± 2.39 after Duhamel. Paired t test showed that the mean score of incontinence and constipation were different significantly in 3, 6, 12 months after surgery ($p < 0.05$). So Duhamel surgery can be concerned good method to treat megarectum due to FC.

Keywords

- Functional constipation
- Duhamel procedure
- Megarectum
- constipation

Conclusion: Our findings indicated that Duhamel operation could help relieving the sign and symptoms of constipation and fecal incontinence in FC children.

Introduction

Functional constipation (FC) is a common problem in childhood. It is estimated that 0.7 to 30 percent of children suffer from CF all over the world with a mean female/male ratio of 2.1:1.¹ Patients with FC experience

severe and long-lasting symptoms such as abdominal pain, distension, early satiety, and soiling. In most cases, a physiologic cause for constipation is not found.²

FC leads to psychological problems including aggression, anxiety, depression and cause emotional reactivity. Moreover, it could disturb the social performance and reduce quality of life of whole family.³

More than half of children would treat with conservative methods including cleansing enemas, laxatives, diet, and physiotherapy. On the other hand, if constipation progresses, it can lead to fecal retention and rectal/sigmoid distension, megarectum which impairs normal colorectal motility.⁴⁻

⁷ Megarectum is one of the complications in long-lasting FC. It causes hypomotility and increased sensation threshold. Rectum dilatation happens and leads to fecal incontinence.⁸⁻¹⁰

However, if the conservative treatments had no effects on constipation⁴⁻⁷ or symptoms persisted for several years, surgery could be suggested.¹ Unfortunately, there is no international standard definition of what failure of medical treatment actually means and to the surgeons and gastrointestinal (GI) physicians, this may not be the same in different centers.¹¹

The previous studies introduced some surgical procedures in children such as proctocolectomy, Duhamel operation, soave, some laparoscopic approaches, longitudinal proctoplasty, and trans-anal

resection of rectum. Despite these methods, there is no generally accepted method to treat megarectum in children.¹²⁻¹³

To our knowledge, a study which describes the result of Duhamel procedure in children with FC is not available. In this regard, this study aimed to evaluate the outcomes of Duhamel procedure in treating the megarectum in children with functional constipation.

Materials and Methods

This is a descriptive-analytical study which was done in Isfahan University of Medical Science, Isfahan, Iran, 2020. The aim was evaluation of outcomes of Duhamel operation in treating the children with megarectum suffering FC who admitted to Imam Hossein Hospital. The study was approved by ethics committee of Isfahan University of Medical Science (ethic number: IR.mdui.med.rec.1400.065). The inclusion criteria were age between 3-17 years, suffering FC which did not respond to conservative therapy or long-lasting symptoms of FC, presence of megarectum, presence of Recto-Anal Inhibitory Reflex in colonic manometry, and presence of ganglion cells in the biopsy of the rectum.

The children with anorectal malformation, Hirschsprung disease, and unwillingness of

parents in participating were excluded. The study goals and the procedure were described to the patients and they assured about voluntary participation. The informed consent was completed by the participants.

Sample size was set at 32, using $z=1.96$, $d=0.1$ and based on Levitt et al (8) $p=11\%$. however, considering a possible attrition rate of 20%, the sample size was set 40.

$$n = \frac{z^2 \cdot P(1-P)}{d^2}$$

Data were collected through a checklist composing of three parts. The first part was about demographic data such as age, gender, age of operation, and use of drugs before and after operation. Part 2 was Rintala-hall scoring system¹⁴ and part 3 was PICS for constipation. Rintala-hall is a questionnaire with 7 items. Six of them score 0 to 3 and 1 score 0 to 2. Higher score means better continence. PICS is a checklist with 10 questions with 3 point like RT scale. The total score is 29 and higher score means better defecation.

Forty children with FC who had eligible criteria were included. The demographic data and the constipation/incontinence score were completed. The patients

special surgeon and assistant. The checklist was completed 3, 6, and 12 months after surgery by researcher.

In the Duhamel procedure, dissection outside the rectum is confined to the retro-rectal space, and the ganglionic rectum is anastomosed, using a stapler.

Results will be reported by percent, frequency, and mean \pm SD. To compare the results of pre- and post-procedure, the paired t test or Wilcoxon will be applied for normal distribution and non-parametric data, respectively. The P-value of less than 0.05 was considered significant.

Result

In this study 40 children with FC suffering megarectum were studied and 38.1 percent¹⁵ of children were boys. The mean \pm SD age of operation was 5.85 ± 2.92 years. The mean \pm SD score of incontinence were 10.85 ± 2.26 and 14.00 ± 2.38 before and after Duhamel, respectively. The mean score of constipation was 18.20 ± 3.00 before and 20.50 ± 2.39 after Duhamel. Paired t test showed that the mean score of incontinence and constipation were different significantly in 3, 6, 12 months after surgery ($p < 0.05$). In this study there was no severe post-operative complication. Two (5%) patients showed urinary

retention that underwent treating with bethanechol. Surgery site infection and anastomosis leakage were not reported. The mean scores of constipations and

incontinence is shown in **Table 1**. Another finding of this study was significant reduction of laxatives after surgery ($p=0.001$).

