

## ORIGINAL ARTICLE

# TRANS-RECTAL ABDOMINALLY ASSISTED PULL THROUGH OPERATION; A NEW MODIFICATION OF SOAVE'S OPERATION FOR TREATMENT OF IDIOPATHIC MEGARECTUM AND MEGACOLON

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### Abstract

**Aim:** Idiopathic megarectum and/or megacolon with slow-transit constipation refractory to medical management is an indication for surgery. Non of the surgical options available proved satisfactory. Trans-Rectal Abdominally Assisted Pull Through Operation, is a new modification of the Soave's operation to avoid deep pelvic dissection, and injury of the short vasa recta in adults.

**Methods:** Thirty patients were included in the study with the colonic transit test greater than 96 hours, with the barium enema showing megarectum and/or mega- left side colon, and anal manometry was shown to be normal. Patients diagnosed with chronic idiopathic constipation according to the scoring system reported by Altamore et al.<sup>(15)</sup> which was performed for all patients preoperative, one month after stoma closure, and one year postoperative. Anal myectomy was done for all patients, 25 patients did not improve and required trans-rectal abdominally assisted pull through operation.

**Results:** Patients who were operated upon by abdominally assisted pull through operation showed significant postoperative improvement of their constipation scores after three months, and one year respectively.

**Conclusion:** Trans-rectal abdominally assisted pull through operation is a promising new technique in patients with medically resistant mega-rectum showing good short term results but still long term form follow up awaited.

**Keywords:** Chronic constipation, Slow transit, Myectomy.

### INTRODUCTION

Constipation is among the most common gastrointestinal disorders. It is so prevalent that it is considered endemic in the elderly population.<sup>(1)</sup> Despite its significant impact, the etiology of constipation remains largely unknown. The variety of symptoms and risk factors associated with constipation suggest that its

etiology is likely to be multi-factorial.<sup>(2)</sup> A very small number of patients with chronic constipation are candidates for surgical intervention.<sup>(3)</sup> Slow-transit constipation refractory to medical management is one indication for surgery.<sup>(4)</sup>

Some patients with slow-transit intractable constipation have a markedly dilated rectum and/or colon. This

condition, also called idiopathic megarectum and/or megacolon, affects males and females in equal proportion. Various segments of the large bowel may become dilated, but the process usually begins in the rectum. The etiology of this condition is still unknown. It has been suggested that rectal dilatation may result from childhood behavioral defecatory problems. Although the muscle layers of the dilated segment and their intrinsic and extrinsic innervation appear grossly normal, subtle neural and muscular abnormalities have been reported.<sup>(5,6)</sup> Meier-Ruge examined surgical specimens obtained from patients with idiopathic megacolon. In all specimens, she observed a lack of connective tissue in the muscularis propria. Normally, this connective tissue, consisting of collagen Type III, enables contraction and relaxation of the circular and longitudinal muscle layers. The absence of this tissue affects normal peristalsis, resulting in stasis of fecal material and dilatation of the large bowel, despite a normal enteric nervous system.<sup>(7)</sup>

The diagnosis of idiopathic megabowel can only be made after exclusion of recognized pathologies such as Hirschsprung's disease, myotonic dystrophy, Chagas' disease, and systemic sclerosis. Digital examination almost invariably shows that the rectum is loaded.<sup>(8)</sup> Radiographic findings show that almost all patients have rectal dilatation down to the pelvic floor, with no distal narrow segment. Patients with idiopathic megarectum have normal small bowel transit and abnormal colonic transit, with delay occurring predominantly in the dilated segment.<sup>(9)</sup>

The initial management of patients with idiopathic megabowel should be medical. The aim of treatment is to prevent fecal impaction, either by inducing a semiliquid stool using osmotic laxatives or by regular use of enemas or suppositories. In some patients, however, manual disimpaction is inevitable. This is not without risk as it may damage anal sphincters. This damage further affects continence and compromises the outcome of operative treatment.<sup>(10)</sup>

None of the surgical options available to treat idiopathic constipation with megarectum or megacolon proved satisfactory. Anorectal myectomy did not offer good long-term results.<sup>(11)</sup> The role of rectal excision using Duhamel technique is controversial because of the reported high complication rates.<sup>(12)</sup> Other procedures such as the Swenson operation and the Soave coloanal anastomosis are anecdotal. Another option for a grossly dilated colon is a restorative proctocolectomy with an ileoanal pouch.<sup>(13,14)</sup>

Trans-Rectal Abdominally Assisted Pull Through Operation, is a new modification of the Soave operation to avoid deep pelvic dissection, and injury of the short vasa recta in adults.

