Technique

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SURGICAL ENDOSCOPY
and Other Interventional Techniques

Laparoscopic ventral recto(colpo)pexy for rectal prolapse: surgical technique and outcome for 109 patients

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Abstract
The authors propose a new laparoscopic technique for correction of rectal prolapse. The unique feature of this technique is that it avoids any posterolateral dissection of the rectum. The mesh is sutured to the anterior aspect of the rectum to inhibit intussusception. The technique was applied in 109 consecutive patients to correct total rectal prolapse. Conversion was needed for four patients. No postoperative mortality or major morbidity occurred. Minor morbidity was noted for 7% of the patients, and a recurrence rate of 3.66% was observed. Because this technique limited the dissection and the subsequent risk of autonomic nerve damage, a cure comparable with that resulting from classical mesh rectopexy can be anticipated.

Key words: Laparoscopy — Nerve sparing — Rectal prolapse — Rectopexy

A variety of procedures is available for correction of rectal prolapse. Results suggest that abdominal rectopexy, as compared with perineal procedures (Delormes' mucosectomy or Altemeier's perineal rectosigmoidectomy), offers the best prospect of cure, with a lower recurrence rate [7]. Furthermore, perineal procedures reduce rectal capacity and compliance, which can result in persistent postoperative incontinence [10]. Abdominal procedures aim to reduce rectal mobility and include rectosacral fixation using sutures, mesh, or sponge. Postoperative constipation, a continuing problem after rectopexy, is observed in up to 50% of patients [3, 6].

An inherent step in all rectopexies is full mobilization of the rectum. Autonomic nerve injury during extensive rectosigmoid mobilization may lead to postoperative dysmotility and impaired evacuation [9, 12, 14]. Virtually every type of open transabdominal surgical approach to rectal prolapse has been performed laparoscopically. A substantial body of literature supports the laparoscopic approach as superior in terms of postoperative pain, length of hospital stay, and ileus [13]. Salkeld et al. [11] recently reported on the positive economic impact of the laparoscopic approach.

We aim to describe a novel technique of laparoscopic ventral rectopexy (LVR) that avoids any posterolateral rectal mobilization to minimize the risk for autonomic neural damage. The unique anterior placement of the mesh with reinforcement of the rectovaginal septum restores normal rectal evacuation. In this article, we highlight the details of this new laparoscopic technique and focus on its reliability and safety.

Patients and methods

From January 1995 to December 2004, 109 patients underwent LVR for total rectal prolapse. Most of these patients were women ($n = 100$) with a mean age of 49.3 years (median, 50 years; range, 16–88 years). The male patients were significantly younger, with a mean age of 38.2 years (median, 32 years; range, 22–72 years; $p = 0.033$). Of the 109 patients, 33 (30%) had undergone previous pelvic surgery, the most common of which was hysterectomy, performed for 19 patients. For 18 patients, LVR was performed for recurrent rectal prolapse (Table 1). Data concerning previous pelvic surgery, operative difficulties and conversion, postoperative morbidity and recurrence were gathered from a prospective database.

Operative details

Patients undergo bowel preparation using sodium phosphate (Fleet Phospho-Soda; Fleet Pharmaceuticals, NV Wolf, Sint-Niklaas, Belgium) and receive a single dose of a broad-spectrum antibiotic. The patients are placed on a moldable "bean bag" and positioned in a modified lithotomy position, with both arms along the body and catheterized.

A pneumoperitoneum is created. A cannula is placed at the umbilicus, and the camera is inserted. Three additional ports are placed: a 12-mm port in the right lower quadrant, a 5-mm port in the left lower quadrant, and a 5-mm port in the right lateral abdominal wall. The surgeon is on the patient's right side, and the assistant surgeon (camera person) is on the left.

