Laparoscopic treatment of chronic slow transit constipation
Report of three cases and review of literature

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INTRODUCTION: The Authors present their experience with laparoscopic total or subtotal colectomy (TC or SC) in three patients operated for intractable chronic slow transit constipation (STC), together with a review of literature.

MATERIAL AND METHODS: From July 2005 to July 2009 three young patients affected by STC, after meticulous preoperative instrumental work-up and after failure of medical treatment, were submitted to laparoscopic TC and Ideo Rectal Anastomosis (IRA) in two cases and to laparoassisted SC followed by Ceco Rectal Anastomosis (CRA) in one case. Number of daily bowel motions, urgency soiling, incontinence, abdominal pain, bloating with special regard to patient’s quality of life, were analyzed.

RESULTS: All the interventions were completed via laparoscopic approach. No postoperative morbidity or mortality were observed. After twelve months, the patients referred two-three daily evacuation of soft stool, with a good continence and disappearance of abdominal pain and other relatives symptoms. They reported excellent satisfaction with the surgical results and a significant improvement of their quality of life.

DISCUSSION: TC with IRA and CRA after SC represent the most effective and widely used surgical operations in the treatment of STC, in well selected patients, after failure of conservative treatment. According to Literature data, and in our experience, no significant differences in terms of postoperative morbidity or mortality neither in quality of life were observed between the two operations. It is well demonstrated the feasibility of the laparoscopic approach in treatment of colorectal pathologies with typically advantages of less invasive surgery, respect of parietal integrity, less postoperative pain and ileus, fewer postoperative adhesions, a reduced hospitalisation and finally a better cosmesis.

CONCLUSIONS: Laparoscopic TC and IRA and CRA after laparoassisted SC represent efficacious operations in the treatment of STC offering a good postoperative quality of life and reduced morbidity compared to open surgery.

KEY WORDS: Cecorectal anastomosis, Colonic inertia, Ileorectal anastomosis, Laparoscopic total colectomy, Laparoscopic subtotal colectomy, Slow transit constipation.

Introduction

The large diffusion of laparoscopic surgery in the last decade has demonstrated the feasibility of laparoscopic colorectal resections and in the literature various laparoscopic, laparoassisted or hand assisted total or subtotal colectomy (TC or SC) for slow transit constipation (STC) are reported, demonstrating well known advantages in comparison to “open” surgery. The mechanical cecorectal or ileorectal anastomosis (CRA or IRA) after SC or TC are the most effective and widely used surgical operations, after failure of conservative treatment. Together with a review of literature, the Authors describe their experience in the treatment of three young patients affected by STC and submitted to laparoscopic TC or SC.

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Materials and Methods

CASE REPORT N. 1

In January 2005 a 20 years old male patient came to our observation; when he was a child he was submitted to sphincteromioectomy for an erroneous diagnosis of Hirschprung’s disease. The patient complained of untreatable constipation, encopresis, nausea, abdominal pain and bloating, paradoxical diarrhoea with a poor quality of life. Preoperative instrumental work-up included a barium enema showing a redundant colon; a panocolonoscopy with normal values. A colo-rectal biopsies, excluding Hirschprung’s disease; an anorectal manometry indicating a marked rectal hypo sensibility; an oesophageal manometry with normal values. A colonic transit time study was performed and showed a colonic total slow transit constipation with retention of about all markers in the whole colon on the fifth day after ingestion. In may 2005, in accordance with the gastroenterologist, the patient was submitted to laparo-assisted subtotal colectomy with extracorporeal end to end anisoperistaltic mechanical cecorectal anastomosis according to Sarli procedure. The postoperative course was uneventful and after an Rx gastrographin enema in 8th postoperative the patient was discharged. After about 3 weeks the patient reported 3 daily evacuations of soft faeces. After 3 months a new colonic transit time study was performed and showed a regular transit and after 6 months the patient reported 2 daily evacuations, in absence of nausea, abdominal pain and bloating and excellent satisfaction with the surgical results with a normal faecal continence, no urgency and a significant improvement of his quality of life.

