

## Hirschsprung's Disease: Modified Soave Technique "Boley's Technique

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### Abstract

#### **Objectives:-**

To study the presentation of Hirschsprung's disease, evaluation of surgical management of Hirschsprung's disease by modified soave technique "Boley's technique " that includes one stage, two stages and three stages procedure in our pediatric surgical center.

#### **Designs:-**

A prospective study of 64 cases.

#### **Results:-**

Sixty four patients ,the male to female ratio was 3.3:1. Seventy five percent presented with history of delay passing meconium, 73.5% has history of constipation, with 7.3% encopresis, with 10% fecal impaction, with 6.25% fecal masses and 10% presented with neonatal intestinal obstruction.

Those patients had been managed as follows

Group I: one stage modified soave pull through (Boley's) nineteen patients. Nine patients (47.3%) had smooth recovery, 2 patients (10%) developed fecal fistula, four patients (20%) had recurrent enterocolitias, one patient (5%) developed retraction and revision of the operation.

Group II: two stages modified soave technique. Eight patients

Four patients had been managed with pull through and colostomy followed by closure of colostomy. Four patients had been managed by colostomy followed later by pull through and closure of colostomy, all had smooth recovery as they are well selected.

Group III: Three stages modified soave technique. Thirty one patients.

Nineteen patients (61.21%) had smooth recovery, Three patients (9.4%) had recurrent enterocolitias, Three patients (9.4%) had adhesive intestinal obstruction ,two patients had retraction of ganglionic colon .Four patients disappeared during the period of study ,two patient died during the study.

#### **Conclusion:-**

Modified soave technique "Boley's technique "is a good procedure in the management of Hirschsprung s disease. It provides

Good continence.

1. Less leak and peritonitis.
2. No stricture or stenosis.

3. It's easily learned and performed by joiners surgeons.
4. Three stages technique is the safest way to avoid major complications.

**Keywords:** Hirschsprung s disease, Boley's technique

## Introduction

Congenital megacolon, or Hirschsprung's disease, is one of the classical problems in pediatric surgical practice .It enters into the differential diagnosis of intestinal obstruction in newborn infants as well as the perplexing problem of an older child with recalcitrant constipation.The Incidence of Hirschsprung's disease ranges from 1 in 4400 to 1 in 7000 live births.<sup>1</sup>The male to female ratio in patients with classic Hirschsprung's disease is generally reported as 4:1 in favors of males.<sup>2</sup> In long segment disease, the ratio approaches 1:1 and may actually become reversed.<sup>3</sup>The incidence of Hirschsprung's disease increases in familial cases to approximately 6%. *Bandar et al*<sup>4</sup> calculated the risk for transmission of Hirschsprung's disease to relatives. In his study brothers of patient with short segment Hirschsprung's disease have a higher risk 4% than sister 1%. In long segment Hirschsprung's disease brothers and sons of affected female have the greatest risk for being affected (24% and 29% respectively). Associated malformations are presented in 11% to 30% of the children with Hirschsprung's disease. *Swenson* and *Bill* performed the first resection of an aganglionic segment in 1948 since then 3 other basic techniques have been developed.<sup>5</sup>

## Swenson Techniques

The patient is positioned to provide surgical access to the abdomen and perineum at the same time. The proximal colon and mesentery are dissected to achieve a sufficient length for reconstruction. The peritoneal reflection at the rectosigmoid is then incised and the deep pelvic dissection commenced. The dissection is performed close to the rectal wall to protect the pelvic autonomic nerve system. Division of rectosigmoid is accomplished by a stapling device at a convenient level. The rectosigmoidal stump then inverted through the anus .The mucocautaneous line should be clearly visible. An oblique incision is made through the anterior half of prolapsed rectum and a clamp is inserted into the pelvis to grasp and pull the proximal ganglionic segment through the anus then an extra anal anastomosis is performed with interrupted suture material.<sup>5</sup>

## Duhamel – Procedure

The principle of this procedure is preservation of the internal anal sphincter; opening of the retrorectal space only, followed by retrorectal pull through of the ganglionic part of the colon; and elimination of colorectal septum. Today the retrocolic anastomosis is most often performed using a stapling device.<sup>29</sup>

## Anterior Resection According to Rehbein

*Rehbein* technique differs from *Swensons* procedure in that, the anastomosis is a low, anterior colorectal anastomosis. The pelvirectal dissection is completed leaving the aganglionic terminal 2 to 3cm of the rectum in infants and 4 to5 cm in older children with vigorous sphincter dilation with Hegars bougies. The anastomosis may be performed using a circular end to end anastomosis stapling instrument introduced through the anus or by direct suture deep in the pelvis.<sup>6</sup>

