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ORIGINAL ARTICLE

Long-term outcome of laparoscopic rectopexy for full-thickness rectal prolapse

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Abstract

Background The aim of this study was to assess the long-term outcomes of laparoscopic rectopexy for full-thickness rectal prolapse (FTRP).

Methods Data of a prospectively maintained database were analysed. A structured telephone interview was conducted to assess a consecutive series of long-term outcomes of an unselected population who had laparoscopic rectopexy at a single centre between April 2006 and April 2014. The primary outcome was recurrence of FTRP. Secondary outcomes were functional outcomes and morbidity associated with the procedure.

Results A total of 80 patients (74 female, median age of 66 years, range 23–96 years) underwent a laparoscopic rectopexy, of whom 35 (44%) were for recurrent prolapse. Seventy-two patients (90%) had a posterior suture rectopexy, six (8%) had a ventral mesh rectopexy, one (1%) had a combination of both procedures, and one (1%) had a posterior suture rectopexy with a sacrocolpopexy. There was no conversion to open surgery. Three patients (4%) needed reoperation within 30 days after surgery: two due to small bowel obstruction and one for a suspected port site hernia. Seventy-four patients (93%) were available for either clinical follow-up (FU) or telephone interview and there were 17 (23%) recurrences of FTRP at the median FU of 57 months (range 1–121 months). The median time to recurrence was 12 months (range 1–103 months). Recurrence of FTRP was seen in nine patients (12%) within 1 year following surgery. A history of multiple previous prolapse repairs increased the risk of prolapse recurrence (odds ratio 8.33, 95% confidence interval 1.38–50.47, $p = 0.020$). Based on clinical follow-up of 71 patients up to 1 year, there were 41 patients (58%) who had faecal incontinence prior to rectopexy of whom two patients (5%) had complete resolution of symptoms and 14 (34%) had improvement.

Conclusions Laparoscopic rectopexy is a safe operation for full-thickness rectal prolapse. The durability of the repair diminished over time, particularly for patients operated on for recurrent prolapse.

Keywords Laparoscopic rectopexy · Long-term follow-up · Rectal prolapse

Introduction

Treatment of full-thickness rectal prolapse (FTRP) in adults is essentially surgical. The goals are to reduce the prolapse, improve continence and bowel function, and minimize the risk of recurrence. It is also important to minimize the operative risk, as patients with FTRP are often elderly with additional comorbidities [1].

Surgical approaches can be divided into perineal or abdominal approaches. Perineal procedures can be performed under local or spinal anaesthesia, which may suit frail patients, but the recurrence rate is high [2, 3]. In contrast, an abdominal approach is thought to provide a more robust repair by rectosacral fixation of the rectum and is considered to be associated with a lower recurrence rate [2]. However, abdominal rectopexy involves mobilization of the rectum which can be associated with autonomic nerve injury, potentially leading to rectal dysmotility and impaired evacuation [4].

The frequency of laparoscopic abdominal repair of FTRP has increased in recent years, the most popular procedure

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being the ventral mesh rectopexy [5]. An alternative option is the laparoscopic suture rectopexy or posterior fixation rectopexy. Both techniques are commonly used in addressing FTRP with good functional results and low short-term recurrence rates [6–8]. However, knowledge of the long-term results of laparoscopic rectopexy is still limited [9–11].

The aim of this study was to review the outcomes of all laparoscopic rectopexy procedures, focusing on prolapse recurrence, functional outcomes, and morbidity.

Materials and methods

Study design

A prospectively maintained database of a consecutive series of patients who had laparoscopic rectopexy for FTRP by two surgeons (JTJ; RHK) at our institution between April 2006 and April 2014, was reviewed in line with the Idea, Development, Exploration, Assessment, Long-term Follow-up (IDEAL) recommendations [12].

The collected data included patient characteristics [date of birth, gender, age, body mass index (BMI), American Society of Anesthesiologists (ASA) classification], rectal prolapse history, and prior rectal prolapse surgery, surgical details and perioperative morbidity (operative time, operative technique, blood loss, conversion rate, operative difficulties, length of hospital stay, 30 days, and in-hospital complications), and late outcomes (recurrence, further prolapse surgery, stoma formation, mesh related complications, functional outcomes with regard to constipation, faecal incontinence, and evacuation difficulties). Postoperative complications were scored using the Clavien–Dindo classification [13]. The clinical follow-up data were collected from the patients' medical notes (electronic records and paper files). Patients were admitted on the day of surgery, an enhanced recovery programme was used in all, and bowel preparation was not used other than the administration of a phosphate enema prior to surgery [14].

