

# The Role of Laparoscopic Total Colectomy in Treatment of Slow-Transit Constipation: A Prospective Study

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**Background:** *Patients with intractable chronic constipation should be evaluated with physiologic tests after structural disorders, and extracolonic causes have been excluded. Conservative treatment options should be tried excessively. If surgery is indicated, subtotal or total colectomy with ileorectal anastomosis is the treatment method of choice.*

**Patients and methods:** *In this prospective study, 7 patients were reviewed including patient demography, clinical manifestations, preoperative investigations, operative procedure, intraoperative and postoperative complications, and postoperative follow up. All patients enrolled in the study underwent laparoscopic total colectomy (LTC), with ileorectal anastomosis (IRA). Average age of the patients was (35±15.8 years), average operative time was (80±30 min), average blood loss was (75±30 ml), average hospital stay was (6±2.5 days).*

**Results:** *7 patients in our study were diagnosed to have slow-transit constipation via history, clinical examination, colonoscopy and barium enema to rule out structural disorders, colonic motility study, anorectal manometry, colonic transit time, and defecography. All patients underwent LTC with IRA after failure of conservative treatment. 3 patients(42.8%) had postoperative diarrhea which resolved spontaneously after 2 weeks, 1 patient (14.2%) had wound infection, 1 patient(14.2%) had minor anastomotic leak which subsided on conservative treatment. 2 patients had abdominal pain and bloating which improved gradually, 1 patient had recurrent constipation which was improved on laxatives, median number of motions/day was 3, with median satisfaction and success rate of about 82%.*

**Conclusion:** *Laparoscopic treatment of slow-transit constipation seems to be safe, feasible, and effective procedure with satisfactory results, with minimal postoperative complications, short hospital stay, with a faster return to social activity, along with a better cosmetic results and good functional results.*

**Key words:** *Slow-transit constipation, laparoscopic total colectomy(LTC), ileorectal anastomosis(IRA), colonic motility study, anorectal manometry.*

## **Introduction:**

Constipation is one of the most frequent gastrointestinal symptoms, and one of the most frequent reasons for medical consultation. Basically constipation is related to intestinal motility disorders, pelvic floor disturbance.<sup>1</sup> Patients often complaint of subjective feelings like incomplete evacuation, abdominal or rectal pain, firm stool consistency, and need for straining. The best definition for constipation was proposed by Whitehead.<sup>2</sup> Two or more of the following

complaints must be present when the patient is not taking laxatives, and if symptoms persist for at least 12 months:

- 1) Straining on >25% of bowel movements.
- 2) Feeling of incomplete evacuation after >25% of bowel movements.
- 3) Scyballous stools on >25% of bowel movements.
- 4) Stools less frequent than 2/ week with or without other symptoms.

Slow-transit constipation occurs most commonly in young women who had

infrequent bowel movement, the condition often starts at puberty, associated symptoms are an infrequent urge to defecate, bloating, and abdominal pain, dietary and cultural factors contribute to symptoms, in these patients a high fiber dietary, increase stool-weight, decrease colon transit time.<sup>3</sup> Patients with more severe slow-transit constipation have a poor response to dietary fiber and laxatives, such patients have a more delayed emptying of the proximal colon, and fewer high-amplitude peristaltic contractions. Colonic inertia, a related condition is characterized by slow colonic transit. Histopathological studies have shown alterations in the number of the myenteric plexus neurons expressing the excitatory neurotransmitter substance P, abnormalities in the inhibitory neurotransmitters vasoactive intestinal peptide and nitric oxide. Hirschsprung's disease is an extreme form of slow-transit constipation with similar enteric neuropathological features.<sup>4</sup>