With the patient in steep Trendelenburg position, all the small bowel is retracted out of the pelvis. A temporary hysteropexy using

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Table 1. Previous pelvic surgery for 33 patients who underwent laparoscopic ventral rectopexy for total rectal prolapse

Procedure	*n*
Hysterectomy	19
+ Cystopexy	1
+ Total colectomy	1
Rectopexy	8
Cesarean section	3
Myomectomy	1
Colpopexy	1
Kidney transplant	1
	33 patients

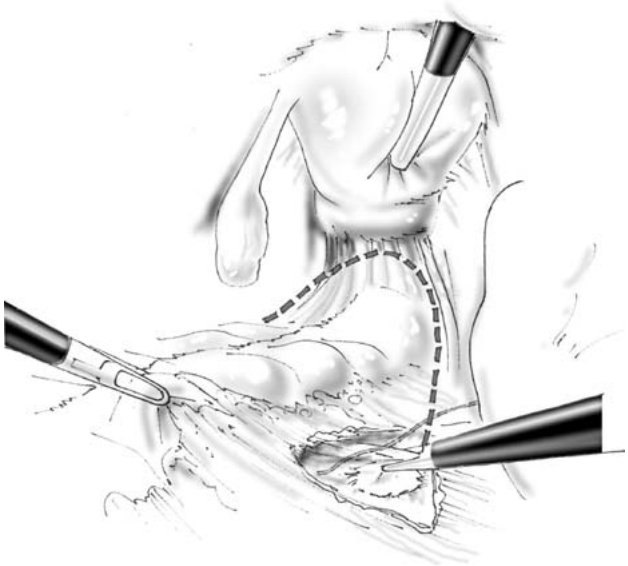

Fig. 1. Dissection starts at the sacral promontory with preservation of the right hypogastric nerve. The caudal extension of the peritoneal incision follows the dotted line.

transparietal sutures through the round ligaments enhances the pelvic view. Dissection is performed using either ultrasonic shears or monopolar coagulation. It is helpful to have an angled 30° scope, especially for the deepest dissection.

Step 1: Dissection. The assistant retracts the mesosigmoid ventrally and to the left. The right ureter is visualized as it crosses the right iliac artery. A peritoneal incision is made over the sacral promontory. The incision is extended caudally in an inverted J form along the rectum and over the deepest part of the pouch of Douglas. Special care is taken not to damage the right hypogastric nerve at the pelvic inlet (Fig. 1). Denonvillier's fascia is incised, and the rectovaginal septum is broadly opened down to the pelvic floor (Fig. 2). Probing of the vagina can facilitate this maneuver. Lateral and posterior dissection is avoided. Thus, no rectal mobilization or transsection of the so-called lateral ligaments is performed. At this stage, the surgeon can decide to resect the redundant pouch of Douglas, However, care should be taken not to enter the rectum inadvertently, and hemostasis should be meticulous.

Step 2: Mesh fixation. A strip of Marlex (Bard, Crawley, UK) trimmed to 3 × 17 cm is inserted. Using nonabsorbable sutures (EthibondExcel 0 or 00; Ethicon, Johnson & Johnson, Brussels, Belgium), the mesh is sutured to the ventral aspect of the distal rectum. The sutures are passed through the right lower quadrant cannula. Using a knot-pusher, the sutures are tied down with simple surgical knots. Further sutures fix the mesh to the lateral seromuscular border of the rectum, proximal and distal to the incised pouch of Douglas.

