Original article

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Laparoscopic ventral rectopexy for rectal prolapse and symptomatic rectocele: an analysis of 245 consecutive patients

H. A. Formijne Jonkers*, N. Poierrié*, W. A. Draaisma*, I. A. M. J. Broeders*† and E. C. J. Consten*

*Department of Surgery, Meander Medical Centre, Amersfoort, the Netherlands and †Institute of Technical Medicine, Twente University, Enschede, the Netherlands

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Abstract

Aim This retrospective study aimed to determine functional results of laparoscopic ventral rectopexy (LVR) for rectal prolapse (RP) and symptomatic rectoceles in a large cohort of patients.

Method All patients treated between 2004 and 2011 were identified. Relevant patient characteristics were gathered. A questionnaire concerning disease-related symptoms as well as the Cleveland Clinic Incontinence Score (CCIS) and Cleveland Clinic Constipation Score (CCCS) was sent to all patients.

Results A total of 245 patients underwent operation. Twelve patients (5%) died during follow-up and were excluded. The remaining patients (224 women, nine men) were sent a questionnaire. Indications for LVR were external RP ($n = 36$), internal RP or symptomatic rectocele ($n = 157$) or a combination of symptomatic rectocele and enterocele ($n = 40$). Mean age and follow-up were 62 years (range 22–89) and 30 months (range 5–83), respectively. Response rate was 64% (150 patients). The complication rate was 4.6% (11 complications). A significant reduction in symptoms of constipation or obstructed defaecation syndrome was reported (53% of patients before vs 19% after surgery, $P < 0.001$). Mean CCCS during follow-up was 8.1 points (range 0–23, SD ± 4.3). Incontinence was reported in 138 (59%) of the patients before surgery and in 32 (14%) of the patients after surgery, indicating a significant reduction ($P < 0.001$). Mean CCIS was 6.7 (range 0–19, SD ± 5.2) after surgery.

Conclusion A significant reduction of incontinence and constipation or obstructed defaecation syndrome after LVR was observed in this large retrospective study. LVR therefore appears a suitable treatment for RP and rectocele with and without associated enterocele.

Keywords Rectal prolapse, rectopexy, incontinence, constipation

What is new in this paper?

This paper describes a large cohort of patients after LVR and demonstrates a significant improvement of associated symptoms after this procedure, not only for external rectal prolapse but also for internal rectal prolapse and symptomatic rectocele (with or without enterocele).

Introduction

Pelvic organ prolapse is a common disorder. The posterior compartment of the pelvic floor, the rectum, is often involved in this multi-organ problem [1]. The cause of associated symptoms such as incontinence, constipation and the obstructed defaecation syndrome (ODS) can be various, including external and internal rectal prolapse (intussusception), large rectoceles and enteroceles.

Correspondence to: E. C. J. Consten, MD, PhD, Meander Medical Centre, Department of Surgery, Utrechtseweg 160, 3818 ES Amersfoort, the Netherlands.
E-mail: ecj.consten@meandermc.nl

Laparoscopic ventral rectopexy (LVR) is the most popular technique in Europe for the treatment of external and internal rectal prolapse [2–4]. Furthermore, it has been recommended for the treatment of large rectoceles [5]. During this procedure a mesh is placed between the anterior rectal wall and the posterior vaginal wall thereby reinforcing the rectovaginal septum. Most available papers on LVR describe significant improvement of functional symptoms with small complication rates [2,3,5–9]. These studies have been conducted in small patient series with a short follow-up. The aim of this study was to determine the functional results of all patients after LVR in our centre up to 2011.

Patients and methods

Study design

This study comprised a retrospective analysis of all consecutive patients who underwent LVR for internal or external rectal prolapse and symptomatic rectocele (with or without enterocele) between 2004 and 2011. All patients underwent operation in a large teaching hospital in the Netherlands by one of two experienced pelvic floor surgeons. All patients who underwent primary surgery were included for analysis. Demographics, medical history, surgical and follow-up details of patients were collected from their medical records and gathered into a database.