## PATIENTS AND METHODS

This study was conducted on 30 patients, 17 males

(57%) and 13 females (43%). All patients were suffering from chronic idiopathic constipation. They were admitted to the department of surgery, unit of colorectal surgery in the Main University Hospital, Alexandria University. Patients diagnosed with chronic idiopathic constipation according to the scoring system reported by Altamore et al.<sup>(15)</sup> which was performed for all patients preoperative, one month after stoma closure, and one year postoperative.

All patients had a history of failure of medical treatment with a median period of constipation  $4.8 \pm 2.74$  (range 2-2) years. All cases had a careful clinical evaluation containing digital rectal examination and psychological consultation. All patients were evaluated via laboratory tests, such as thyroid-function test, serum calcium, glucose level, and complete blood count. Colonoscopy was done for each patient to exclude organic lesion.

The slow transit constipation was established with the diagnostic workup including: colonic transit test, anal manometry, and barium enema. Positive colonic transit test was defined as any patient who had greater than 20% of radio-opaque markers still present in the colorectum after 96 hours. Anal manometry was conducted to assure normal sphincteric function of the anal canal. Barium enema was done to exclude mechanical obstruction accounted for the constipation and also to diagnose cases with mega-rectum and megacolon. A rectal diameter of 6.5 cm at the pelvic rim on lateral view defines megarectum.<sup>(16)</sup>

Eligible patients were those in complete accord with the colonic transit test greater than 96 hrs, with the barium enema showing megarectum and/or mega- left side colon, and anal manometry was shown to be normal.

Between January 2006, and March 2008, 224 patients with chronic idiopathic constipation were admitted to colorectal unit of these 194 patients were excluded from the current study. Exclusion criteria included: large bowel organic disease (tumors, solitary rectal ulcer syndrome, diverticulosis and malignant colorectal stricture), anorectal organic diseases (mechanical causes include fissures, anal stenosis due to surgery, Crohn's disease, and radiation), anorectal outlet obstruction (rectocele, enterocele, rectal prolapse either occult or evident, and paradoxical contraction of the puborectalis muscle), psychological disorders, patients receiving medications (opiates, anti-cholinergics, anti-histaminics, anti-depressants), endocrinal disorders (hypothyroidism, hyperparathyroidism, glucagonomas, and panhypopituitarism) and neurological disorders (parkinsonism, and demyelinating diseases). Patients with barium enema showing total mega colon were excluded also from the study.

A signed informed consent was provided by all patients before each procedure. All of the operations were performed by the same surgical team.

**Surgical procedure:** Surgical biopsy by anorectal

myectomy<sup>(17)</sup> was done for the 30 patients, and after one month rescored of constipation was done using the same scoring system. Patients who did not show improvement after anorectal myectomy (25 patients) were subjected to Trans-rectal abdominally assisted colonic pull through; under general anesthesia the patient was put in lithotomy position with head slightly down. Four stay sutures were inserted at sites two, five, seven, and ten o'clock to evert the anal cushions in an outward fashion (Fig. 1).

Using diathermy a circumferential incision in the rectal mucosa was done after injection of diluted adrenaline solution 1/300000 mg sub-mucosally all around the rectum. Care was taken to avoid missing any islet of mucosa from cutting, and also not to go deeper than the sub-mucosa. It was found that it is easier not to begin dissection in the posterior aspect of the anal canal which is the site of previous myectomy, if dissection is started laterally on both sides first then we move to dissect posteriorly with great care not to miss the plane, the dissection will proceed in an easy way without complications. Once the area of previous myectomy is passed, the dissection becomes easier.

A sleeve of mucosa was dissected free from the muscle wall of the rectum to reach at least 35 cm from the verge. The beginning the dissection process was a bit difficult and may incline either to the mucosal side, or the muscular side, however, once the proper plane was established the process becomes easy and bloodless. The distance was insisted to pass the dilated rectum, the dilated sigmoid up to the area where the sigmoid taking blood supply from the higher sigmoid arteries (Figs. 2,3).

Transverse horizontal muscle cutting incision in the left iliac fossa was done through which the sigmoid was de-vascularised, and a circumferential cut of the muscle wall at the superior end of the mucosal dissection was done ( identified by the presence of a circumferential bruise at that site to enable the pull through process. The excess colon was transected and the colon was sutured to the everted inferior rectal mucosa in a

circumferential fashion (Figs. 4-6). A diverting stoma (ileostomy or transverse colostomy) was done to protect the suture line and closed after two months.

