

## Anterior rectopexy for full-thickness rectal prolapse: Technical and functional results

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**Data sharing:** Technical appendix and dataset are available from the corresponding author at [jlfaucheron@chu-grenoble.fr](mailto:jlfaucheron@chu-grenoble.fr). No additional data are available.

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### Abstract

**AIM:** To assess effectiveness, complications, recurrence

rate, and recent improvements of the anterior rectopexy procedure for treatment of total rectal prolapse.

**METHODS:** MEDLINE, PubMed, EMBASE, and other relevant database were searched to identify studies. Randomized controlled trials, non-randomized studies and original articles in English language, with more than 10 patients who underwent laparoscopic ventral rectopexy for full-thickness rectal prolapse, with a follow-up over 3 mo were considered for the review.

**RESULTS:** Twelve non-randomized case series studies with 574 patients were included in the review. No surgical mortality was described. Conversion was needed in 17 cases (2.9%), most often due to difficult adhesiolysis. Twenty eight patients (4.8%) presented with major complications. Seven (1.2%) mesh-related complications were reported. Most frequent complications were urinary tract infection and urinary retention. Mean recurrence rate was 4.7% with a median follow-up of 23 mo. Improvement of constipation ranged from 3%-72% of the patients and worsening or new onset occurred in 0%-20%. Incontinence improved in 31%-84% patients who presented fecal incontinence at various stages. Evaluation of functional score was disparate between studies.

**CONCLUSION:** Based on the low long-term recurrence rate and favorable outcome data in terms of low *de novo* constipation rate, improvement of anal incontinence, and low complications rate, laparoscopic anterior rectopexy seems to emerge as an efficient procedure for the treatment of patients with total rectal prolapse.

**Key words:** Total rectal prolapse; Laparoscopy; Anterior rectopexy; Ventral rectopexy; Results; Recurrence; Systematic review

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**Core tip:** Several procedures have been described to correct full-thickness rectal prolapse. They can be separate into abdominal procedures and perineal procedures. Laparoscopic anterior rectopexy has become the procedure of choice for the treatment of total rectal prolapse in many colorectal surgical teams. This review assesses effectiveness, morbidity, recurrence rate, and recent improvements of the technique.

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## INTRODUCTION

Total or complete rectal prolapse is the circumferential full-thickness protrusion of the rectal wall through the anus<sup>[1]</sup>. The cause of the disease is unknown, but anatomical disturbances are commonly found in patients with total rectal prolapse. These are a straight rectum, a lack of fascial attachments of the rectum against the sacrum, a redundant sigmoid colon, a diastasis of the levator ani, an abnormally deep Douglas pouch, and a patulous anus<sup>[2]</sup>. Full-thickness rectal prolapse can affect men and women, of any age. However, it is more common in women, reflecting the fact that obstetric injuries are its most common cause<sup>[3]</sup>. The impact on the quality of life can be very severe. Patients with total rectal prolapse present with a lump at the anal verge, typically after defecation, which may reduce spontaneously or require reduction by digital pressure. This should be distinguished from other causes of a lump, such as mucosal prolapse or hemorrhoids. Many patients report fecal incontinence which can be passive incontinence, urge incontinence, or mucus discharge (soiling). Total rectal prolapse may also cause pain, ulceration, bleeding<sup>[4]</sup>, incarceration<sup>[5]</sup> and even gangrene. Patients may report a history of slow transit constipation, and/or obstructed defecation syndrome, which is typically characterized by a sensation of incomplete evacuation or of a blockage, hard stools, the need to digitate vaginally, anally, or perianally, straining, repeated (often unsuccessful) visits to the toilet, and anorectal heaviness or even pain, bringing up the problem of a past history of internal rectal prolapse.

Several procedures have been described to correct full-thickness rectal prolapse<sup>[6]</sup>. The objectives of the surgical treatment are to cure the anatomical abnormality, to cure the accompanying symptoms

of incontinence, constipation, and pain, with an acceptable rate of recurrence and the lowest rate of complications.