Evaluation and surgical technique

Surgery was performed after work-up involving history, physical examination and radiological evaluation (dynamic MRI and/or evacuation proctography) of the pelvic floor with intra-vaginal and intra-rectal contrast enema. All patients were discussed in a multidisciplinary meeting consisting of dedicated gynaecologists, urologists, radiologists, pelvic floor physical therapists and pelvic floor surgeons.

An external rectal prolapse (Oxford classification grade V) was an absolute indication for LVR. Furthermore, a history of constipation and/or faecal incontinence in combination with an Oxford grade III or IV internal rectal prolapse was an indication for surgery. Surgery was also performed in patients with similar functional symptoms in combination with an anterior rectocele, defined as > 2 cm bulging of the anterior rectal wall during physical examination (or objectified on dynamic MRI or evacuation proctography).

Pelvic floor biofeedback therapy was started in all patients with an internal rectal prolapse or a rectocele prior to surgery. For patients with an external rectal prolapse, biofeedback therapy was initiated only if estimated to be useful, e.g. in the case of a concomitant pelvic floor descent.

The LVR procedure was carried out as described by D'Hoore and Penninckx [3]. Instead of a Marlex mesh (Bard, Crawley, UK), either a Hi-TEC mesh (Textiles Hi-Tec, Labastide-Rouairoux, France) (until mid-2007) or a Prolene mesh (Ethicon Inc., Johnson & Johnson, Hamburg, Germany) (from mid-2007 and on) was used. This switch in supplier and mesh was caused by new policies in stock acquisition, not for any medical or surgical reason. Proximal fixation upon the sacral promontory was performed with either titanium tacks (Autosuture Protack 5 mm, Covidien, Mansfield, Massachusetts, USA) or one titanium 2 mm × 8 mm screw (Karl Storz, Tuttlingen, Germany), according to the surgeons' preferences.

Questionnaire

After informed consent, patients were asked to complete a questionnaire regarding functional results (constipation and incontinence). This questionnaire included the Cleveland Clinic Incontinence Score (CCIS) [10] and the Cleveland Clinic Constipation Score (CCCS) [11]. The CCIS and CCCS were translated into the Dutch language and underwent cultural adaptation according to the guidelines of the International Society of Pharmacoeconomics and Outcomes [12].

Outcome parameters

Symptoms of incontinence and constipation or ODS before and after surgery were set as main outcome parameters of this study. The Rome II criteria were used for routine preoperative and postoperative assessment of constipation and ODS. Faecal incontinence was defined as the involuntary loss of solid or liquid stool once or more during the last month.

Constipation/ODS was objectified with the CCCS (range 0–30; a score of 30 is severe symptoms of constipation; a score > 15 is regarded as constipation). The CCIS (range 0–20; 20 is complete incontinence) was used for evaluation of incontinence. Complications were classified according to the Clavien–Dindo (CD) classification [13].

Statistical analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences, version 17.0 (SPSS Inc., Chicago, Illinois, USA). Patient data are presented as percentage or as mean ± SD and range for all numerical variables. For the descriptive analyses, McNemar tests were used to evaluate differences in percentages. $P < 0.05$ was considered significant.

Results

Patients and follow-up characteristics

A total of 245 consecutive patients (234 women and 11 men) underwent LVR between 2004 and 2011. Twelve patients (5%) died during the follow-up period due to causes unrelated to the LVR procedure and were therefore not analysed. The remaining 233 patients (224 women, nine men) were included in the study and

received a questionnaire. In total, 150 patients (64%) completed and returned the questionnaire, 39 patients (17%) were contacted but refused participation [for various reasons: no interest in participation ($n = 12$), deeming themselves too old for the questionnaire ($n = 3$), embarrassment ($n = 2$), miscellaneous/other reasons ($n = 22$)]. A total of 44 patients (19%) were lost to follow-up; addresses could not be retrieved.