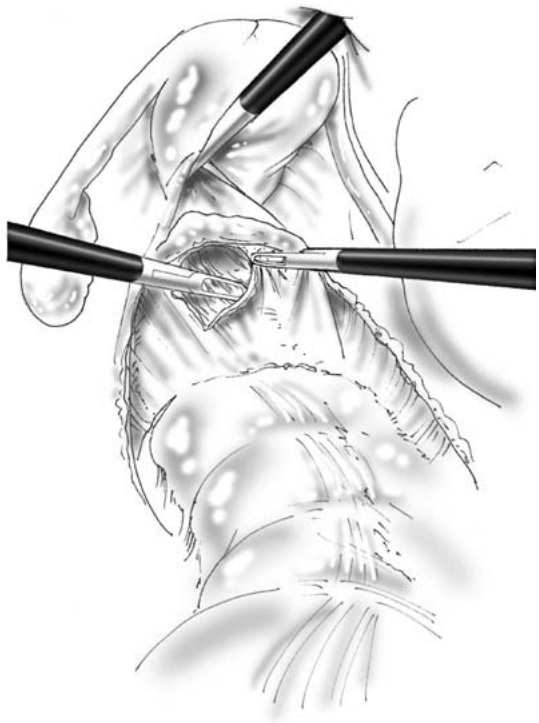

Fig. 2. The deepest part of the fold of Douglas is retracted and incised. The rectovaginal septum is opened without any lateral dissection.

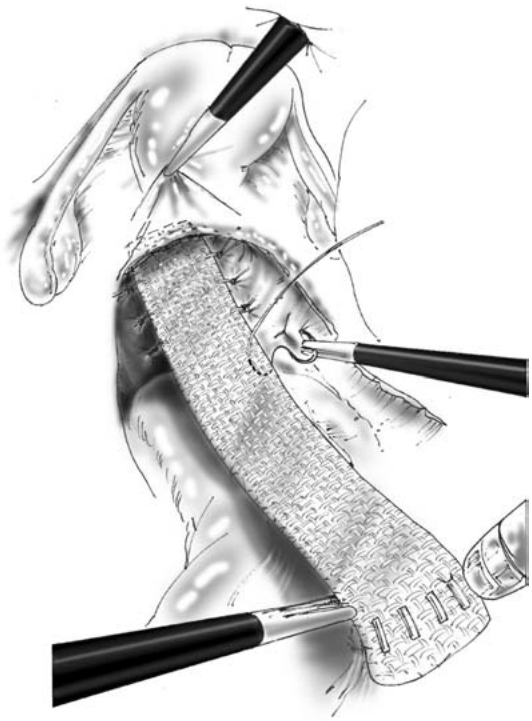

Fig. 3. A strip of polypropylene is sutured to the anterior aspect of the rectum and fixed without traction on the sacral promontory.

The position of the mesh allows reinforcement of the rectovaginal septum. The mesh then is fixed upon the sacral promontory using either sutures or an endofascia stapler (Endopath EMS; Ethicon Endosurgery, Norderstedt, Germany). No traction is exerted on the rectum, but the prolapse should be reduced at the time of mesh fixation. The

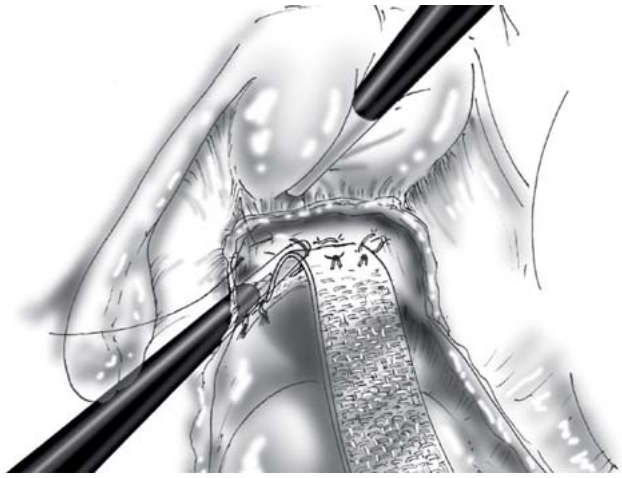

Fig. 4. The posterior vaginal wall is elevated and sutured to the same mesh.

Fig. 5. Further fixation of the mesh prevents a higher intussusception of the rectum.

rectum remains in the sacrococcygeal hollow (Figs. 3 and 4). The clinician should take care not to strangle the rectosigmoid between the sacral promontory and the mesh.