A structured telephone interview was conducted between March 2016 and May 2016 to assess long-term outcome. All patients in the database were contacted via their last known contact details regarding prolapse recurrence and functional outcomes. If there were no response patients and were contacted on several occasions and at different times of the day. The structured interview was conducted by one of the two researchers who were not involved in the care of the patients. Patients were asked if there was physical recurrence of prolapse ('bowel outside the anal canal'), what symptoms they experienced in case of recurrence (faecal incontinence, constipation, bleeding, and pain) and their satisfaction regarding the operation. They were also asked to define functional outcomes related to prolapse as follows: new onset, exacerbation, no change, improvement, or full resolution (Fig. 1). When a recurrence was reported, patients were advised to contact their general practitioner (GP) for a review at the local hospital, or new referral to us if they had been discharged, according to the referral system. Data on recurrence, functional outcomes, and satisfaction are based on the last available follow-up information, either from clinical or telephone information. Patients' data available either by clinical follow-up or by telephone interviews greater than 12 months after the operation were defined as long term.

Operative method

For posterior fixation rectopexy technique, laparoscopic ports were placed as follows: one 10 mm port at the umbilicus, two 5 mm ports suprapubically (6 cm apart), one 10 mm port, 5 cm to the right, and 5 cm inferiorly to the umbilical

Laparoscopic Rectopexy Questionnaire

Patient name:.....

Tel nr.(s):.....GP:.....

Operation a/o clinical details:.....

.....

1. Clinical details

Has prolapse recurred (full-thickness)?..... (Y/N)

- If yes, how long after the operation?.....

What was your main pre-operative symptom?.....

2. What symptoms in relation to prolapse, if any, do you currently have?

Prolapse	Passive incontinence	Flatus incontinence
Urgency	Urge incontinence	Urinary incontinence
Constipation	Chronic pain	Others (if any):

How have they changed since the operation?
How often do you get the symptom(s)? daily/weekly/monthly/never

3. Patient satisfaction

How satisfied are you with the procedure?

1 2 3 4 5
Not Extremely

What was your most important pre-operative expectation?

Was this expectation met? (Y/N) If not, why not?.....

.....

Is there anything else you would like to comment?.....

.....

Fig. 1 Laparoscopic rectopexy questionnaire

port. A 5 mm port superomedially to the right anterior superior iliac spine was used only for intracorporeal suturing. The rectum was mobilized fully posteriorly and laterally to the levators as for total mesorectal excision (TME). Hypogastric nerve branches were identified and preserved in all patients. Anteriorly, the rectum was mobilized to approximately 3 cm short of a full TME dissection (midvaginal level in females). Then, 5 × Ethibond Excel® (Ethicon, Somerville, NJ, USA) sutures were used to stitch the mesorectum to the presacral fascia in the midline, with the first suture being as low as possible and the last being at the sacral promontory. All suture knots were placed as sliding reef knots. A suction drain was normally placed behind the rectum for 24 h and laparoscopic 10 mm ports were closed using fascial sutures.

The laparoscopic ventral mesh rectopexy was performed as previously described by D'Hoore [15], suturing the mesh [PROLENE® Mesh (Ethicon, Somerville, NJ, USA)] to the anterior aspect of the rectum using seromuscular stitches and the opposite end to the sacral promontory.

This study was completed as a service audit, approved by the Research and Development Department of the London North West Hospitals NHS Trust.

Statistical analysis

Data were collected in an Excel spread sheet and entered into an SPPS database. Normally distributed continuous variables were expressed as means [standard deviation (SD)], and non-normally distributed data as medians [range or interquartile range (IQR)]. Testing for normality was done with the Shapiro–Wilk test. Data handling and analyses were done with SPSS® software version 24.0 (IBM, Armonk, New York, USA). Continuous data were compared with the independent *t* test or the Mann–Whitney *U* test, and categorical variables were investigated with the Chi-square test or the Fisher's exact test. A *p* value of less than 0.05 was considered to indicate statistical significance.

Results

Patient data

Eighty patients (74 female, 93%) with a median age of 66 (range 21–96 years) underwent an elective laparoscopic rectopexy for FTRP between April 2006 and April 2014. During the same period, the surgeons performed no open or perineal prolapse procedures. The majority of patients were healthy (70 with ASA classification I or II) with a median BMI of 25 (range 17.8–42.6). Thirty-five patients (44%) had a history of 51 previous prolapse repairs, including: 40 Delorme procedures, 6 Altemeier procedures, 3 open rectopexies, and two resection rectopexies. Thirteen patients (16%) had recurrent prolapse with a history of multiple repairs. Symptoms associated with prolapse were faecal incontinence ($N=41$), constipation ($N=12$), bleeding ($N=11$) and urine retention ($N=2$). Demographic data and preoperative details are summarised in Table 1.

Operative details and complications

Seventy-two out of 80 patients (90%) had a laparoscopic posterior rectopexy, 6 patients (8%) a laparoscopic ventral mesh rectopexy, 1 patient (1%) a combined laparoscopic ventral mesh and posterior suture rectopexy, and 1 patient (1%) a laparoscopic posterior rectopexy and a sacrocolpopexy (Table 2). The 2 senior surgeons performed 28 (35%) of the procedures, and in the other 52 patients, a trainee performed all or parts of the operation, with the consultant assisting.

