



Operative Technique

Laparoscopic modified Orr-Loygue mesh rectopexy for rectal prolapse in children

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ABSTRACT

Aim: We present an operating technique inspired from the Orr-Loygue mesh rectopexy adapted for laparoscopy, and detail the technical steps that differ from laparoscopic posterior suture rectopexy more commonly described in the paediatric literature.

Method: We present a retrospective study of all children who underwent a modified Orr-Loygue procedure for recurrent complete rectal prolapse from 1999 to 2012 after failure of conservative treatment. Pathological conditions, technical details of the procedure (excision of the Douglas pouch, use of a prerectal non-absorbable mesh to suspend the rectum to the presacral fascia and promontory avoiding any tension on the rectal wall) and postoperative results were reviewed.

Results: Eight patients were included, median age 6.5 years (range, 2–17). Median symptoms duration before surgery was 14 months (range, 6–24). Four patients presented with associated pathological conditions: 1 neurological impairment (Williams–Beuren syndrome), 1 severe malnutrition (mental anorexia), 1 solitary rectal ulcer with frequent bleeding, 1 syringomyelic cavity in the spinal cord. All procedures were completed laparoscopically with a median operative time of 98 minutes (range, 80–125). Median hospital stay was 3.5 days (range, 2–5). No postoperative constipation or recurrence was reported during the median follow-up period of 6 years (range 2–13).

Conclusion: The laparoscopic modified Orr-Loygue mesh rectopexy is a simple operating technique, reproducible and efficient as surgical treatment of nonresolving recurrent complete rectal prolapse in children. To avoid postoperative constipation, it is important to perform a tension-free rectopexy which can be achieved by the use of a mesh to simply suspend and not “fix” the redundant rectosigmoid. Nonetheless, a greater number of patients as well as colorectal electromyography or anorectal manometry would be necessary to prove the absence of postoperative deleterious functional disorder.

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Rectal prolapse (RP) in children has been well described in the Hippocratic Corpus. It is a relatively common condition during the first years of life, especially around the time of toilet training. It is mostly a self-limited condition that spontaneously resolve. Conservative management including stool softeners or laxatives and avoidance of prolonged straining, is successful in the vast majority of cases. Less than 10% of rectal prolapses require a surgical treatment [1].

When surgery becomes necessary, either after failure of medical management or because of associated conditions, different procedures may be offered. The aim of each surgical treatment is to control prolapse, restore continence and prevent constipation or impaired evacuation.

In our institution, minimal invasive surgery is the favourite approach whenever feasible. Therefore, a laparoscopic approach was chosen for those selected patients. Inspired from the open Orr-Loygue procedure we adopted a laparoscopic mesh rectopexy (LMR) that is supposed

to maintain the rectum's function as normal as possible to avoid postoperative constipation.

1. Materials and methods

A retrospective case review was performed. From 1999 to 2012, all patients who underwent surgical treatment for a recurrent complete rectal prolapse were included. Initial work-up included systematic sweat test and neurological examination. In case of abnormal neurological findings, an MRI was done to exclude spinal cord anomalies. In cases of severe constipation despite well conducted medical treatment or long prolapse, a defecography and an anorectal manometry were performed before surgery.

No bowel preparation was done before surgery. All patients received oral metronidazole (30 mg/kg/day) antibiotics for 48 hours around surgery.

The procedure is derived from the open Orr-Loygue procedure. With the patient in supine Trendelenburg position, the surgeon and scrub nurse stand on the right side, the assistant on the left and the monitor

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at the end of the table near the patient's feet. Laparoscopic approach is done through a 10 mm incision in the umbilicus for a 30-degree telescope. Two 5 mm operative trocars are used: one in each upper quadrant. When necessary, to help retraction of the redundant colon, an additional trocar is inserted in the right lower quadrant.

The procedure is divided into three steps: the obliteration of the abnormally deep Douglas pouch with peritoneal resection (Fig. 1), the blunt posterior dissection of the rectum and finally the fixation of the rectum to the promontory. To achieve this step, a Y-shaped strip of Mersilene mesh is cut to the appropriate size. Each leg of the Y-shaped mesh is secured to the rectal wall anteriorly and laterally (Fig. 2) near the lateral rectal ligaments (that were not divided). The stem of the Y is anchored to the sacral promontory laterally to the rectum by non-absorbable suture. To place the mesh in a retroperitoneal position, the peritoneum is closed with a continuous suture (Fig. 3).

Low-fiber diet was started at the first day after surgery and offered for two weeks post operatively. Neither stool softeners nor laxatives were given in the postoperative period.