## Soave Procedure "Modified Soave"

The *Soave* procedure is an ingenious and appealing operation, because the aganglionic rectosigmoid is removed by an endorectal dissection, theoretically minimizing the risk of the pelvic injury associated with the *Swenson* procedure.The normally innervated colon is passed though anorectosigmoid muscular cuff. There is no aganglionic segment of rectum left, such as that, which occurs with the

*Duhamel* procedure. This operation was originally performed without colostomy, leaving a portion of the pulled through colon protruding well beyond the anal skin margin. This was then excised at a second operation two weeks later. This two-stage procedure was modified by *Boley* into a one-stage operation by effecting a primary anastomosis to the anal verge. The endorectal dissection is initiated usually 1 or 2 cm above the peritoneal reflection. It is recommended that the endorectal dissection be carried down to approximately 1 or 2 cm above the dentate line in order to preserve the sensitive anal mucosa. 30

### Laparoscopic Pull Through Techniques

Advancements in minimally invasive surgery and instrumentation have resulted in pull through procedures being performed using laparoscopic techniques. Most surgeons who treat Hirschsprung's disease endoscopically have used a modified Swanson's pull through technique. But the *Duhamel* method and the *Soave* technique have been performed laparoscopically as well. Operative times required for the laparoscopic *Swenson* procedure have been reported to be similar to those for open technique. The duration of the *Duhamel* procedure was somewhat longer. The experience with the technique remains limited to special centers. 7,8,9

### Primary Transanal Endorectal Pull Through

Single stage trans-anal modified pull through done without abdominal incision, which is another approach applied in the last few years in some centers. 10,11

### Treatment of Total Colonic Aganglionosis: (TCA)

For the treatment of TCA, *Martin* introduced along side to side anastomosis between the normal ileum and aganglionic descending colon and the rectum. The operation should be performed at the age of 1 year, where the performing of the rectal and pelvic anastomosis is easier. Unfortunately, *Martin's* modification of *Duhamel* procedure has not completely eliminated the complications, such as frequent and liquid stools, excoriated perineum, enterocolitis and nighttime incontinence, which occur in as many as 66% of patients. Therefore, we prefer the *Rehbein* deep anterior resection in patients with total colonic aganglionosis. The persistent rectal achalasia increases transit time and the resorption capability of the ileum without increasing the frequency of enterocolitis. 12,13,14

### Aganglionic Patch (Kimura Procedure)<sup>15</sup>

Another technique that has recently become popularized is *Kimura's* utilization of a parasitized cecal patch.

1. The ganglionic ileum is first decompressed with an end ileostomy.
2. Several weeks later an extensive longitudinal ileocolostomy approximately 10 – 25 cm in length is created.
3. After 6 – 12 months the ileocolostomy is used for the pull through with either a *Swenson* or endorectal technique.

### Primary Pull – Through

Primary pull through in the newborn was introduced mostly by surgeons who prefer *Boley's* procedure. They postulate that endorectal dissection is more difficult to perform in older children than in infants because of tenacious adhesions in the submucosal plane caused by chronic proctitis and daily enemas. During the first 3 months of life and especially in the newborn, the rectum shows less inflammation and the dissection between the submucosal layer and muscular cylinder is easy to perform. Primary endorectal pull through usually does not require a protective colostomy. The reported results of primary pull through are not better than those of staged treatment. In a reported series of 24 patients, 1 died, 1 developed bowel volvulus, 9 (39%) suffered from recurrent Enterocolitis and 12 (42%) were constipated. 16,17 18

## Post Operative Complications

### Early Complications

Complications that become manifested within the first 4 weeks after operation are usually the result of technical error or infection.

- Wound infections.
- Anastomotic leaks.
- Anastomotic stricture.
- The pulled – through colon retracted.

The most frequent early complications after *Swensons* and *Duhamel* procedures were anastomotic leaks. Disturbances of micturition occur more frequently in children who undergo surgery late in life. dribbling, incomplete urinary control, bladder atony and ureteric obstruction all have been reported in children after pull through operations. Voiding dysfunction's occurred mostly after *Swensons* technique (12%) and *Duhamel* technique (4%). Nerve fibers are most probably damaged during the operative procedure or by compression from the enlarged rectum before the operation.<sup>19,20</sup>

### Late Complications: 31

- Chronic constipation.
- Enterocolitis.
- Encopresis.
- Long term voiding dysfunction.
- Sexual dysfunction.