Two approaches are generally possible to treat the patients. The perineal approach with the Delorme<sup>[7]</sup> and the Altemeier<sup>[8]</sup> procedures are less and less proposed to the patients due to the high rate of recurrences. As a result, they are only advocated for patients who are not candidates for an abdominal operation<sup>[6]</sup>. It is nowadays generally accepted that the abdominal procedures including the rectopexy to the promontory carry a lower recurrence rate and improved functional outcome and are therefore preferred over the perineal operations<sup>[9]</sup>. Since its first description by Orr in 1953, and the modification introduced by Loygues<sup>[10]</sup> in 1984, the procedure of rectopexy has evolved through years and has become the procedure of choice in case of total rectal prolapse, but also in cases of other kind of posterior pelvic floor dysfunction such as internal rectal prolapse and enterocele. The aim of this review is to assess the effectiveness, complications, recurrence rate, and recent improvements of the so-called anterior or ventral rectopexy procedure for treatment of total rectal prolapse.

## MATERIALS AND METHODS

Specific guidelines outlined in the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) statement have been followed<sup>[11]</sup>. A systematic review of the literature was performed on the major electronic databases including MEDLINE, PubMed, EMBASE, and the Cochrane Central Register of Controlled Trials. Research keywords syntax was: [(total rectal prolapse) OR (full-thickness rectal prolapse)] AND [(rectopexy) OR (anterior rectopexy) OR (ventral rectopexy)] AND [laparoscopy] AND [(results) OR (technical results) OR (functional results) OR (morbidity)]. The titles and abstracts resulting from the search were screened by two reviewers independently (JLF and BT). The full text versions of the relevant articles were obtained. All references of these articles were carefully screened for any further articles that could have been not identified in the initial search.

Inclusion criteria were: randomized controlled trials, non-randomized studies and original articles in English language, with more than 10 patients, who underwent laparoscopic ventral rectopexy, for full-thickness rectal prolapse, with a follow-up over 3 mo, stating outcome measures of morbidity, functional results (constipation and fecal incontinence), or recurrence, in adult population.

Exclusion criteria were: case reports, editorials, review and meta-analysis, rectopexy associated with colonic resection, perineal approach, any kind of rectopexy for other reason than full-thickness rectal prolapse, and short-term follow-up less than 3 mo. Duplicate reports were identified and excluded from