SURGICAL TECHNIQUE (SC with CRA)

Mechanical bowel preparation started 3 days before the operation. At anaesthesia induction 2gr of ceftazidima (Glazidim®,-GlaxoSmithKline Verona Italy) and 500 mg of metronidazole (Metronidazolo, Bioindustria-Noviligure Italy) were administrated intravenously. Patient was catheterized and placed in a supine Trendelemburg position of about 30°, with legs abducted. This position was hold during the entire operation with a mild lateral rotation (to the right during left colon dissection and to the left during right colon dissection). A pneumoperitoneum with intrabdominal pressure of 12 mmHg was established according to an “open technique” with an Hasson trocar (Bluntport plus-Autosuture Tyco Corporation). A 30° camera was utilized. Four mms trocars-2 in the left and right flanks, 1 in supraumbilical and one in sovrapubic, where a minilaparotomy of about 7 cm was performed were utilized.

The dissection was performed by an electrothermal bipolar vessel sealing device- Atlas Ligasure®, (Tyco Corporation), and not absorbable clips were utilized on the branches of the middle colic vessels. A laparoassisted subtotal colectomy from “left to right” was performed preserving superior rectal and ileocolic vessels. The operation started with mobilization of sigmoid and left colon, the operating surgeon standing on the right side of the patient. During the dissection of the splenic flexure the patient was held in a Trendelemburg position and the operating surgeon on the left side of the patient to ultimate the separation of colic flexure from the spleen. After dissection of great omentum from transverse colon and mesocolon following by a complete mobilization of the right colon with identification of the right ureter and gonadic vessels, a longitudinal minilaparotomy of about 7 cm was performed. After the extraction of the entire colon out of the abdominal cavity, protecting the abdominal wall by a plastic ring drape, appendectomy and colonic section preserving about 10 cm of right colon from ileocecal valve was performed. The rectum was transected at the level of promontory and the head of a 34 mm circular stapler (EEA p 34®, Autosuture Tyco Corporation) was fixed to the rectal stump by a reloadable 90 GIA. The abdominal cavity was drained from port sites and a 24 ch Foley transanal catheter for anastomotic decompression was utilized. Operation’s time was 220 minutes.

CASE REPORT N. 2

The second patient, a 28 years-old woman, came to our observation in February 2008: she referred constipation refractory to pharmacological treatment, with evacuation of solid stool each almost 7-10 days. Also she complained of chronic abdominal pain, nausea and bloating. The preoperative work-up consisted of barium enema, total colonoscopy, anorectal manometry and study of intestinal transit time. No relevant abnormality was relieved at these instrumental examines except for the last one which demonstrated a slow colonic transit time with retention of all markers in the colon on the 10th day after ingestion. In September 2008 the patient underwent laparoscopic TC with IRA. No postoperative complications occurred and the patient resumed oral alimentation on 4th postoperative day and was discharged home on the 7th post operative day. At 6 months clinical follow-up after 6 months from the operation the patient reported excellent outcome with two daily evacuations of soft stool and disappearance of chronic abdominal pain and other related symptoms.

CASE REPORT N. 3

The third patient, a 26 years-old woman was observed at our department on March 2009; the referred symp-
tomatology was the same as for the second patient with a similar frequency of evacuations. Analogue was the preoperative work-up with a clearly pathologic radiologic study of colonic transit time. In July 2009 the patient was operated and underwent a laparoscopic TC with IRA. Postoperative course was uneventful and the patient returned home on 6th postoperative day. At 6 months clinical follow-up after 6 months the patient referred good satisfaction with 2-3 evacuations of soft stool per day and only mild occasional abdominal pain and flatulence.