## Aim of the Study

To study the presentation, the evaluation of the surgical management of Hirschsprung's disease by (modified Soave technique "Boley's technique") and the evaluation of the result of one stage ,two stages and three stages procedures.

## Patients and Method

64 cases with Hirschsprung's disease. All cases were dealt by different surgeons and underwent endorectal pull through (Modified Soave). All cases were subjected to rectal biopsy, or biopsy from Colostomy when the baby presented with neonatal intestinal obstruction or perforation. Modified *Soave* technique was done in all cases. Pull through, by pulling the ganglionic part out side the anus and everting the submucosal – mucosal tube into the perineum to facilitate the performance of anastomosis with the proximal ganglionic part just (1-2 centimeter) above the dentate line. The presentation, technique of pull through and complication following surgery were all analyzed and discussed. There were many techniques in the management of Hirschsprung's disease. Different surgeons employed different techniques, but by the time all surgeons now are using the following technique. " Modified Soave"

The operation was performed by using a combined abdominoperenial approach.

- The abdomen opened through a Lt. paramedian incision or suprapubic Smile incision.
- Identification (and resection) of the aganglionic segment with the cone segment, the resection should extended few centimeter into the normal colon then its opening is closed with a silk sutures.
- The dissection started above the peritoneal reflection to separate the seromuscular layer from the mucoas and submucosa, which extended down to the anus.
- The cuff of the seromuscular layer is left as funnel shape, and fixed from the upper 4 angles by stay sutures.

- The perineal portion of the operation then started by inserting a long curved artery through the anus and pushed to the site near by the closed lumen of remaining colon.
- This segment is pulled through the anal canal out side.

So, all the aganglionic segment can be resected out side the abdomen through the rectum

- Then the anastomosis is carried down between the mucosa of the anal canal (above the dentate line) and the normal ganglionic colon.
- Or the aganglionic segment can be resected within the abdominal cavity.

## Results

### Sex

64 patients (49 males and 15 females), the male to female ratio is (3.3:1)

**Table 2:** Male to female ratio

Total number	Male	female	M/F ratio
64	49	15	3.3:1

### Age

Their age range from 3 days to 11 years (10 patients at the neonatal age) (35 patients at the infantile age) and (16 patients older than one year). Three of them had positive family history (one presented at third day, the second patient at 8 months and third patient at 14 months).

**Table 3:** Age distribution

Age	No	Family history	%
Neonatal	10	1	17.18
Infantile	35	1	56.25
Older	16	1	26.52
<b>Total</b>	<b>61</b>	<b>3</b>	<b>64</b>

## Presentation

Forty eight Patients have positive history of delayed passing meconium,(14) Patients their parents couldn't remember that , Two Patients passed meconium early within 72 hr. Ten Patients presented with classical neonatal intestinal obstruction (i.e.) failure to pass meconium, abdominal distention, and repeated bilious vomiting).Thirty six Patients had classical constipation and gradual abdominal distention with (encopresis in 5 patients, fecal impaction in 7 patients, and fecal masses in 4 patients). Two Presented with acute retention of urine, (4) presented with perforation. (One at appendix, two at the ascending colon, and one at transverse colon).Some of the patients (12) had history of enterocolitis during their life which passed unnoticed and managed as inpatient in medical side with the diagnosis of gastroenteritis. The physical finding were varied, according to the age and the presence of complications.

**Table 4:** The presentation

Result	Cases no.	Percentage
<b>Neonatal intestinal obstruction</b>	10	15.62 %
Failure to pass meconium	48	75%
Constipation	47	73.5 %
Progressive abdominal distention	27	42. 18 %
Encopresis	5	7.8 %

**Table 4:** The presentation - continued

Fecal impaction	7	10.9 %
Tight anus	30	46.89 %
Acute retention of urine	2	31 %
Enterocolitis	12	18.7 %

## Investigation

### Barium Enema

Radiological study were done in the majority of cases and were diagnostic in infants and children (but not in neonates) showing abnormal dilation of the colon with narrow distal segment.

### Rectal Biopsy

All cases underwent rectal biopsy either punches or full thickness biopsy except 10 neonate had biopsy from the colostomy. All rectal biopsies were full thickness and were negative for ganglionic cells. 6 out of 10 from the colostomy were negative. One biopsy from the ileum, from patient with perforated appendix, was positive.