A thorough history and physical examination can rule out most secondary causes of constipation. An assessment of stool form can be used to estimate the extremes of colonic transit time. A careful rectal examination should be performed, the perianal area should be examined for scars, fistulas, fissures, external piles. Next the clinician should observe the perineum with the patient at rest and while the patient is bearing down, in order to determine the extent of perineal descent, digital rectal examination should determine whether fecal impaction, anal stricture, or rectal masses are present or not. Laboratory tests that may be useful include thyroid-function tests, serum calcium, glucose, and electrolytes, a complete blood count, and urinalysis.<sup>5,6</sup>

A complete colon examination is required to exclude structural diseases such as colon cancer, which is done via colonoscopy and barium enema. Physiological testing is necessary in patients with refractory symptoms which include anorectal manometry and balloon expulsion, defecography may be considered if the results of these tests are equivocal. The colonic transit time is

normally less than 72 hours. Other diagnostic tests include electromyography, and pudendal nerve terminal motor latency.<sup>7,8</sup>

Management regimens include; high fluid intake, physical exercise, increased fiber intake, osmotic laxatives such as milk of magnesia, sorbitol, lactulose, colonic stimulants like bisacodyl, senna derivatives. Prokinetic agents should be preserved for patients with severe constipation. Patients with defecatory disorders should undergo retraining of the evacuation process. Patients with fecal impaction should have manual evacuation, preliminary data suggest that injection of botulinum type A toxin into the puborectalis muscle may be effective in treatment of defecatory disorders.<sup>9,10</sup>

For refractory constipation, total colonic resection and ileorectal anastomosis should be considered only if the patient does not have a defecatory disorders and only after medical therapy have failed.<sup>11</sup>

#### **Patients and methods:**

In this prospective study, 7 patients were evaluated, had full investigations, and underwent laparoscopic total colectomy and ileorectal anastomosis, between May 2013 and May 2015, and the study was conducted at January 2016. Patients had full preoperative diagnostic work up in the form of history taking, physical examination, colonoscopy and barium enema, CT scan, MRI, anorectal manometry, colonic motility studies, and colonic transit time estimation, to assess slow-transit constipation. All patients tried medical treatments with no or poor response, as well as defecatory disorders were absent in all patients. All the patients were fully informed about the procedure, and written consent was taken. A complete patient demographic data, preoperative investigations, and operative data are illustrated in **Table (1)**.

Operative technique: After a mechanical bowel preparation. The patient is placed in a modified lithotomy position, and pneumoperitoneum is established. Using the subumbilical 12-mm trocar the camera is inserted. Two further 12-mm and 5-mm trocars, each are used for access to the

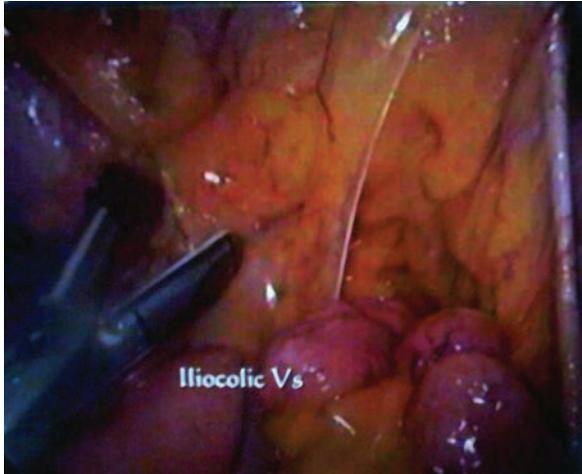


Figure (1): Division of iliocolic vessels, ileum.

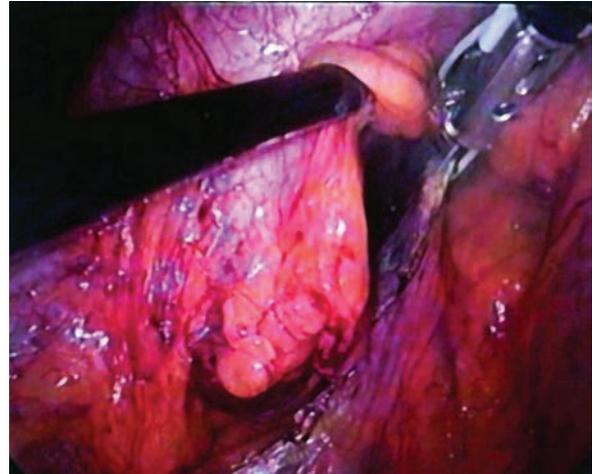


Figure (2): Dissection of right colon.