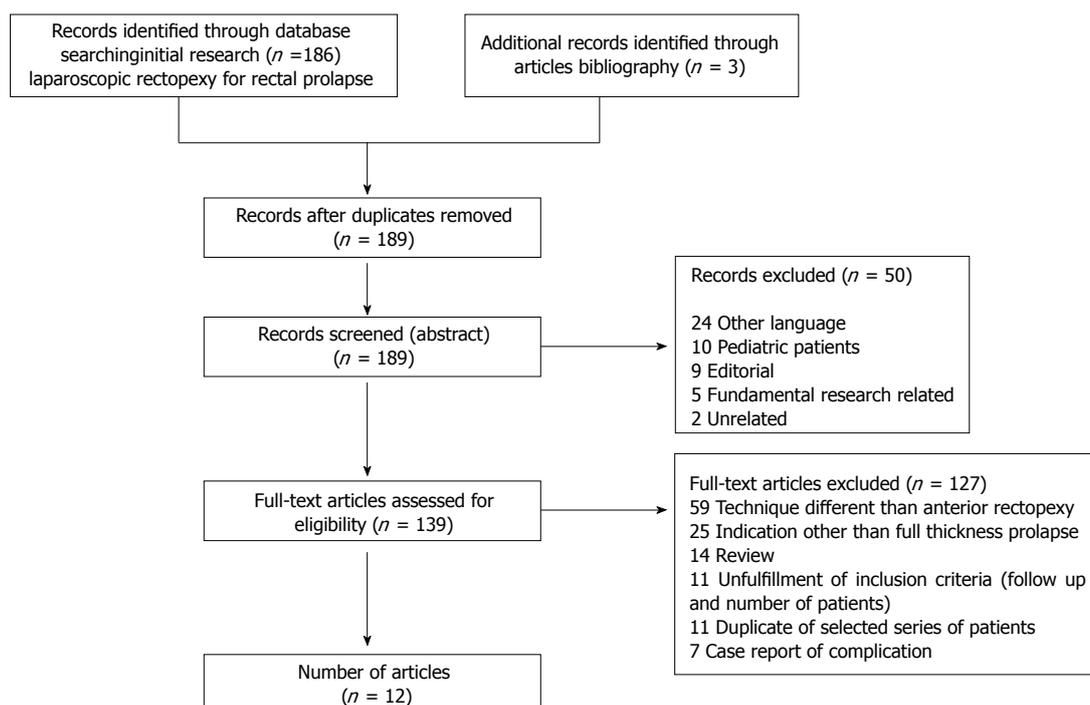


Figure 1 Selection of studies for the review.

this review. Any difference in opinion was resolved by common reading and consensus. Articles that not clearly stated indication, technique and/or outcome were excluded after common second careful reading by the two reviewers.

## RESULTS

The database search identified 186 abstracts, to which 4 further papers were added from the references of the corresponding adequate articles. Following application of inclusion and exclusion criteria, 12 non-randomized case series studies with 574 patients who were treated by laparoscopic ventral rectopexy for total rectal prolapse were included in the review (Figure 1)<sup>[12-23]</sup>. A summary of included studies that gives attention to some technical issues is shown in Table 1.

Morbidity was also evaluated (Figure 2). Complications occur in 100 patients (17.4%). No surgical mortality was described. Conversion was needed in 17 cases (2.9%), most often due to difficult adhesiolysis. Twenty eight patients (4.8%) presented with major complications (Clavien Dindo  $\geq$  III; Figure 3). Seven mesh-related complications (1.2) were reported. Most frequent complications were urinary tract infection and urinary retention.

Mean recurrence rate was 4.7% with a median follow-up of 23 mo. Improvement of constipation range from 3%-72% of the patients and worsening or new onset occurred in 0%-20%. Incontinence improved in 31%-84% patients who presented fecal incontinence at various stages (Table 1). Evaluation of functional score was disparate between studies and it

is very difficult to draw conclusions on these data.

## DISCUSSION

The abdominal techniques described up to now for the treatment of total rectal prolapse differ in the approach (open versus laparoscopic), extent of rectal mobilization (anterior versus anterior and posterior versus complete mobilization), excision or simple incision of the Douglas pouch peritoneum, methods used for rectal and sacral fixation, type, size, nature and number of meshes used for the pexy, and addition or omission of a sigmoid resection. The wide range of postoperative outcomes we observed in this review can probably be explained by several parameters, one of which being the various modifications of the technique used by the authors.

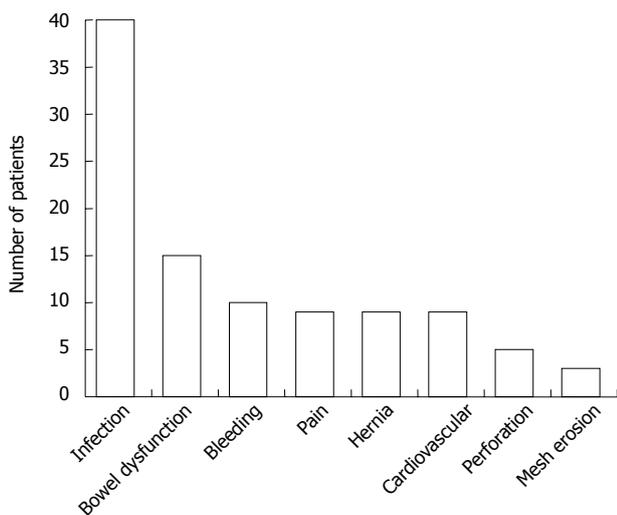
All the procedures of anterior rectopexy to the promontory derived from the original open technique described by Loygue *et al.*<sup>[10]</sup> in 1984. From 1994, the procedure was proposed through a laparoscopic approach<sup>[14,24,25]</sup>. The advantages of a laparoscopic rectopexy to exteriorized rectal prolapse are now well documented<sup>[14,25-29]</sup>. It has been proven as effective as open rectopexy in terms of clinical results, functional results, and recurrence rate. There are significant reductions in postoperative pain, hospital stay, recovery time, return to work, and length of scar. The laparoscopic approach is even cheaper than the open approach<sup>[30]</sup>. The laparoscopic approach has been the first manner to improve the results of anterior rectopexy.