Step 3: Vaginal fornix fixation. The posterior vaginal fornix (or posterior vaginal vault) is elevated and sutured to the same strip of mesh (Fig. 5). If no enterocele is present, two lateral sutures suffice. In other cases, more sutures must be placed. This maneuver allows closure of the rectovaginal septum and suspension of the middle pelvic compartment. In this way, a vaginal vault prolapse or enterocele is corrected.

Step 4: Neo-Douglas formation. Next, the lateral borders of the incised peritoneum are closed over the mesh (Fig. 6) using resorbable sutures (Vicryl; 00 Ethicon, Johnson & Johnson). This elevates the neo-Douglas over the colpopexy. The mesh should be covered completely with peritoneum to avoid any later small bowel fixation to the mesh. No drain is left in place. Cannulas are removed in a routine fashion, and only the fascia at the 12-mm port is closed.

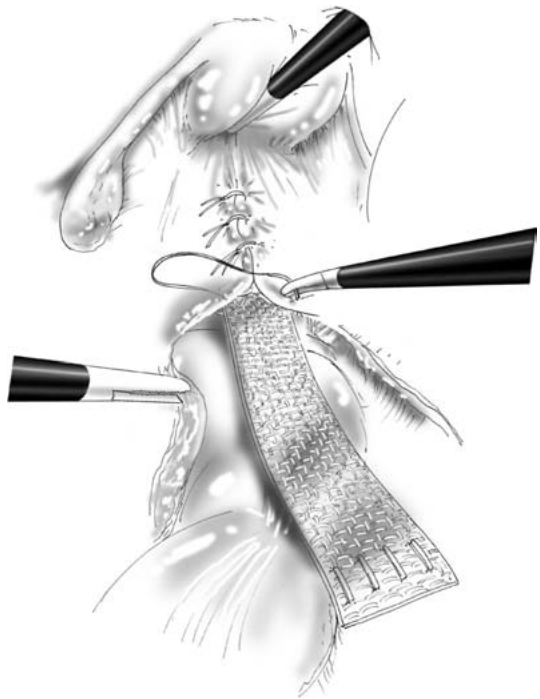

Fig. 6. The peritoneum is securely closed over the mesh forming a neo-Douglas.

Postoperative treatment

Thrombose prophylaxis using low-molecular-weight heparin is continued during the hospital stay. A normal diet is resumed as soon as possible. The Foley urinary catheter is removed on day 3, and the patients are allowed to leave the hospital after passing stools. A fiber-enriched diet is prescribed, and straining effort in the absence of any urge sensation is discouraged.

Statistical analysis

Data are presented as mean, median, and range. Yates' corrected chi-square was used for nonparametric data, and a *t*-test was used for paired and unpaired samples. A p value less than 0.05 was considered statistically significant.

Results

Conversions

Conversion was needed for only four patients (3.66%). Although 33 patients had undergone previous pelvic surgery, only in two patients were severe adhesions the reason for conversion. Previous pelvic surgery is not a significant risk factor for conversion. In an 88-year-old woman, conversion was dictated by anesthesiologic reasons. Bleeding from the left iliac vein was the cause of conversion for one patient.

Table 2. Recurrences after laparoscopic ventral rectopexy (LVR) and subsequent surgical therapy

Patient no.	Primary/secondary rectal prolapse	Type of recurrence	Failure	Resurgery
5	Secondary (Delorme)	Total rectal prolapse	Promontory fixation	Laparoscopy Frykman-Goldberg
12	Primary	Enterocele	Colpopexy	Laparoscopy Colpopexy
23	Secondary (Delorme)	Total rectal prolapse	Promontory fixation	Laparoscopic LVR
51	Primary	Total rectal prolapse	Promontory fixation	Laparoscopic LVR
96	Primary	Total rectal prolapse	Incomplete reduction	Altemeier

Morbidity

Perioperative mortality did not occur. Morbidity was noted in eight patients (7%), but it was minor: urinary tract infection in five patients, prolonged (6 weeks) neuralgia at the right lower quadrant port in one patient, prolonged ileus treated conservatively in one patient, and fever *e causa ignota* in one patient. No mesh infection or mesh erosion was observed in this series.

