

## LAPAROSCOPIC APPROACH IN RECTO-COLIC DISEASES IN CHILDREN

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### Abstract

**Objectives:** This paper is intended to analyze the clinical applicability and efficiency of the laparoscopic recto-sigmoidian resection in children suffering from congenital megacolon and chronic idiopathic constipation.

**Material and method:** Between April 2001 - June 2012 were operated on 49 children diagnosed with congenital megacolon or medically intractable chronic constipation. We excluded from the analysis 7 children operated on according to the Duhamel procedure, 6 cases in which the intervention was performed in a transanal (TERPT) manner, a newborn with a total aganglionic form who died shortly after ileostomy and two cases who were out of the records after colostomy. A laparoscopic rectosigmoidian resection was practiced in 31 cases, with a mean age of 3.8 years (6 weeks-17 years), and in two cases the intervention was limited to multiple intestinal biopsy. Recto-colic laparoscopic biopsy was performed in 20 patients: 5 times before surgery, 8 times when practicing colostomy and in 7 cases during definitive surgery. In the remaining patients the resection was assessed by changes in the colic wall appearance; histological examination were practiced on the fragments of the specimen. In 8 cases the final operation was preceded by temporary colostomy practice and in a single case by an ileostomy. Preoperative preparation of the colon was made after a variable schedule depending on the age of the patient and volume of the fecal retention. The standard approach- rectosigmoid resection is performed with optic trocar in the right upper quadrant and with two pararectal working trocars placed on the right and on the left. Oral nutrition was allowed from the first postoperative day, depending on recovery of the bowel movement. Patients were discharged on average, 9 days after surgery.

**Results:** There were no significant differences in postoperative outcome between children operated on for congenital megacolon ( 21 patients) and those for severe constipation (10 patients). Intestinal transit recovery was noted immediately, in day I-III, but, in some cases, followed by variable periods of bowel movement disorders requiring treatment. Patients were discharged, on average, 9 days after surgery. Soiling persisted in 4 of the patients at the time of analysis. In one of the patients redo surgery was required because of inadequate resection of the aganglionic segment. We recorded two cases of anastomotic fistula resolved by temporary colostomy. One of the patients

developed an anastomotic stenosis. In this series we registered no deaths.

**Conclusions:** Laparoscopic approach allowed personalized diagnostic strategy and improved surgical therapy results in colic motility disorders in children.

**Key words:** congenital megacolon, chronic constipation, laparoscopy.

### Introduction

Aganglionic colorectal resection and restoration of digestive continuity with preservation of functional anal sphincter structures was felt that the logical treatment of megacolon and applied in the clinic for the first time by Orvar Swenson in 1948 (1). The analysis of Swenson operation results allowed the identification of complications and unsatisfactory results that were directly related to the surgical approach- low rectal resection with coloanal anastomosis performed by combined abdomino-perineal approach. Trying to correct the Swenson operation, B.Duhamel proposed in 1956, an operation in which, after bowel resection, aganglionic rectum is preserved under the promontory (2), and in 1964 F.Soave proposed rectal mucosectomy, keeping rectal muscle sheath and pull through of the normal bowel within it (3). Accumulating significant number of patients, operated through these methods, showed that keeping the rectum becomes a source of limiting quality therapeutic results. In 1995 K.Georgeson (4) enters into practice rectosigmoidian resection and abdomino-perineal pull-through in one stage performed by laparoscopy.

**The purpose** of this paper is to present the initial series of patients operated on laparoscopic and to evaluate the safety and effectiveness of the method.

### Material and method

From April 2001 to June 2012 were treated 49 children affected by severe forms of colic motility disorders, diseases occurring outside a general, endocrine or lumbo-sacral spinal injuries. We use both contrast enema(fig.1, fig.2) and histopathologic exam to diagnose congenital megacolon or idiopathic constipation. Patients diagnosed with idiopathic constipation were operated on only after failure of medical therapy and bowel management program.

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Fig. 1 Congenital megacolon-contrast enema.