## Management

### Operations

Nineteen Patients had been managed with one stage modified Soave (*Boley's*) pull through without colostomy. (4) Patients had colostomy at the same session with pull through. (37) Patients had first stage colostomy to be followed by pull through and then closure of colostomy. (4) Patients disappeared during the follow up.

### Complication of Rectal Biopsy

Two main complications occur with punch technique from posterior rectal wall biopsy.

- a. Perforation.
- b. Severe bleeding.

### Complications of Colostomy

**Table 5:** Complications of colostomy

A.	Dermatitis and sever skin excoriation	12
B.	Prolapsed colostomy	6
C.	Burst through colostomy.	1
D.	Closure leaking	4

### Resected Segment

It varied from few centimeters to extensive involvement.

**Table 6:** Extent of aganglionic segment

Short segment ( Rectosigmoid)	11
Long segment (extended to the colon)	46
Total colonic with small intestinal involvement	3

## Operative Procedure

The main operative procedure used in the management of our cases was modified *Soave (Boley's)*.

### One Stage Pull Through

Nineteen Patients with different ages had been managed with one stage. The youngest one was 2 months old, the procedure was easy and the resected segment was 18cm length .The oldest one was 10 years old.

Under 1 year .we have (5) cases three of them had smooth post operative recovery one developed fecal fistulae from the suprapubic wound and the other had high fever.

Between 1–3 years. We have (7) patients one of them had leaking anastomosis and colostomy done for him. After 3 months checking by distal colostogram showed spontaneous closure of the site of leak and colostomy closure. Two patients have high post operative fever, one of them developed infection.

Older than 3 years. We have 7 patients, one of them developed severe stenosis and stricture at the site of anastomosis secondary to retraction of pulled through colon.

Four Patients within 6 months developed recurrence of the signs and symptoms and had recurrent admissions for severe colonic dilation with diarrhea and high fever.

**Table 7:** Result of one stage operation

Result	Cases no.	Percentage
Smooth and excellent recovery	9	47.3
Faecal Fistula → colostomy	2	10
High post operative fever	1	5
High post operative fever + wound infection	2	10
Recurrent enterocolitis	4	20
Revision (retraction)	1	5

### Two Stages Pull Through

Four patients had been managed with 2 stages, as pull through with proximal colostomy at the first stage mainly inpatients with recurrent attacks of enterocolitis beyond 6 months of age and when there is severe adhesion between the mucosal and the sub mucosal plain. Then followed 1 – 2 months by closure of colostomy. Four patients have colostomy first then followed by pull through with closure of colostomy at the same time as the second stage. In this group, we anticipated leak or complication, but fortunately it didn't happen.

### Three Stages Pull Through

Thirty seven Patients had been managed with colostomy. One died secondary to severe enterocolitis. The other with sepsis, secondary to perforation at presentation. He has Down's syndrome and heart failure. Only 31 patients had three stages pull through technique. (5) Patients had laparotomy secondary to: -

- Perforated Appendix at the caecal wall managed with resection of caecum and stoma of ileum and ascending colon.
- Perforated rectum after punch biopsy so Transverse colostomy done and laparotomy followed by burst abdomen .the patient had pull through after 6 months and closure of the colostomy 2 months later and all these followed by attacks of intestinal obstruction secondary to bowel adhesion mostly.
- Intestinal obstruction, (3) neonates at presentation had laparotomy looking for the actual causes of intestinal obstruction, which was classical coning of the colon ended with colostomy i.e. proximal transverse colostomy.

The other had colostomy at different age ranging from 20 days to 11 years. Followed by pull through at proper age or 2 months later.

- Recurrent enterocolitis in (3) patients (abdominal distention, constipation) with out any anastomotic tension or stricture.

2. Two patients develops sever wound infection as a result of improper isolation of the wound from the colostomy discharging material.
3. Two patients had postoperative high fever.
4. Two patients had retracted colon one of them with severe infection with discharging pus from the anus and kept on regular dilation. And after closure colostomy he developed leaking from the colostomy anastomosis, which necessitate reopening of the colostomy and Biopsy taken from the colostomy which was negative for ganglion cell. Re pull through done, pulling down the colon proximal to colostomy. Also he developed severe abdominal distention and non-functioning bowel. An ileostomy had done for him. Attempt to close the ileostomy failed and a fistula developed and the patient became marasmic and escaped from the hospital (died at home).
5. Three patients had adhesive intestinal obstruction, which opened by laparotomy.
6. Nineteen patients Had smooth postoperative period.