Hospital stay

Overall, the hospital stay was 5.14 days (median, 5 days; range, 2–10 days). However we found a significant reduction in hospital stay over time. The median hospital stay for the last 25 patients was 4 days, which was significantly shorter than the hospital stay of 7 days for the first 25 patients ($p = 0.020$).

Recurrence

Three patients experienced a recurrent rectal prolapse. In all three patients, detachment of the mesh at the sacral promontory was the cause. In one patient, a large enterocele developed due to dehiscence of the colpopexy. One patient experienced an incomplete reduction of the rectal prolapse at the time of surgery (Table 2).

Discussion

The idea for the reported laparoscopic technique is based on the cinegraphic data of Broden and Snellman [2], who demonstrated that an intussusception of the rectum is the means by which prolapse of the rectum originates. Therefore, Roscoe R. Graham [4] showed that the apex of the prolapse is the pelvic cul-de-sac, and that the major portion of the external prolapse occurs at the expense of the anterior rectal wall. The proposed mesh repair restores the normal anatomic position of the anterior rectal wall and prevents intussusception at straining.

An enterocele is not an uncommon finding with total rectal prolapse. Recent defecography data from Mellgren et al. [8] showed an enterocele incidence of 42% (157 of 371 patients). This confirms our belief that treating or preventing the appearance of an enterocele is an integral part of rectal prolapse repair. Obliteration of the pouch of Douglas by serial purse-string sutures according to the Moschowitz procedure has been added to classical rectopexy. The anterior position of the mesh allows performance of a colpopexy or vaginal vault fixation and provides a permanent support for the neo-Douglas, which will be elevated above the mesh.

It seems important to have a permanent implant to correct rectal prolapse and to allow for a modest recurrence rate. Our recurrence rate of 3.66% is in line with the reported recurrence rates for classical mesh rectopexy. Avoidance of any posterolateral rectal mobilization does not seem to increase the recurrence rate.

Although no traction should be exerted on the rectum, complete reduction of the prolapse above the anal sphincter complex at the time of rectopexy is necessary. An adequate anchorage of the mesh to the sacral promontory is essential.

Presacral bleeding can occur after any procedure in which the posterior rectum is mobilized. This is an inherent step in classical rectopexy. Furthermore, fixation of the mesh to the presacral fascia increases the risk for puncture to the anterior presacral plexus or basivertebral veins. Therefore, avoidance of posterior rectal mobilization and fixation to the sacral promontory makes this risk nearly virtual. In this series, only one bleeding occurred at the left iliac vein, which necessitated a conversion.

From the metaanalysis performed by Brazzelli et al. [1] on surgery for rectal prolapse, it appears that preservation of the "lateral ligaments" is associated with an improvement in continence and a reduction in constipation. Although it is beyond the scope of the article, we refer to the reported long-term functional outcome after LVR for total rectal prolapse in 42 consecutive patients. Continence improved in 90% of the patients, and constipation resolved in 84%. [5] We assume that this beneficial effect is secondary to the avoidance of any rectal mobilization and sympathetic nerve injury, and that the unique position of the mesh on the anterior aspect of the rectum can add to improved rectal evacuation.

This data further demonstrate that the reported technique is reliable because conversion rates are low even in the presence of previous pelvic surgery. Morbidity was minor, reflecting the safety of this novel technique.

Conclusion

Despite a multitude of existing operative techniques for correction of rectal prolapse, we believe that the reported laparoscopic technique can become a valuable

extension of the available surgical armamentarium. This technique further allows correction of a concomitant enterocele and elevation of the neo-Douglas. The avoidance of rectal mobilization results in fewer functional side effects.

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