**SURGICAL TECHNIQUE (TC with IRA)**

Bowel mechanical preparation and surgical technique utilized in case 2 and in case 3 was similar to that reported in case 1. The operations consisted in a “left to right” laparoscopic total colectomy by an electrotherbal bipolar vessel sealing device – Atlas Ligasure® (Tyco corporation)- and by five trocars – one paraombelical, two in the left and right subcostal space, one in the left iliac fossa and one in the right iliac fossa where a minilaparotomy was performed. Vascular control was obtained by Atlas Ligasure in a pericolic dissection plane. The mobilisation of colonic flexures was typically performed with patient in 30° antiTrendelemburg position and a mild lateral rotation (to the right during left colon dissection and to the left during right colon dissection). After section of the colon at the sigmoid rectal junction by disposable laparoscopic 60 endoGIA® (Johnson & Johnson), the whole colon was extracted out the abdominal cavity and the terminal ileum was extracorporeally transected; after closure of minilaparotomy, an intracorporeal transutural end to end mechanical ileorectal anastomosis by EEAp 25® (Johnson & Johnson) was performed (double-stapling technique). In every case an intraoperative endoscopic anastomotic control was performed and abdominal cavity was drained from port sites. Operation’s time was 190 minutes and 235 minutes respectively in case 2 and in case 3.

**Discussion**

Chronic slow transit constipation (STC) represents a disabling syndrome characterized by untreatable constipation with an higher incidence in young female patients 9,10. The pathophysiology is still unclear and a visceral neuropathy of the mioenteric plexus is supposed 11-13. together with abnormalities of neuroendocrine peptides levels 14,15. Less then 10% of the patients require surgical management, in case of failure of conservative treatment and only after meticulous preoperative investigations 16,17. In each case a multidisciplinary team is requested comprising gastroenterologist, nutritionist, psychiatrist and surgeon. A total colectomy (TC) followed by ileorectal anastomosis (IRA) is the most common effective and widely performed surgical operation with a success rate of approximatively 90% 17-19, also if it is associated with a significant postoperative morbidity in terms of diarrhoea, number of daily bowel motions, soilong, faecal incontinence and postoperative adhesions 3. In 1955 Lillehei and Wangesteen first described the use of mechanical cecorectal anastomosis (CRA) after SC 20. 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 torsions 21,22. A current operative technique, as first reported by Mouiel 23 and by Sarli 3, so called Sarli procedure, creates an anisoperi-

**Table 1 - Results of laparoscopic operations for slow transit constipation**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Pts</th>
<th>Approach</th>
<th>Technique</th>
<th>Morbidity</th>
<th>Mortality</th>
<th>Conversion</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ho (2)</td>
<td>24</td>
<td>VL 7 Open 17</td>
<td>TC+IRA</td>
<td>43%</td>
<td>0</td>
<td>0</td>
<td>96%</td>
</tr>
<tr>
<td>Athanasakis(24)</td>
<td>4</td>
<td>VL</td>
<td>TC+IRA</td>
<td>25%</td>
<td>0</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Sarli (25)</td>
<td>2</td>
<td>VL</td>
<td>SC+CRA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Pokala (26)</td>
<td>20</td>
<td>VL 10</td>
<td>TC+CRA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>?</td>
</tr>
<tr>
<td>Sample (27)</td>
<td>14</td>
<td>VL</td>
<td>SC+CRA</td>
<td>7.1%</td>
<td>0</td>
<td>7.1%</td>
<td>91%</td>
</tr>
<tr>
<td>Iannelli (28)</td>
<td>4</td>
<td>VL</td>
<td>SC+CRA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Marchesi (1)</td>
<td>22</td>
<td>VL 5 Open 17</td>
<td>SC+CRA</td>
<td>9.3%</td>
<td>0</td>
<td>0</td>
<td>88%</td>
</tr>
<tr>
<td>Hsiao (29)</td>
<td>44</td>
<td>Handassisted</td>
<td>TC+IRA</td>
<td>4.5%</td>
<td>0</td>
<td>0</td>
<td>88.6%</td>
</tr>
</tbody>
</table>

SC=subtotal colectomy; CRA=Cecumrectal anastomosis; TC= total colectomy; IRA=ileorectal anastomosis; VL= video-laparoscopic
staltic end to end mechanical anastomosis avoiding vis-
cerai rotation.

The diffusion of laparoscopic surgery gave great impulse to
this kind of operations and in the last 15 years some authors published their results that are summarized in Table I.