General patient characteristics are presented in Table 1. Mean age at surgery was 62 years (range 22–89). The mean duration of follow-up at the time of the questionnaire was 30 months (range 5–87, SD 20.4).

Indication, operation, recurrence and complications

Thirty-six patients (15%) were operated on because of an external rectal prolapse, 157 patients (68%) because of symptomatic rectocele or internal rectal prolapse and 40 patients (17%) due to a symptomatic rectocele and/or internal rectal prolapse in combination with an enterocele.

In six patients a conversion to laparotomy was required due to extensive adhesions as a result of previous abdominal and pelvic surgery. They all underwent an open ventral rectopexy.

No intra-operative complications occurred. The complication rate after surgery was 4.6% (11 patients) and included myocardial ischaemia ($n = 3$) requiring admission on a specialized cardiac care unit (CD grade IVd). Two patients suffered from mesh infection complicated by discitis at the site of proximal mesh fixation. Antibiotic treatment was started and avoided surgical re-intervention in one (CD grade II), while the other patient needed revisional surgery. During operation, the infected mesh was removed, a temporary loop colostomy was situated and antibiotics were started (CD grade IIIb–d). One patient suffered from urinary retention, requiring a temporary urinary catheter (CD grade I). All remaining complications were CD grade II and consisted of urinary tract infections ($n = 4$) and one pneumonia. No mortality occurred. Mean hospital stay was 5 days (3–30, including the day of admission and discharge). Six patients (2.6%) underwent revisional surgery during follow-up because of recurrence of (internal) rectal prolapse.

Table 1 Baseline characteristics.

	Total cohort ($n = 233$)
Mean age (years)	62 (range 22–89)
Sex	
female	224 (96%)
male	9 (4%)
Mean parity (no. of children)	3 (range 0–10)
Prior abdominal/pelvic surgery	121 (52%)
Mean follow-up (months)	30 (range 5–87)
Mean admission (days)	5 (range 3–30)
Postoperative complications	11 (4.6%)

Functional results

Before surgery, 123 patients (53%) reported symptoms of constipation or ODS. During follow-up, a significant overall reduction ($P < 0.05$) in these symptoms was found: 44 patients (19%) encountered persisting constipation or ODS. In Table 2, preoperative and postoperative functional results per indication are depicted. For all indications, a significant reduction in ODS/constipation was observed. A total of five patients (2%) encountered new onset constipation/ODS after surgery. Mean CCCS during follow-up was 8.1 points (range 0–23, SD $\pm$ 4.3) out of 30. Four patients (2.7% of respondents) had a score > 15, which indicates significant constipation.

Before surgery, 138 patients (59%) experienced symptoms of incontinence. After surgery, incontinence was encountered in 32 patients (14%, $P < 0.05$). A significant reduction in incontinence rates was observed for all indications, as can be seen in Table 2. In one patient (0.5%), new onset incontinence was reported after operation. A mean CCIS of 6.7 (range 0–19, SD $\pm$ 5.2) out of 20 was determined after operation; 50% of respondents had a CCIS of $\leq$ 4.

Discussion

LVR is an established technique for the treatment of rectal prolapse and has been described for the treatment of rectoceles as well [2–9]. As currently available studies tend to describe relatively small cohorts of patients, the aim of this study was to determine the influence of LVR on symptoms in a larger series of patients. A significant reduction in incontinence and constipation was found for patients with an external rectal prolapse, internal rectal prolapse or symptomatic rectocele and for patients with a combination of rectocele and enterocele. These results were accompanied by a low rate of complications.

For external rectal prolapse, similar results in reduction of incontinence and constipation are observed in the current study as in previous studies in the literature [2,6].

The current literature on LVR for internal rectal prolapse and symptomatic rectocele is limited, especially with regard to functional outcomes. Two studies focus

Table 2 Functional results per indication.