Fig. 2 Idiopathic constipation-contrast enema.

This study refers to 33 children, with a mean age of 3.8 years (2 weeks-17 years) who were operated on by laparoscopy. 31 recto-colic resections and coloanal anastomosis were practiced and 5 colic biopsies as unique laparoscopic surgery. In 4 cases the resection exceeded the left angle of the colon. "Full-thickness" colic biopsy was practiced 5 times preoperatively and 7 times in the beginning of surgery (extemporaneous histopathological examination). In the other 8 cases histopathological examination was performed before definitive surgery, when practicing external digestive derivation. In the remaining patients, the level of the colic resection was determined intraoperative according to appearance of the colon. Temporary colostomy was closed at the time of definitive surgery, except in a case with multiple postnatal cecal perforations, in which we left in place ileostomy practiced at birth. General preoperative preparation of patients was the standard one for major surgery. Colic preparation for surgery was performed according to the child's age. It was limited to evacuation and colic lavage with antiseptic solution on the operating table in infants, and went to the mechanical evacuation under anesthesia followed by administration of laxatives and enemas in cases with important fecal impaction.

#### OPERATIVE TECHNIQUE:

Very young children are placed supine across the operating table. We start with sterile drape below the nipple designed for double approach: abdominal and perineal - "total body preparation". The surgeon is placed at the patient's head, the camera at the operator's left arm and the video system at patient's feet. Pneumoperitoneum is set to achieve values of (6) 8-12 mmHg, the optical trocar is placed in the right upper quadrant in an open manner. Working trocars are positioned right and left at the level of

the pararectal line. An additional working trocar can be placed in the left upper quadrant. The surgery begins by creating a mesenteric window at the level estimated as the upper limit of the resection. Sigmoid dissection is followed by rectal dissection beneath the levator's level. The perineal stage includes exposure of the anal canal and rectum using circumferentially stiches placed approximately 1 cm above the dentate line. It is followed by the incision and dissection of the mucosa up to 3-4 cm, crossing the muscular wall and dissecting in the perirectal space to meet the plane of the abdominal dissection. Then we pull through and resect the dissected bowel performing a coloanal anastomosis.(fig.3 and 4) It is recommended in postoperative period to keep the nasogastric tube in place for decompression and to give nothing per oral for 12-24 hours, depending on the extent of the surgery. It is recommended checking the caliber of the anastomosis at 14 days after surgery.

#### Results

Digestive tolerance and bowel movements were restored in 24 -36 hours after surgery, depending on the patient's age, but there were noticed in some cases, variable periods of bowel movement disorders requiring medical treatment. In one patient there was a late recovery of intestinal transit, on the 7 p.op. day, without any sign of anastomotic or peritoneal complications. Oral feeding was allowed 12-24 postoperative hours. Analgesic therapy was always kept 72 hours postoperatively. Discharge patients was made, on average, 9 days after surgery, the average value over the published series, but directly influenced by the 3 cases with complicated evolution: two anastomotic fistulas and one incomplete resection. Persistent soiling uninfluenced by medical treatment, is present in 4 patients at the time of evaluation. Two of the operated patients developed anastomotic fistula with generalized peritonitis.

Those two have been revised by laparotomy and temporary colostomy was performed. In one patient, which first underwent a laparoscopic resection surgery, I practiced initially a temporary colostomy and then I practiced a redo

laparoscopic approach for remaining aganglionic bowel resection. We recorded one single anastomotic stenosis - an anastomotic fistula consequence which we controlled by periodic dilatations. There is no death recorded.



Fig. 3 Resection of the pulled bowled.



Fig. 4 Laparoscopically dissected bowel.