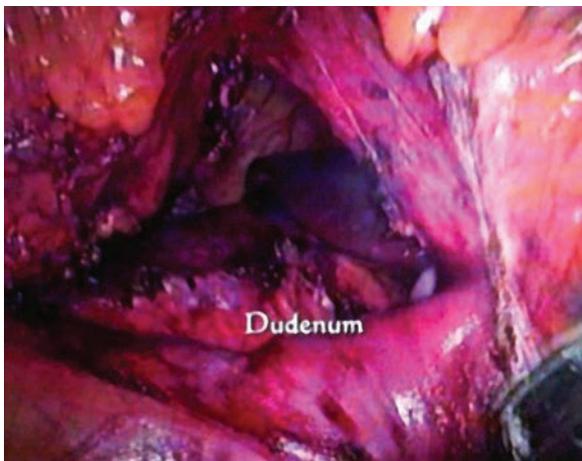


Figure (3): Dissection of hepatic flexure.



Figure (4): Division of middle colic Vs.

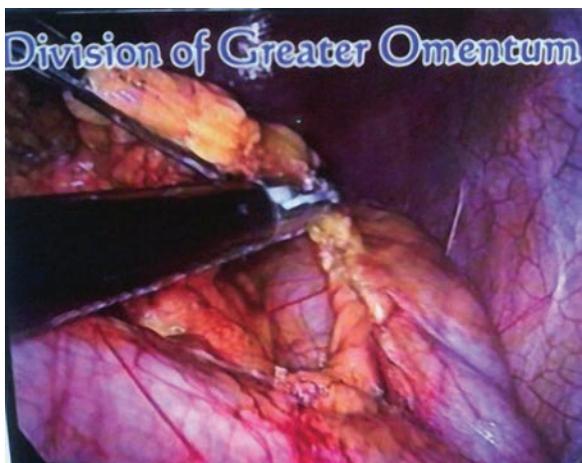


Figure (5): Division of greater omentum.



Figure (6): Mobilization of splenic flex.

peritoneal cavity. In an approach from medial to lateral; the ileocolic, middle colic vessels, and the inferior mesenteric artery are divided. Medial mobilization is completed before the sigmoid is freed up laterally **Figure (1,2)**.<sup>12</sup>

The lateral mobilization of the descending, transverse, and ascending colon is done with the omentum being separated from the transverse colon completely **Figure (3,4)**. The mesorectum is divided using the

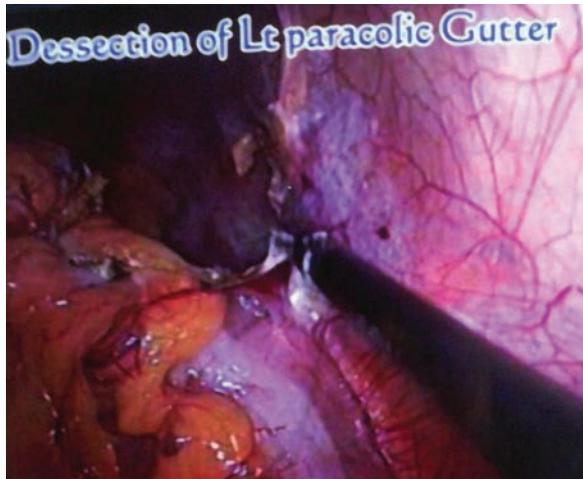


Figure (7): Dissection of Lt. paracolic gutter.



Figure (8): Division of Lt colic Vs.



Figure (9): Dissection of sigmoid mesentery.