Indication	Preoperative incontinence	Postoperative incontinence	*P*	Preoperative constipation	Postoperative constipation	*P*
External rectal prolapse (n = 36)	21 (58%)	5 (14%)	<0.001	19 (53%)	8 (22%)	0.01
Internal rectal prolapse/rectocele (n = 157)	92 (59%)	20 (13%)	<0.001	80 (51%)	27 (17%)	<0.001
Combination rectocele and enterocele (n = 40)	25 (63%)	7 (18%)	<0.001	24 (60%)	9 (23%)	<0.001

on symptomatic rectocele and internal rectal prolapse; both found a significant reduction of symptoms of ODS/constipation in small cohorts of patients (75 and 41 patients, respectively) after a median of 12 months follow-up [5,7]. Collinson *et al.* also focused on improvement of incontinence and found significant reduction of incontinence after a mean follow-up of 12 months [7]. In addition to these studies, the current study also found a significant improvement in functional outcomes after a mean follow-up of 30 months.

Successful symptomatic outcome was not reported in all patients: 19% and 14% of patients respectively reported ongoing symptoms of constipation or incontinence. The cause of incontinence and constipation is regularly multifactorial and the patients who did not improve after surgery may have had other underlying factors causing symptoms of incontinence and constipation, such as for example anal sphincter failure or colonic transit disorders [14,15]. Improved continence and constipation in patients after LVR seems to be caused by restored anatomy, probably resulting in a better function of the rectum, better sensitivity for faeces in the rectum and less bulging of the rectal wall, causing ODS. Exact mechanisms, however, are unknown. An important future goal is therefore to determine predicting factors for success or failure of LVR in patients with an external rectal prolapse, internal rectal prolapse or rectoceles. New onset constipation as a result of kinking of the redundant sigmoid after rectopexy has been described after posterior rectopexy [16,17]. In this study, new onset constipation was recorded in 2% of patients, which is in accordance with current literature [6].

A recent safety notification of the US Food and Drug Administration concerning pain, mesh infections and mesh erosion through the vagina after mesh implant for pelvic organ prolapse surgery in 2011 led to a discussion about the use of meshes for this indication [18,19]. These reports, however, concern transvaginal positioned meshes. Reported mesh related complications in the current study consisted of only two mesh infections. These cases are the only reported cases of mesh infection after LVR until now and have been described previously by our group [20]. Therefore, the occurrence of mesh related complications after LVR is limited, despite the position of the mesh at the site of the rectovaginal septum. Probably, because of differences in surgical approach abdominal positioned meshes offer fewer safety issues and complications compared with transvaginal meshes. We also report a low percentage of re-operation due to failure as a whole (2.8%).

The cross-sectional design of this study has some methodological disadvantages. It was only possible to gather preoperative incidences of symptoms but no actual severity scores, as we did not routinely perform the CCCS and CCIS questionnaires during evaluation. Comparison of validated scores before and after surgery was consequently impossible. Furthermore, our response rate was 65%, caused by refusal to participate and loss to follow-up in this relatively elderly patient population. This loss of patients in our follow-up might have influenced results, as it is imaginable that patients who are unsatisfied by the results of the procedure are less willing to fill out questionnaires. This burden is closely related to questionnaire studies and its exact impact cannot be determined. Nevertheless, the current study provides an adequate overview of complications, recurrences and functional results after LVR in a large cohort of patients with a mean follow-up of 30 months.

In conclusion, a significant reduction of incontinence and constipation was observed after LVR for patients with a rectal prolapse and/or symptomatic rectocele. These outcomes support the application of LVR for these indications.

Author contributions

HAFJ, NP and WAD primarily conceived, designed, acquired, analysed and interpreted data and drafted the manuscript. IAMJB and ECJC contributed substantially in all aspects.