**Table 8:** Results of three stages operation

Result	Cases no.	Percentage
Smooth and excellent recovery	19	61.2
High post operative fever	2	6.4
Severe wound infection	2	6.4
Recurrent Enterocolitis	3	9.4
Retraction of ganglionic colon	2	6.4
Adhesive intestinal obstruction	3	9.6

## Discussion

The clinical presentation of Hirschsprung's disease and other related neuromuscular intestinal motility disorder in Iraq did not differ too much form other studies in the literatures.

### Sex

The male to female ratio in patients of Hirschsprung's disease is generally reported (4:1).<sup>21</sup> In our study its nearly the same (3.3:1) . *Klein an et al.*<sup>74</sup> reported male to female ratio (3.3:1).

### Age

The mean age of diagnosis in the past few decades is decreasing. During 1960s the mean age was (18.8) months and it decreased to (2.6) months in 1980s.<sup>22</sup> In our study the mean age was (14.8) months, because we have some cases with late presentation at the age of 11 years. Majority of our patients was presented below the age of one year, (56.25%) below one year, (17.18%) below one month and (26.52 %) were presented above one year of age.

## Presentation

Regarding the presenting sings and symptoms, (10) cases (15.62 %) were presented with classical signs and symptoms of neonatal intestinal obstruction. The usual presentation of Hirschsprung's disease in the neonatal age group consist of delayed passage of meconium within the first 48 hrs. (95%) of full term infant will defecate within the first 24 hrs of life, and the reminer will pass their first stool by 48 hrs.<sup>23</sup> In our study, (75%) (48 Patients) has history of failure to pass meconium, however, the history of failure to pass meconium may be absent in (6%) to (46%).<sup>24,25</sup> We have (47 patients) (73.5%) presented with constipation and (27 patients) (42.18%) presented with progressive abdominal distention. Only (5 patients) (7.8%) were presented with encopresis. Fecal impaction and masses were present in (7 patients) (10.9 %). Stenosed and tight anus was recorded in (30 patients) (46.89%) and



this sign is very important, this low incidence might be due to multiple PR examination before arrival to our center. Two patients (3.1 %) presented with acute retention of urine. (12 patients). (18.7%) presented with attacks of enterocolitides which is reported to occur in (12 –58 %) of patients with HD.<sup>26,27,28</sup>

## Diagnosis

The diagnosis in our study depends on the clinical presentation, barium enema and rectal biopsy. barium enema is a very classical method of diagnosis. The classical finding is that of the normal caliber rectum or narrow distal segment, a funnel shaped dilatation at the level of transitional zone and a marked dilatation of the proximal colon which was the finding in the (33 patients) (51.56 %). (5 cases) (7.8%) had megarectum with proximal dilatation of the descending colon, which are proved to have no ganglion cells in the rectal wall biopsy. The rectal biopsy is the gold standard and the keystone for the diagnosis of Hirschsprung's disease. The main disadvantages of rectal wall biopsy include bleeding, perforation and the need for general anesthesia. In our study two patients had developed bleeding and perforation. We have found that in short segment Hirschsprung's disease rectal biopsy may be followed by transient relief of constipation for a period ranging between 3 to 5 months as a result of anal dilatation. The rectal wall biopsy was usually taken by punch biopsy forceps or full thickness rectal wall biopsy in cases of perforation or obstruction at the neonatal period another biopsy is taken from the site of colostomy. We sent the biopsy to the pathologist who has a good experience in looking for ganglion cells by illustrating many sections from the specimen reaching up to 20 sections. All rectal biopsies were negative for ganglion cells. We have no facility for examination with acetylcholinesterase stain. We have no facility for manometric study which is not beneficial mainly in the neonates.

## The Management

The modified Soave technique was used in the management

The advantages of this technique are:

- Absence of any pelvic dissection out side the rectum.
- The preservation of the rectum and it's sensory receptors.
- The presence of normal propulsive colon right down.
- Diminishes expectation of anastomotic leaks.
- Preservation of all sphincters.
- Absent or minor possibility for anal stricture or stenosis.
- No need for postoperative dilatation.

Some surgeons prefer one stage (primary pull through) when there is no contra indications like severe enterocolitis or huge dilatations of the proximal colon which might increase the possibility of anastomotic leaks as a result of ill fitting pulled through colon in the seromuscular cuff. The primary pull through was introduced mostly by surgeons who prefer *Boley's* procedure.<sup>16,17</sup> (19) Patients had primary pull through, in our study. Other surgeons prefer either 3 stages or 2 stage procedures.