#### Comments

K.Georgeson was the first who reported a rectosigmoidian resection for megacolon by laparoscopic approach (4). The operation is actually a Swenson intervention with adaptation of the anal stage with technical elements taken from Soave technique. N.Bax reported laparoscopic reproduction of the Duhamel technique (5), but the largest reported series reveals a preference for lap Swenson technique. Laparoscopic surgery corrects one of the issues that were considered key quality outcomes for surgery: the aggressiveness of pelvic dissection of the various techniques. Compared with open surgery, minimally invasive approach is characterized by significantly reducing operative trauma, absence of parietal incisions, limiting visceral handling, reduced postoperative pain, decreased need for medication, general status and rapid recovery of gastrointestinal function, early resumption oral diet, limit the duration of hospitalization (6). Certain superiority of laparoscopic approach consists of quality of the pelvic rectal dissection, one of the risk elements in classic operations that can be done, in perfect conditions of visibility and safety in laparoscopic surgery (7). Improvement of all immediately postoperative clinical parameters is a common feature in laparoscopic surgery, but we should underline that some patients are carriers of intestinal stoma and may require laborious adhesions dissection, or closing or repositioning the stoma, partially modifying the immediate postoperative data. In our clinical series 8 patients had colostomy at the time of definitive surgery. We performed colostomy in emergency situations, when it was impossible to perform curative surgery and in those situations when colonic emptying was impossible in order to perform a safe surgery.

We prefer to perform laparoscopic Swenson approach with optical trocar in the right upper quadrant and pararectal working trocars right and left below the umbilicus. When the colon is too much distended we add a left upper quadrant

working trocar. This type of trocar placement allows easily to restore the operating field for total colectomy when it is necessary to mobilize the left colic angle or transversal colon resection. We resected the transverse colon below the right colic angle in 4 cases: in higher forms (1 case) and because of colostomy placed at this level (3 cases). We prefer to take colic biopsy before definitive surgery. We avoid endorectal biopsies due to subsequent intraoperative difficulties and prefer taking them when practicing colostomy. We performed multiple colic biopsies in 13 patients, of which 8 (16%) when practicing colostomy. Biopsy was performed 7 times at the beginning of definitive surgery. In the absence of biopsy, intraoperative appearance of the colon is an important decision regarding the resection level, but not enough. Under these conditions we performed an inadequate resection requiring colostomy and reoperation by laparoscopic approach. Two of our patients developed anastomotic fistula requiring open reintervention and temporary colostomy.

We believe that fistula occurred as a consequence of difficulties during coloanal anastomosis due to a mismatch segments (one case) and because of the tension at the level of the anastomosis. It is recommended to resect the dilated segment even if is histologically healthy, but we should avoid, in general, descending a very much stretched colon to the perineum, because it can cause further development of incontinence. Laparoscopic surgery favors early recovery of intestinal functions in the postoperative period, but we found difficulties in bowel movement recovery in those children in whom the preoperative preparation was made with strong medication or for a longer period of time (more than 2 days). We did not recorded acute enterocolitis in the immediate postoperative period, but 12 of the patients needed 3-5 months to reach a number of 1-2 bowel movements/day. At the time of follow-up 4 children presented soiling. All these patients were included in a

bowel management program consisting of: constipating diet, administration of pectin, small volume enemas and medication that reduces colic motility. (8) One of the patients present a minor degree of anastomotic stricture secondary to postoperative fistula and he is on a regularly program of dilatation –once in three months. Our series does not register patients that develop chronic constipation in the postoperative period. It is estimated that rectosigmoid resections performed by laparoscopy avoid residual constipation which is noted in approximately 15-20% of patients operated according to Duhamel or Soave procedures, but favors increased frequency of postoperative incontinence. It is estimated that excessive exposure of the

anal canal disrupt the internal anal sphincter fibers, decreasing its functional capacity.

**Conclusions**

Autonomous innervation disorders of the rectum and colon are the most common cause of low intestinal obstruction in children. Excluding the technical imperfections regarding these cases, we believe that unsatisfactory results in the treatment of these types of lesions should be sought to the limit where the pathology of the autonomic nervous system of the intestine is understood in this moment. Laparoscopic approach for rectocolic resection minimize intraoperative trauma and improve early and late postoperative outcome.

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