References

1 Elneil S. Complex pelvic floor failure and associated problems. *Best Pract Res Clin Gastroenterol* 2009; **23:** 555–73.
2 D'Hoore A, Cadoni R, Penninckx F. Long-term outcome of laparoscopic ventral rectopexy for total rectal prolapse. *Br J Surg* 2004; **91:** 1500–5.

3 D'Hoore A, Penninckx F. Laparoscopic ventral recto(colpo)pexy for rectal prolapse: surgical technique and outcome for 109 patients. *Surg Endosc* 2006; **20:** 1919–23.
4 Formijne Jonkers HA, Draaisma WA, Wexner SD *et al.* Evaluation and surgical treatment of rectal prolapse: an international survey. *Colorectal Dis* 2013; **15:** 115–9.
5 Wong MT, Abet E, Rigaud J, Frampas E, Lehur PA, Meurette G. Minimally invasive ventral mesh rectopexy for complex rectocoele: impact on anorectal and sexual function. *Colorectal Dis* 2011; **13:** e320–6.
6 Boons P, Collinson R, Cunningham C, Lindsey I. Laparoscopic ventral rectopexy for external rectal prolapse improves constipation and avoids *de novo* constipation. *Colorectal Dis* 2010; **12:** 526–32.
7 Collinson R, Wijffels N, Cunningham C, Lindsey I. Laparoscopic ventral rectopexy for internal rectal prolapse: short-term functional results. *Colorectal Dis* 2010; **12:** 97–104.
8 van den Esschert JW, van Geloven AA, Vermulst N, Groenedijk AG, de Wit LT, Gerhards MF. Laparoscopic ventral rectopexy for obstructed defecation syndrome. *Surg Endosc* 2008; **22:** 2728–32.
9 Wijffels N, Cunningham C, Dixon A, Greenslade G, Lindsey I. Laparoscopic ventral rectopexy for external rectal prolapse is safe and effective in the elderly. Does this make perineal procedures obsolete? *Colorectal Dis* 2011; **13:** 561–6.
10 Jorge JM, Wexner SD. Etiology and management of fecal incontinence. *Dis Colon Rectum* 1993; **36:** 77–97.
11 Agachan F, Chen T, Pfeifer J, Reissman P, Wexner SD. A constipation scoring system to simplify evaluation and management of constipated patients. *Dis Colon Rectum* 1996; **39:** 681–5.
12 Wild D, Grove A, Martin M *et al.* Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: Report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health* 2005; **8:** 94–104.
13 Dindo D, Demartines N, Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. *Ann Surg* 2004; **240:** 205–13.
14 Hayden DM, Weiss EG. Fecal incontinence: etiology, evaluation, and treatment. *Clin Colon Rectal Surg* 2011; **24:** 64–70.
15 Rao SS. Constipation: evaluation and treatment. *Gastroenterol Clin North Am* 2003; **32:** 659–83.
16 McKee RF, Lauder JC, Poon FW, Aitchison MA, Finlay IG. A prospective randomized study of abdominal rectopexy with and without sigmoidectomy in rectal prolapse. *Surg Gynecol Obstet* 1992; **174:** 145–8.
17 Sayfan J, Pinho M, Alexander-Williams J, Keighley MR. Sutured posterior abdominal rectopexy with sigmoidectomy compared with Marlex rectopexy for rectal prolapse. *Br J Surg* 1990; **77:** 143–5.
18 Rogers RG. To mesh or not to mesh: current debates in prolapse repair fueled by the U.S. Food and Drug Administration Safety Notification. *Obstet Gynecol* 2011; **118:** 771–3.
19 Steinberg AC. Use of vaginal mesh in the face of the recent FDA warnings and litigation. *Am J Obstet Gynecol* 2011; **204:** e10–1.
20 Draaisma WA, van Eijck MM, Vos J, Consten EC. Lumbar discitis after laparoscopic ventral rectopexy for rectal prolapse. *Int J Colorectal Dis* 2011; **26:** 255–6.