Figure (10): Dissection of mesorectum.



Figure (11): Transection of upper rectum.

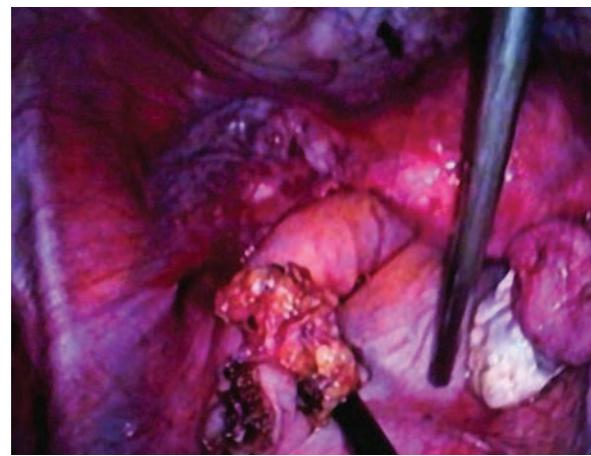


Figure (12): Rectal stump before IRA.

harmonic scalped, and the upper rectum is transected with either one or two passes of the endoscopic linear cutting stapler **Figure (5,6,7)**. The colon is exteriorized through a 5-cm Pfannenstiel incision. The terminal ileum is transected extracorporeally. After pneumoperitoneum has been

reestablished, the ileorectal anastomosis is performed laparoscopically using a double-stapling technique or end-to-end anastomosis via circular stapler **Figure (8,9,10,11,12)**.<sup>13,14</sup>

Perioperative management-data collection: All the patients underwent total laparoscopic colectomy with ileorectal anastomosis after

**Table 1: Epidemiological, and operative data of the patients.**

Number of patients	7
Age of the patients/year	*(35±15.8)
Sex, male : female	1(14.2%):6(85.7%)
Operative data	
Duration of procedure/min	*(80±30min)
Blood loss/ml	*(75±30)
Preoperative investigations	
History, physical examination	7(100%)
Colonoscopy, barium enema	7(100%)
CT scan, MRI	5(71.4%)
Anorectal manometry	6(85.7%)
Colonic motility study	7(100%)
Colon transit-time testing	7(100%)
Defecography	5(71.4%)
EMG, PNTML	4((57.1%)

\*(mean±SD)

\*EMG: Electromyography \* PNTML; Pudendal nerve terminal motor latency

**Table 2 : Postoperative complication, and outcomes.**

Anastomotic leak	1(14.2%)
Intraperitoneal collection, abscess	1(14.2%)
Intraperitoneal hemorrhage	-
Diarrhea, fecal incontinence	3(42.8%)
Small bowel obstruction	-
Abdominal pain, bloating	2(28.4%)
Recurrent constipation	1(14.2%)
Median number of motions/day	3
Median satisfaction, success rate, and improved quality of life	82%
% of reoperation	-
Chest infection	-
Pleural effusion	-
Wound infection, hematoma	1(14,2%)
GI bleeding	-
Overall morbidity%	38%
Mortality%	-
Average hospital stay	*(6±2.5)

\*(mean±SD)

mechanical bowel preparation, and systemic antibiotic prophylaxis was administered. Oral feeding is regained 3days post-operatively,

drains are removed with minimal serous fluid output. Evidence of anastomotic leak or intraperitoneal collections were assessed

clinically and radiologically. Postoperative follow up was completed for all the patients, postoperative complications are demonstrated in **Table (2)**.