Complete mobilization of the rectum down to

**Table 1 Summary of included studies**

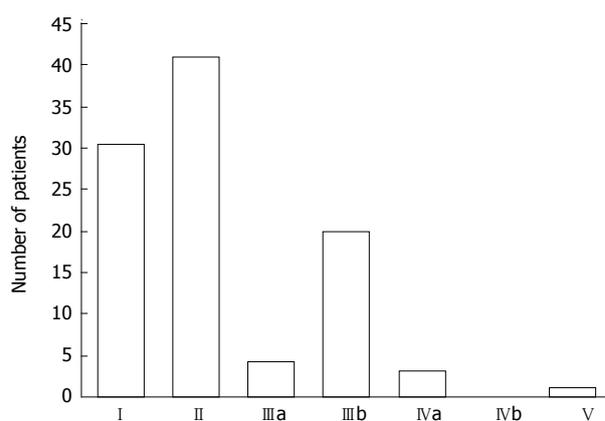
Ref.	Year	Surgical technique	Median FU (mo)	Recurrence	Constipation (improvement-worsening/new on set)	Incontinence (improvement-worsening)	Conversion and morbidity
Formijne Jonkers <i>et al</i> <sup>[12]</sup>	2014	Laparoscopic	42	0	159%-W 25%	172%	1 conversion (injury of small bowel), 1 ileus, 2 myocardial infarctions
Germain <i>et al</i> <sup>[13]</sup>	2014	Robotic	51.8	13	167%-W 14%	182%	3 conversions (adhesion, rectal tear, presacral hemorrhage)
van Geluwe <i>et al</i> <sup>[14]</sup>	2013	Laparoscopic	25.3	4.6	171%-W 2.3%	184%	8 conversions (5 adhesiolysis, 3 bleeding), 23 UTI, 2 ileus, 9 hematomas, 6 cardiac problems, 1 bowel perforation, 1 examination under anesthesia, 1 secondary adhesiolysis, 1 strangulation, 5 mesh erosions, 5 port site
Gosselink <i>et al</i> <sup>[15]</sup>	2013	Laparoscopic	12	NS	W 8%	174%-W 11%	7 urinary retentions, 1 UTI, 1 port site infection, 1 mesh erosion
Mäkelä-Kaikkonen <i>et al</i> <sup>[16]</sup>	2013	Laparoscopic (50%) Robotic (50%)	3	2.5	W 2.5%	W 2.5%	1 conversion (bleeding), 1 vaginal perforation, 1 wound infection
Faucheron <i>et al</i> <sup>[17]</sup>	2012	Laparoscopic	75	3	NA	NA	2 brachial plexus palsy, 3 UTI, 1 ureteral lesion, 1 small bowel perforation, 1 mesh erosion
Wijffels <i>et al</i> <sup>[18]</sup>	2011	Laparoscopic	23	3	NA	NA	1 myocardial infarction, 1 small bowel obstruction, 1 wound infection, 3 port site infections, 1 UTI, 1 chest infection

NS: Not significant; NA: Not available.