As it can be observed in the table 1, excellent or good outcome were reported after TC or SC, with comparable morbidity and mortality, also if, because of the little number of patients affected by STC candidates to surgery, the series are very limited 1,2,24-31. However, the debate regarding therapeutic choice is still open. Some Authors support the SC because the preservation of terminal ileum, ileoceleal valve and cecum, allows the reabsorption of electrolytes, biliary salts, B12 vitamin and about 2 liters of water per day, preventing the occurrence of biliary and renal stones with a reduced number of daily bowel motions and without faecal incontinence 1,32,33. Furthermore, independently from the operative technique (iso-anisoperistaltic), the cecum seems to fill well the pelvis reducing the risk of postoperative obstructions or adhe-
sions of the small bowel compared to TC and IRA 1,8,28,34,35. Nevertheless in the Author's experience, in the pa-
ients submitted to TC + IRA a disabling diarrhoea, incontinence or urgency was not observed at 6 months clinical follow up after 6 months from operation and after 12 months, the functional results of SC+CRA were similar to those observed after TC+IRA with an excellent quality of life. Furthermore, after a mean follow up of 43 months (range 23-73), a suboclusive crisis due to adher-
tial syndrome was never observed.

In our opinion, also if our experience is limited, the two operations can give similar excellent results, without signif-
ificant differences in terms of morbidity and mortality. We believe also that the increasing diffusion of “one port” laparoscopy (SILS) will allow more and more diff-
fusion also for this kind of challenging operation 36,37.

Conclusion

Laparoscopic TC and SC represent efficacious and inter-
esting operations in the treatment of STC, offering a good postoperative quality of life and a reduced mor-
bindity compared to “open” surgery. Laparoassisted or total laparoscopic operation allows reduced postoperative pain and ileus, a shorter hospitalisation, a faster return to social activities along with a better cosmetic result and good medium-long term functional results.

Riassunto

Gli Autori presentano i risultati funzionali della colec-
tomia totale laparoscopica con ileo-retto-anastomosi e della colectomia subtotale laparoassitita con cieco-retto-
anastomosi in tre pazienti affetti da stipsi cronica da rall-
lentato transito. Tra il luglio del 2005 ed il luglio 2009, tre giovani pazienti affetti da stipsi cronica da ritardato transito sono stati sottoposti a colectomia totale laparo-
scopica ed ileo-rettostomia in due casi ed a colectomia subtotale seguita da cieco-rettostomia laparoassitita (intervento di Sarli) in un caso dopo fallimento del trat-
tamento medico. Ad un follow up medio di 3 anni sono stati esaminati diversi fattori – numero di evacuazioni quotidiane, soiling, incontinenza, dolore addominale, bloatig – in relazione alla qualità di vita. A dodici mesi i pazienti riferivano due-tre evacuazioni al giorno di feci morbide, con buona continenza e scomparsa del dolore addominale, ritenendosi notevolmente soddisfatti del risultato chirurgico. La colectomia totale seguita da ileo-
rettoanastomosi e la colectomia subtotale seguita da cie-
co-rettoanastomosi rappresentano gli interventi più dif-
fusi per il trattamento della stipsi cronica da rallentato transito, in pazienti selezionati e dopo fallimento del trat-
tamento medico conservativo. Dall’analisi della Letteratura emerge che la colectomia totale seguita da ileo-retto-anastomosi è largamente preferita con una per-
centuale di successo del 90%, anche se in circa il 30% dei casi è gravata da diarrea disabilitante o da stipsi per-
sistente. La colectomia subtotale con conservazione del cieco e della valvola ileocecale è seguita da migliori risul-
lati in termine di numero di evacuazioni quotidiane, “soi-
ling”, incontinenza fecale e sindromi aderenziali posto-
peratorie. L’approccio laparoscopico alle patologie colo-
rettali offre i tipici vantaggi di una chirurgia meno inva-
siva con rispetto parietale, minore dolore ed ileo posto-
peratorie, minore insorgenza di aderenze, una ridotta ospe-
dalizzazione ed infine un migliore risultato estetico rispet-
to alla chirurgia open. Nell’esperienza degli Autori due diversi interventi laparoscopici hanno consentito risultati funzionali simili a lungo termine, con notevole miglio-
ramento della qualità di vita.

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