2. Results

From 1999 to 2012, 8 patients were offered the modified Orr-Loygue mesh rectopexy for recurrent rectal prolapse despite a well conducted medical treatment for at least 6 months. They were 3 boys and 5 girls with a median age of 6.5 years (range, 2–17 years). Median symptoms duration was 14 months (range, 6–24 months). Associated pathological conditions were present in 4 patients: 1 neurological impairment (Williams–Beuren syndrome), 1 severe malnutrition (anorexia nervosa), 1 solitary rectal ulcer with frequent bleeding and 1 syringomyelic cavity in the spinal cord with a moderate weakness of the sphincter but no clinical incontinence. A proctoscopy with biopsies of the rectal ulcer confirmed the absence of a malignant lesion. The sweat test was negative in all cases.

Median operative time was 98 minutes (range, 80–125 minutes). All procedures were completed laparoscopically with no operative complications. Median hospital stay after surgery was 3.5 days (range, 2–5 days), the patients being discharged after the first defecation.

Median follow-up period was 6 years (range, 2–13 years) with annual visits. There were no recurrences of the rectal prolapse. No patient had any significant constipation and none required stool softeners or laxatives after surgery. Despite the absence of rectal prolapse recurrence and a normal postoperative defecography, the solitary rectal ulcer healed very slowly, but finally disappeared at 6 months postoperatively.

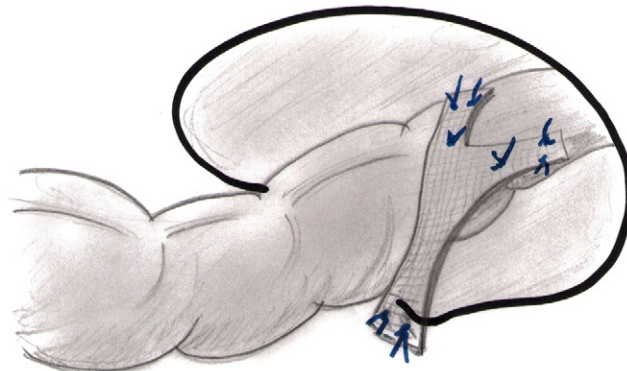


Fig. 2. The Y-shape mesh was cut out by the surgeon. Fixation points on the rectal wall and on the presacral periosteum on the promontory.

3. Discussion

Surgery for recurrent rectal prolapse is rarely required in children. Thus, the ideal procedure should be minimally invasive and have a low recurrence rate and minimal functional consequences on the bowel, mainly on constipation.

Laparoscopic approach for rectal prolapse repair is rarely reported in the paediatric literature. There are less than 100 reported cases [2–7]. All of those were treated using a laparoscopic posterior suture rectopexy (LPSR): the rectum was mobilized from the presacral space and the posterior rectal wall was secured to the sacral promontory using nonabsorbable sutures. In some cases (with severe laxity and weakness of pelvic floor and in patients with neurological diseases as myelomeningocele) additional retrorectal Prolene mesh was used [4]. Instead of hand-sewn promontorial periosteal sutures, Mi-Tek suture anchors with attached Ti-Cron needle thread were used in some cases [3]. In our series, the dissection is circumferential and the use of a Y-shape nonabsorbable mesh for rectopexy avoids a direct promontopexy. The aim is to spread evenly the fixation points and to leave the rectum sufficiently mobile.

With LPSR, a low recurrence rate (0 to 5%) is reported. We have not encountered any in our 8 cases. Among the technical differences between our LMR and the LPSR that could account for this lower recurrence rate is the way the rectal dissection is performed. During LPSR, the authors mainly dissect and expose a significant portion of the posterior rectal wall, but without complete perirectal dissection. No Douglas pouch resection is reported. However, in severe and recurrent rectal

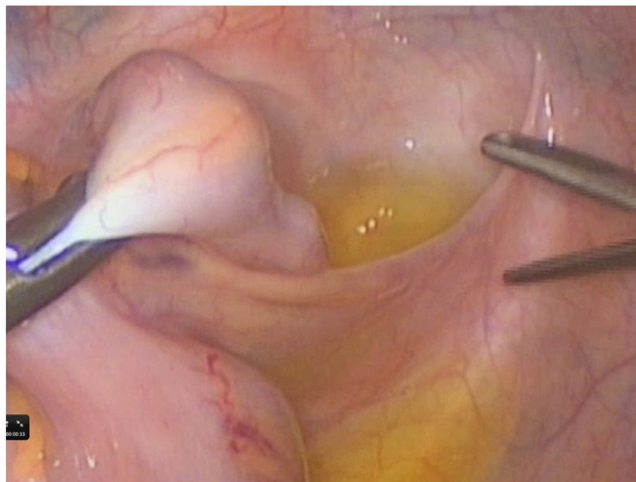


Fig. 1. A laparoscopic view of the Douglas pouch: the Douglas hernia requires a peritoneal excision (Douglasectomy).