### **Results:**

In our study, 7 patients were presented with manifestations of slow-transit constipation, 6 were females (85.7%), and 1 was male (14.2%), average age of the patients was (35±15.8 years), average operative time was (80±30 min), average intraoperative blood loss was (75±30 ml), average hospital stay was (6±2.5 days). No other procedures, or concurrent operations were performed. 3 patients (42.8%) developed postoperative diarrhea and fecal incontinence which subsided completely after 2 weeks, 1 patient (14.2%) had minor anastomotic leak and mild intraperitoneal collection which resolved on conservative measures. 1 patient (14.2%) had wound (Pfennenstiel incision) infection. No significant intraoperative, or postoperative hemorrhage was detected. The overall morbidity was 32%, and no mortality could be detected. 2 patients (28.4%) had recurrent abdominal pain and bloating which improved gradually over 2 months, 1 patient developed recurrent constipation which improved with cathartics, the median number of motions was 3/day, after about 3 weeks. After 3 months, a new colonic transit time study was performed and showed a regular transit. The median satisfaction, and success rate was 82% with marked improvement in quality of life which was detected via follow-up and clinical assessment. All the laparoscopic procedures have done after exclusion of defecatory disorders, and failure of conservative treatment. Malignancy or inflammatory bowel diseases were absent by histopathological examination for all resected specimens. There was no need for reoperation in all cases.

### **Discussion:**

Chronic slow-transit constipation represents a disabling syndrome characterized by untreatable constipation, with a higher incidence in young female patients. The

pathophysiology is still unclear, and a visceral neuropathy of the myoenteric plexus is supposed, together with abnormalities of neuroendocrine peptides. Less than 10% of the patients require surgical management, in case of failure of conservative treatment and only after meticulous preoperative investigations.<sup>15</sup>

A total colectomy (TC) followed by ileorectal anastomosis (IRA) is the most common effective and widely performed surgical operation with a success rate of approximately 90% , in spite of being associated with a significant postoperative morbidity, in terms of diarrhea, number of daily bowel motions, soiling, fecal incontinence, and postoperative adhesion.<sup>16</sup>

In 1995 (Lillehei and Wangsteen); first described the use of mechanical cecorectal anastomosis (CRA), after subtotal colectomy (SC). The original technique consists in an end to end CRA after a 180° rotation of the cecum; after this, several modifications of such technique were described in order to avoid the possible vascular adhesions. The diffusion of laparoscopic surgery gave great impulse to this kind of operations. However, the debate regarding therapeutic choice is still open.<sup>17</sup>

Some authorssupport the SC because the preservation of terminal ileum, ileocecal valve, and cecum allows absorption of electrolytes, bile salts, and vitamin B12, and about 2 litres of water daily, preventing the occurrence of renal, and biliary stones, with a reduced number of daily bowel motions, and without fecal incontinence. Furthermore, the cecum seems to fill well the pelvis, reducing the risk of postoperative obstruction, or adhesions of small bowel, compared to TC and IRA. Nevertheless , in some surgeons experience with the patients submitted to TC and IRA, a disabling diarrhea , incontinence or urgency was not observed at 6 months regular follow up.<sup>18,19</sup>

The functional results of SC and CRA were similar to those observed after TC and IRA with an excellent quality of life. Furthermore , after a mean follow up of 43 months (range 23-73), a subocclusive crisis

due to adhesions was never observed. In our study, 3 patients developed postoperative diarrhea, and fecal incontinence which resolved spontaneously after 2 weeks, 1 patient had minor anastomotic leak which also resolved with conservative measures, 2 patients developed abdominal pain and bloating, gradually improved without medical treatment. 1 patient had recurrent constipation which is markedly improved on laxatives, the median number of motions 3/day, the median satisfaction, and success rate was 82%, with marked improvement in quality of life. All such results are close to those published in the literature, and encouraging the usage of laparoscopy in treatment of chronic slow-transit constipation.<sup>20</sup>

### Conclusion:

Laparoscopic TC and IRA represents efficacious, and interesting operation in the treatment of slow-transit constipation. Offering a good postoperative quality of life and a reduced morbidity compared to open surgery. Total laparoscopic operation allows reduced postoperative pain and ileus, a shorter hospitalization, a faster return to social activity along with a better cosmetic results, and good medium-long term functional results.<sup>21,22</sup>

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