Table 1: the mean \pm SD score of incontinence and constipation

	Incontinence		Constipation	
	mean \pm SD	P value	mean \pm SD	P value
Pre Duhamel	10.85 \pm 3.26	0.001	18.20 \pm 3.00	0.01
3 months after	14.00 \pm 3.38	0.001	20.50 \pm 2.39	0.01
6 months after	14.61 \pm 3.62	0.001	20.38 \pm 2.18	0.02
12 months after	14.85 \pm 2.26	0.001	20.25 \pm 2.14	0.02

Discussion

The present study showed that Duhamel operation could improve the scores of incontinence and constipation in children with megacolon who suffer from FC. In the other hand, the number of laxatives decreased after the Duhamel procedure. Our results are consistent with the findings of Stabile et al.¹⁵ Their study was done in

the patients above 20 years old. The signs of constipation were improved in 50 percent of patients.

In tertiary care centers, 50% of children referred to a pediatric gastroenterologist are still symptomatic after 5 years, and 20% still struggle with symptoms after 10 years.¹ These patients are typically the ones

referred to surgeons and they may eventually require more invasive alternative therapeutic interventions. It is estimated that approximately 10% of those constipated children who are referred to a pediatric surgeon will need an operation.²⁻¹¹

The choice of what type of surgery and when to perform it should be based on a comprehensive evaluation of the anorectal and colorectal anatomy and physiology, although this evaluation may differ among centers. This means that patients may be referred at different stages of the disease, depending on their setting, and thus the response and postoperative outcomes may be different when deciding on surgical interventions.¹¹

Based on the literature, the variations on technique do not follow any specific rule on dose of laxatives, length of the megarectosigmoid, or manometry findings to perform the surgery. Even the same authors report different techniques for the same type of patients and report that their decisions on whether to do a colonic resection are based only on the contrast enema findings, without guidance by any motility - testing.¹⁶⁻¹⁷

The literature provides information on several surgical procedures with segmental resection including proctocolectomy with reservoir and ileoanal anastomosis, Duhamel's operation, trans-anal Soave's and Swenson's operation, Soave-Georgeson laparoscopic surgery, and laparoscopic/open sigmoidectomy with and without antegrade colonic enema (ACE).¹⁶⁻¹⁹ In this regard, Simians et al in their systematic review showed that partial colon resection (open or laparoscopic) with colocolic anastomosis is the most common intervention in the pediatric population.²⁰ In the study of Kirgizov et al, Soave pull-through was compared to laparoscopic low anterior resection with endorectal end to end stapled anastomosis. The distal rectal ampulla was resected in the Soave approach but it was remained in the other approach. They show that soiling was significantly common in Soave group. They explained that the level of colon resection would be determined better in laparoscopic video assisted approach. So, patients showed better functional results.²¹ Torre et al showed that trans-anal proximal rectosigmoidectomy, involving preservation of a 5 centimeters rectal reservoir allowed patients to reduce the amount of laxative dosage and all of

patients had daily voluntary bowel movements and no fecal accidents.²²

Levitt et al (2003) resected the sigmoid colon with a colorectal anastomosis at the level of the low peritoneal reflection.²³

This procedure allows reduction of the laxative dosage. However, they believed that because of remaining the problematic mega-rectum, the risk of fecal impaction with pseudo-fecal incontinence and the necessity of rectal enemas is always present.

Primary sigmoidectomy and appendicostomy are other procedures.¹⁶⁻¹⁹

They involve a sigmoidectomy with the creation of an antegrade continent enema procedure in the same operation. Gasior et al reported a series of 31 children who underwent a combination of segmental resection and ACE surgery as the definitive treatment.¹⁹ Levitt et al reported 60% of 15 children who underwent trans-anal rectosigmoid resection to be clean on follow up.⁸

Moreover, some patients undergoing sigmoidectomy suffer pain localized on the left side or lower abdomen after resection. Also, the cause of the left abdominal pain is that a nondilated colon is anastomosed to the megarectum. This anastomosis creates a sudden change between two intestinal

segments with different peristalsis.⁸

Complete rectal and sigmoid resection with coloanal anastomosis resolved constipation and the risk of fecal impaction. However, these

patients suffered true fecal incontinence after the surgery.⁸⁻²⁴ The causes could be lack of a fecal reservoir, plus a more active bowel, compared with peristalsis of the megarectosigmoid, anastomosed to the anal canal.

In Tamura et al three different types of resections are compared: pan-proctocolectomy with ileoanal pouch anastomosis, total colectomy with ileorectal anastomosis, and segmental resections and anastomosis (SR). Their results indicated no significant difference among the 3 procedures.²⁵

In the last few years, colonic resection based on motility findings on CMAN is increasing, as this manometric tool has been proposed as a good guide to predict surgical interventions²⁶ As mentioned earlier, it has been shown that the segments with dysmotility are potentially reversible and can improve after decompression of the colon (with an ileostomy/colostomy, e.g.) or after successful antegrade irrigation.¹⁸⁻²⁷

We had some limitations in this study including low number children with

megarectum because of low prevalence and short time for study. It is suggested to do another study with more samples and longer duration of follow up.

Conclusion

Our findings indicated that Duhamel operation could help relieve the signs and symptoms of constipation and fecal incontinence in FC children.

Ethical Consideration

This study received ethical code from the ethical committee of Isfahan university of medical sciences (IR.MUI.MED.REC.1400.065).

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Conflict of interests

There is no conflict of interest

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