## RESULTS

After exclusion of the five cases who improved after myectomy, twenty five patients (14 males and 11 females) with a mean age of  $16.32 \pm 6.421$  years were included in current the study, the mean period of patients follow up was  $14.45 \pm 8.55$  months. Among the patients, 2 patients (8%) had constipation for more than 10 years, 9 patients (36%) for more than 5 years and 14 patients (56%) less than 5 years. The colon transit revealed delay in all cases, 12 patients (48%) in the left colon and 13 patients (52%) in the sigmoid and rectum.

All patients were operated upon with anorectal myectomy and the constipation score was reported one month after. It showed no improvement and further surgery was required in the form of endorectal pull through. The mean operative time was  $3.62 \pm 0.43$  (range 2.75 - 4.15) hours. The mean post operative hospital stay was  $5.43 \pm 1.38$  (range 4-7) days. All patients returned back to work after a mean period of  $16.17 \pm 2.48$  days (range 14-21) days. After two months from the operation, all patients had their stoma closed. The constipation scoring system of Altamore et al.<sup>(15)</sup> was rescored one month after closure of the stoma (three months post operative) and one year later. All patients showed significant improvement of their constipation scores three months, and one year postoperatively Table 1. Anal incontinence was evaluated using a Wexner scale<sup>(18)</sup> 3 and 6 months after the procedure and revealed normal findings.

As regard the post operative complications, in the early post operative period, two patients (8%) had mild abdominal wound infection in the form of erythema around the edge of the wound that was treated with conservative local measures. One patient (4%) had incisional hernia at the site of the stoma and required mesh repair after six months. Three patients (12%) had mild anal stenosis and required repeated anal dilatation.

**Table 1. Constipation scores before and after surgery.**

Score variables	Pre- operative	Early post-operative (after three months)	Late post-operative (after one year)
<b>Spontaneous bowel evacuation</b>	2.28 ± 0.81	0.60 ± 0.59	0.89±0.61
Z		4.01	3.21
P		0.0001*	0.001*
<b>Use of laxatives</b>	2.77 ± 0.62	0.51 ± 0.43	0.92±0.66
Z		4.11	3.46
P		0.0001*	0.001*
<b>Use of enema</b>	2.66 ± 0.53	0.33 ± 0.41	0.71±0.58
Z		4.21	2.98
P		0.0001*	0.005*
<b>Abdominal pain</b>	2.71 ± 0.73	0.69 ± 0.47	0.98±0.61

WSR test: Wilcoxon signed ranks test.

\*significant.



**Fig 1. stay sutures in the abdominally assisted endorectal pull through.**



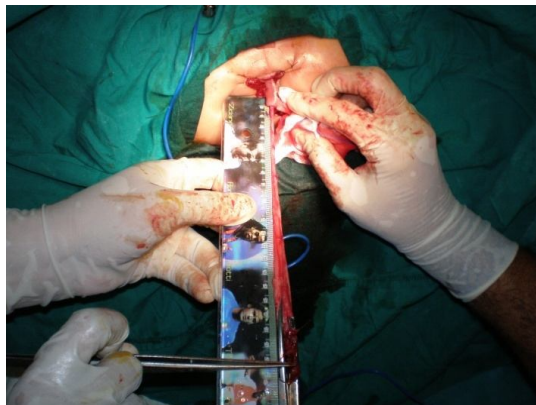
**Fig 4. The pulled through colon. Notice the transverse incision in the left iliac fossa through which abdominal assistance of dissection was done.**



**Fig 2. Mucosal sleeve dissection from the muscle wall.**



**Fig 5. Colon is sutured to the everted inferior rectal mucosa in a circumferential fashion.**



**Fig 3. Length of the mucosal sleeve.**



**Fig 6. Excised segment.**

## DISCUSSION

One principle goal of surgery in patients with constipation is to increase the number of bowel movements. Whether this translates into a successful treatment is controversial.<sup>(19)</sup> Surgeons must weigh the

complications and chance of persistent symptoms against relief of constipation and improvement in quality of life. Patient satisfaction, although often reported as equivalent to success, is not an accurate measure of surgical outcome because the patient cannot choose to return to the preoperative state. Satisfaction

rates are also likely inflated because patients usually do not want to disappoint their surgeon and often want to look at the bright side after choosing surgery.<sup>(20)</sup> In this study we used the constipation score proposed by Altmore to evaluate the results of our procedure.