### The Management with One Stage;

There were (19) cases, (5) Were females and (14) were males, the mean age was (24.8) months the resected segment varied between (10 and 25 cm). Nine Patients (47.3%) had excellent results and the post operative period was free of any complications. (2) Patients (10 %) developed early leaks from the anastomosis and fecal fistula treated by colostomy. One of them had spontaneous closure of the fistula and colostomy closed 6 months later. (2) Patients (10%) developed high postoperative fever. (1) Patient developed wound infection. (4) Patients (20%) had recurrent enterocolitis. (1) Patients (5%) developed recurrence of the signs and the symptoms and waiting for revision of the surgery. Regarding

those with recurrent enterocolitis, incomplete resections can not be avoided regardless the technique. Proximal to the aganglionic segment there is always hypoganglionosis and often intestinal neuronal dysplasia (IND). The short segment aganglionosis can be associated with long segment hypoganglionosis and vice versa.<sup>37</sup> In a study done in the C.S Mott Children's Hospital in the University of Michigan Medical Center. Between 1974-1995 they have performed 260 endorectal pull through, during their last 7 years, the one stage became more popular. They performed 31 cases with this technique, the results are shown in table 4.

**Table 9:** A comparative study

Post operative complication	no	incidence	no	incidence
enterocolitis	5	16.10%	4	20
Anastomotic stricture	1	3.20%	0	0
Adhesive intestinal obstruction	3	9.70%	0	0
Anastomotic leak	0	0	2	10
Fever above 38	0	0	2	10
Wound infection	1	3.20%	1	5
Intra abdominal abscess	1	3.20%	0	0

In comparison to our result it was nearly the same. The incidence of the enterocolitis was not avoidable we have 4% more. We did not record any one with anastomotic stricture despite of our limited experience in such technique. We have no adhesive intestinal obstruction. We have two cases with fecal fistula i.e internal leak, we did not record any patient with intra abdominal abscess formation. We have done revision of one case. In this case there was severe adhesion between the mucosa and the cuff. It might be secondary to biopsy or recurrent enterocolitis. so improper dissection followed by retraction of the pull through colon after anastomosis. This occurred at the beginning of our work. In a literature review found an overall incidence (39%) of enterocolitis following a Boley's operation. In a reported series of (24) patients, (1) died, (1) developed bowel volvulus, (9) suffered from recurrent enterocolitis and (12) were constipated.<sup>18</sup>

### The Management with Two stages

Eight Patients had two stages pull through Boley's procedure (3) Patients had first stage laparotomy with open colostomy at a site just proximal to proposed transitional zone two with total colonic aganglionosis followed by pulling through the ileostomy. Three Patients had pull through with open the colostomy at the same time followed by closure the colostomy later on. (2) Patients had colostomy followed by pull through and closure of the colostomy at the same stage. Apart from the complications of colostomy no other significant complication would be mentioned.

### The Management with Three Stage

Thirty-one Patients had (3) stages Boley's pull through (23) males, (8) females, the mean age at pull through was 9 months. Nineteen Patients (61.2 %) had smooth postoperative follow up. (3) Patients (9.6%) developed recurrent enterocolitis. (2) Patients (6.4%) had revision of Pull through secondary to retraction of the segment. Three Patients (9.6%) admitted to our center with recurrent attacks of colicky abdominal pain proved to be secondary to adhesion that dealt with by laparotomy. (2) Patients (6.4%) had wound infection as a result of contamination from the colostomy. (2) patients (6.4%) developed high fever, one of them died 18 hrs later post operatively (hyperpyrexia)

### Conclusion

Boley's technique is good procedure in the management of the Hirschsprung's disease, which is one of the classical problems in the pediatric surgery procedure it provides

1. Good continence (absence of any pelvic dissection).
2. Less leak and peritonitis (especially with proximal colostomy).
3. No stricture or stenosis as with other method.
4. Enterocolitis depends on the level of the segment and the level of the cuff.
5. It is easily learned and performed by joiners' surgeons.

One stage technique should be well selected to avoid complications with leaks and peritonitis and retraction. Two stages in our study were well selected so we have no complications and not included in the comparison. Three stages technique is the safest way to avoid major complications. Some complication like enterocolitis can not be prevented especially in long segment aganglionosis.

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