**Figure 2 Type of complications.** Horizontal axis for complications; Vertical axis for number of patients.

the levator ani muscles, as used in the sutured rectopexy or in the posterior mesh rectopexy has been progressively abandoned by the majority of authors, due to high rate of postoperative constipation and outlet obstruction syndrome<sup>[31]</sup>. The lateral wings of the rectum contain important autonomic nerves from the pelvic plexus to the rectum<sup>[32]</sup>. The section or injury (like burning or compression) of these lateral ligaments could explain the more frequent postoperative constipation rate and the more frequent dyschezia rate observed in the surgical techniques involving posterior and posterolateral



**Figure 3 Severity of complications following Dindo Clavien classification.** Adapted from Dindo *et al* Classification of surgical complication. *Ann Surg* 2004; 240: 205-213. Horizontal axis for Dindo Clavien grade; Vertical axis for number of patients.

rectal mobilization, as stated by Bachoo *et al*<sup>[33]</sup> in their Cochrane review. Some cases of rectal akinesia have been published to be due to complete rectal mobilization during rectopexy<sup>[34]</sup>. The initially published anterior rectopexy, known as the Orr-Loygue procedure, involved anterior and posterior rectal mobilization to the level of the levator ani muscle, a Douglas pouch removal, and suturing of two meshes on to the anterolateral walls of the rectum and the sacral promontory<sup>[10]</sup>. In 2004, D’Hoore has described a modification that entails posterior dissection limited to exposure of the sacral promontory, no Douglas pouch excision, and suturing of a 3 centimeters wide

mesh to the ventral aspect of the low rectum<sup>[35]</sup>. At the same time, we have described another modification of the Orr-Loygue procedure (the main author learned the Orr-Loygue procedure with Parc at Saint-Antoine hospital) that involved exactly the same level of rectal dissection as the D'Hoore technique, but also a Douglas pouch peritoneum excision, the use of two thinner non absorbable meshes that were fixed on to the anterolateral part of the low rectum, and finally the closure of the peritoneum over the meshes to isolate them from the abdominal cavity and to create a shallow neopouch of Douglas<sup>[25]</sup>.

Excision of the peritoneum of the pouch of Douglas was an integral part of the procedure described by Loygue and Parc, for the treatment of patients with total rectal prolapse. The rationale for that was based on the fact that in patients suffering from full-thickness rectal prolapse, one of the anatomical abnormalities is the depth of the Douglas pouch. Subsequently, the excision of the redundant peritoneal cul de sac might well decrease the risk of prolapse recurrence. In our recent published series of 175 consecutive patients with full-thickness rectal prolapse treated laparoscopically with the modification we brought to the Orr-Loygue procedure, the cumulative recurrence rate was 3% at 5 years, which is one of the lowest rate published until now<sup>[17]</sup>.

Debate continues as to which type of mesh fixation is optimum for rectopexy. Up to now, there has been no randomized trial comparing the use of sutures or staples, or tacks for the fixation of the meshes to the rectum or anchorage to the sacral promontory. Laparoscopic rectopexy using mesh fixation with spiked chromium staples has been shown to be feasible and quicker than using sutures<sup>[36,37]</sup>. In our experience, the choice of the use of staples instead of sutures was based on the fact that the fixation of the meshes was safer (the size of staples avoids any protrusion inside the rectal lumen) and quicker<sup>[17]</sup>. The use of staplers might well be an improvement in the procedure of laparoscopic anterior rectopexy to the promontory.