A systematic review of surgical options for idiopathic megarectum and megacolon (IMB) to evaluate the published outcome data of surgical procedures for IMB in adults was done by Gladman et al<sup>(21)</sup> in 2005, a total of 27 suitable studies were identified, all evidence was low quality obtained from case series, and there were no comparative studies. These studies involved small numbers of patients (median 12 (range 3-50)), without long-term follow-up (median 3 years (range 5-7)). Inclusion of subjects, methods of data acquisition, and reporting of outcomes were extremely variable. Subtotal colectomy was successful in 71.1 % but was associated with significant morbidity related to bowel obstruction (14.5%).<sup>(22-24)</sup> Segmental resection was successful in 48.4%, and recurrent symptoms were common (23.8%).<sup>(25)</sup> Rectal procedures achieved a successful outcome in 71% to 87% of patients. Proctectomy, Duhamel procedure, and pull-through procedures were associated with significant mortality (3%-25%) and morbidity (6%-29%).<sup>(26,27)</sup> Vertical reduction rectoplasty (VRR) offered promising short-term success (83%).<sup>(28)</sup> Pelvic-floor procedures were associated with poor outcomes. A stoma provided a safe alternative but was only effective in 65% of cases.

They concluded that data of surgery for IMB must be interpreted with extreme caution due to limitations of included studies. Recommendations based on firm evidence cannot be given. Restorative proctocolectomy the most suitable in those with dilatation of the colon and rectum, and VRR in those patients with dilatation confined to the rectum. Appropriately designed studies are required to make valid comparisons of the different procedures available.

As one can conclude from the previously described data, nothing can be so much an ideal procedure for patients with dilated large bowel if a minor, complications free procedure like the anorectal myectomy failed to give a satisfactory result. Soave operation whether done as classically described starting with a laparotomy or as recently described as a trans-rectal pull through operation looks the most suitable procedure for those patients. This is because first, it avoids deep pelvic dissection with its accompanied hazards specially for young patients suffering a benign disorder, secondly, it enables excision of most of the dilated bowel which are considered abnormal even if the cause of dilatation was distally non relaxing segment, thirdly, it ensures anastomosing seemingly normal bowel to the anal canal which should be at that time able to relax for the coming motion, and lastly it avoids or minimize abdominal exploration and bowel disturbance specially if the trans-rectal pull through procedure is adopted. Post operative complications that should be put in mind during planning surgery for

constipation was (24%) in our study but the nature of these complications as wound infection and anal stenosis were easily treated conservatively. Only one patient required another operation to treat incisional hernia.

In the original descriptions of Soave's operation, the submucosal dissection was extended above the peritoneal reflection or about 5–6 cms.<sup>(29,30)</sup> However, Somme and Langer<sup>(31)</sup> in 2008 reported having some patients in whom the long muscular cuff "rolled down" and created a tight constricting band around the pulled-through bowel, despite longitudinal division of the cuff prior to the pull-through. As they have gained experience and confidence with the operation, they have increasingly shortened the muscular cuff to approximately 1–2 cm. Excellent results using a short cuff have been reported also by Rintala.<sup>(32)</sup> But in adults, this will be associated with deep pelvic dissection with its hazards. Deep pelvic dissection is completely avoided with our new technique with its all sexual and sphincteric complications.

Despite the trend among pediatric surgeons to avoid routine colostomies, there are still some situations in which a colostomy or ileostomy is indicated.<sup>(31)</sup> The trans-rectal approach can be used for reconstruction in a child with a pre-existing colostomy without the need for a full laparotomy.

In our study, we did the protection but did not try omitting this step. The fear of the described muscular cuff abscess was the main motive to apply the protecting stoma. We did not come across any muscular cuff sepsis in any of the patients. The main drawback of the transverse colostomy is prolapse that usually occurs in the distal segment that occurred in 3 out of 11 patients. However, this was not reported in the results since closure of the colostomy after one and half to two months cures the condition and this caused no problem during closure of the colostomy as well.

The trans-rectal abdominally assisted pull through operation was really the result of application of the above mentioned advantages of the Soave's principle of the trans-rectal application with a trial to make things easier by prolonging the submucosal dissection to reach almost the mid-sigmoid area. This is done to avoid tedious ligation of the short vessels feeding the distal part of the sigmoid and the upper rectum (vasa recta). Moreover, it avoid the possible rolling down of the muscle cuff around the pulled through colon due to the very long muscular cuff which cannot roll down or up due to the presence of intact pelvic structures around.

We can conclude that trans-rectal abdominally assisted pull through operation is a promising new technique in patients with medically resistant mega-rectum showing good short term results but still long term form follow up awaited, also larger series are required to ensure efficiency of the new technique.

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