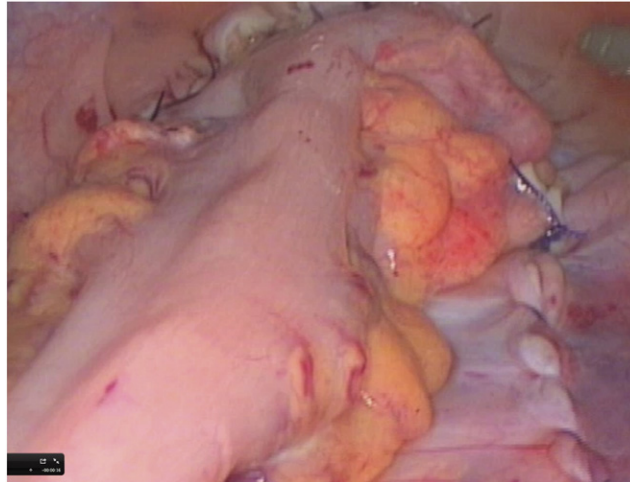


Fig. 3. The peritoneum was closed to place the mesh in a retroperitoneal position using a Vicryl 3/0 continuous suture.

prolapses, the Douglas pouch looks like a deep hernia sac anterior to the rectum. In LMR, the Douglas pouch resection is an important surgical step to prevent recurrence: an anterior deep dissection followed by the resection of the peritoneum and suture-closure of the pelvic cul-de-sac encourage adhesion formation on the pelvic floor. This anterior dissection has never been described in the paediatric literature till now.

The posterior dissection of the rectum is done as in Duhamel's procedure for Hirschsprung's disease [8]: the peritoneum is opened on both sides of the rectum from the promontory down to the lateral rectal ligaments. This dissection is made bluntly using peanuts dissectors and no coagulation device. The lateral rectal ligaments are preserved. This careful perirectal dissection may be an additional key to limit recurrences by promoting adhesion formation from the sacrum down to the pelvic floor. It might also prevent postoperative constipation [6] as it limits damage to the rectal blood supply or presacral innervation.

After LPSR, significant postoperative constipation requiring prolonged use of stool softeners or laxatives is often noted [3,6].

Any excessive tension on the fixation might be responsible for a significant modification of the motility of the colon and the rectum and lead to slow transit constipation. Changes in the viscoelasticity of the parietal wall of the rectum put under tension might lead to obstructed defecation [9,10]. Thus, in the LPSR where the rectum is pulled tight and straight to the promontory, any excessive tension on the rectal wall might induce or worsen constipation. In our series, no postoperative constipation was reported postoperatively despite the low-fiber diet and the absence of any laxatives prescription. This might be caused by the fact that in the LMR technique, the rectum is not "fixed" but only "suspended" to the promontory without excessive tension on the rectal wall. This suspension (and the perirectal dissection) prevents the rectum from prolapsing but respects the local peristalsis. A colorectal electromyography and an anorectal manometry before and after surgery could be useful to prove the advantages of our technique compared to a laparoscopic posterior suture rectopexy with mild or moderate stress on the rectal wall.

In the adult literature, sepsis has been reported in 2% to 16% of patients with mesh rectopexy [11]: we did not encounter any. In the adults, the main risk factor is an associated colon resection, and the use of a mesh seems safe when no sigmoidectomy is performed [11]. To further decrease the risk of sepsis, all our patients benefited from antibiotic prophylaxis. Careful rectal dissection to avoid pelvic haematoma

and no postoperative peritoneal drainage might be other factors. These basic principles avoided any complication due the use of foreign material in this series.

4. Conclusion

The modified Orr-Loygue laparoscopic mesh rectopexy seems efficient, safe and reproducible. Laparoscopy offers the advantage to allow a complete dissection of the rectum and to suspend the redundant colon without tension by a mesh to the promontory with all the benefits of minimal invasive surgery. This technique has a low recurrence rate and promotes normal bowel function when compared to the published techniques. Further research, for instance with colorectal electromyography or anorectal manometry, should prove the main functional differences between the several techniques. These early promising results suggest that laparoscopic mesh rectopexy could become a useful tool in the surgeon's armamentarium.

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