Another debate is about which type of mesh is the best for anterior rectopexy. Smart *et al*<sup>[38]</sup> recently published a systematic review of 13 observational studies reporting outcome of 866 patients undergoing anterior rectopexy. A synthetic mesh had been used in 767 patients and a biological mesh in 99. There was no difference in terms of recurrence (3.7% vs 4%,  $P = 0.78$ ) or mesh related complications (7% vs 0%,  $P = 1.0$ ). Unfortunately in this review, the difference in the length of median follow-up was different from the synthetic group (up to 74 mo) and the biological group (12 mo). Given the properties and behavior of biological grafts, it is quite likely that with longer follow-up, more recurrences will become evident in patients undergoing laparoscopic ventral rectopexy with this type of implant<sup>[39]</sup>. Another important drawback of

biological grafts is the higher cost when compared to synthetic mesh<sup>[40]</sup>. A very recent publication from a panel of experts suggests that biological grafts might be a better option in the following circumstances: young patients, women of reproductive age, diabetics, smokers, patients with a history of previous pelvic radiation or sepsis, inflammatory bowel disease, and in cases of intraoperative breach of the rectum or vagina, despite these authors failed to provide any data to support this<sup>[41]</sup>.

In the era of robotic surgery, one could consider the use of robotic-assisted laparoscopic ventral rectopexy as an improvement for the patients presenting with a total rectal prolapse. There is evidence that robotic ventral rectopexy is a feasible and safe procedure and that bowel function may possibly be better, although the number of cases and experience of robotic ventral rectopexy are limited, the methodology of the studies is weak, and the indications for the operation are different from a study to another<sup>[16,42-45]</sup>. Robotic surgery may be more time consuming and more expensive so that Mäkelä-Kaikkonen *et al*<sup>[16]</sup> concluded they found no arguments to support the routine use of robotic assistance in rectopexy operations.

The last improvement in the management of patients presenting with full-thickness rectal prolapse might come from the length of the hospital stay. Day-case surgery has been proven efficient in selected patients, reducing the risk of in-hospital complications and cost<sup>[17,46]</sup>.

In literature, there is evidence supporting effectiveness of the Altemeier procedure with similar wide range of recurrence rate depending on surgeons' experience<sup>[1,2,4,6,8,9]</sup>. Like anterior rectopexy, Altemeier procedure may offer better technical and functional results with technical modifications and ameliorations. Until prospective randomized studies comparing results between these two different approaches will clarify the issue, laparoscopic rectopexy could still not be supported as the gold standard treatment of full-thickness rectal prolapse.

Based on the low long-term recurrence rate and favorable outcome data in terms of low *de novo* constipation rate, improvement of anal incontinence, and low complications rate, laparoscopic anterior rectopexy seems to emerge as an efficient procedure for the treatment of patients with total rectal prolapse. Prospective randomized study comparing this procedure with the Altemeier procedure could answer the question: is the anterior rectopexy the best surgical option to treat full-thickness rectal prolapse?

## COMMENTS

### Background

Total or complete rectal prolapse is the circumferential full-thickness protrusion of the rectal wall through the anus. The cause of the disease is unknown, but anatomical disturbances are commonly found in patients with total rectal prolapse. These are a straight rectum, a lack of fascial attachments of the

rectum against the sacrum, a redundant sigmoid colon, a diastasis of the levator ani, an abnormally deep Douglas pouch, and a patulous anus.

### Research frontiers

Since its first description by Orr in 1953, and the modification introduced by Loygues in 1984, the procedure of rectopexy has evolved through years and has become the procedure of choice in case of total rectal prolapse, but also in cases of other kind of posterior pelvic floor dysfunction such as internal rectal prolapse and enterocele.

### Innovations and breakthroughs

To assess the effectiveness, complications, recurrence rate, and recent improvements of the so-called anterior or ventral rectopexy procedure for treatment of total rectal prolapse.

### Applications

Based on the low long-term recurrence rate and favorable outcome data in terms of low *de novo* constipation rate, improvement of anal incontinence, and low complications rate, laparoscopic anterior rectopexy seems to emerge as an efficient procedure for the treatment of patients with total rectal prolapse.

### Peer-review

This is a well written non comparative, longitudinal review study evaluating effectiveness, complication and recurrence rate of anterior rectopexy for full thickness rectal prolapse.

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