Ten patients (13%) needed adhesiolysis due to the previous surgery. There was no conversion to open surgery. Median operation time was 130 min (range 60–270 min) with median estimated blood loss of 10 ml (range 0–300 ml). Ventral mesh rectopexy was used when the rectum was densely adherent to the posterior rectal tissues due to prior surgery and mobilization was felt to be high-risk. In two patients, posterior fixation was combined with a ventral mesh placement. In the first, it was due to the prior history of prolapse surgery (one open fixation rectopexy and then a subsequent Delorme procedure) and high chance of recurrent prolapse. The second patient had an anterior mesh sacrocolpopexy combined with posterior fixation, and she had a history of two vaginal prolapse surgeries in the past.

The median hospital stay was 3 days (range 2–13 days). Complications included reoperation in three patients (4%):

Table 1 Patient characteristics

Characteristic	$N=80$
Gender, female	74 (93)
Age, years, range	66 (21–96)
BMI, median (kg/m^2)	25 (17.8–42.6)
ASA classification	
I	28 (35)
II	42 (53)
III	10 (12)
Diagnosis	
FTRP	77 (96)
FTRP + enterocele	3 (4)
Previous prolapse repair	35 (44)
Previous abdominal or pelvic surgery	64 (80)

Values are number (%) or median (range)

BMI body mass index, *ASA* American Society of Anesthesiologists, *FTRP* full-thickness rectal prolapse

Table 2 Operative details

Variable	$N=80$
Operation	
Posterior suture rectopexy	72 (90)
Ventral mesh rectopexy	6 (8)
Posterior + ventral rectopexy	1 (1)
Posterior + sacrocolpopexy	1 (1)
Conversion	0
Reoperation[a]	3 (4)
Operation time (min)	
Median	130
Range	60–270
Estimated blood loss (ml)	
Median	10
Range	0–300
Hospital stay (days)	
Median	3
Range	2–13

Values are *N* (%) or median + range

[a]Small bowel obstruction ($n=2$), suspected port site hernia ($n=1$)

for small bowel obstruction in two and for a negative exploration of a port site swelling in 1. In one patient requiring reoperation a loop of small bowel had been stitched to the camera port site during closure. One patient had a Clavien–Dindo grade IV complication due to respiratory failure, which responded rapidly to continuous positive pressure ventilation (CPAP) and one had subcutaneous emphysema. Five patients (6%) had minor complications, as listed in Table 3. There were three readmissions (4%) within 30 days: for small bowel obstruction, exploration of the port site swelling mentioned above, and for urinary tract infection, in one patient each.

Study follow-up

Clinical follow-up data up to 1 year were available for 71 patients (89%), and 31 of these 71 patients (44%) had clinic follow-up longer than a year.

In 2016, all 80 patients were contacted for telephone interview. Twenty-four patients (30%) could not be reached despite multiple attempts at different times and dates. We also contacted patients' GP surgeries and patients (6%) were deceased, and another five patients (6%) refused to be interviewed. A total of 46 patients (58%, 44 female) were available for long-term follow-up.

The data of 74 patients who had either or both clinical and telephone interview were included for assessment (Fig. 2). The median follow-up of these 74 patients was 57 months (range 1–121 months).

Recurrence of FTRP

The combined number of recurrences from the telephone interview and the clinical follow-up was 17 out of 74 patients (23%). The median time to recurrence was 12 months (range 1–103 months). Recurrence of FTRP was seen in 9 patients (12%) within 1 year following surgery. The patients with an early recurrence had all had a posterior suture rectopexy. Five of these nine patients had had the previous prolapse repairs, and three of these five had had multiple repairs. One patient with a history of multiple repairs was known to have scleroderma (CREST syndrome). Four of the 55 patients followed up for 1 year who had not had the previous prolapse surgery recurred within 1 year and 3 of these were relatively young: 21–33 years.

Four of the nine early recurrence patients then had a laparoscopic ventral mesh rectopexy and FTRP recurred in three. Of these patients, one decided against further surgical repair, one had a stoma formed and one underwent an Altemeier's procedure, which was also unsuccessful.

Late FTRP recurrence was seen in 8 patients (11%) with a median of 40.5 months (range 12–103 months). Four patients had had multiple prolapse repairs in the past and

Table 3 Complications

Early (< 30 days)	*N* (%)	Clavien–Dindo classification
Respiratory failure	1 (1)	IV, requiring CPAP in ITU
Subcutaneous emphysema, widespread	1 (1)	IV, requiring observation overnight in ITU
Small bowel obstruction	2 (3)	IIIb, 1 requiring mini-laparotomy, the other laparoscopic adhesiolysis
Possible port site hernia	1 (1)	IIIb, exploration: no hernia present
Wound infection	2 (3)	II, treated with antibiotics
Atypical chest pain	1 (1)	II, started on ACS medication
Hospital acquired pneumonia	1 (1)	II, treated with antibiotics

CPAP continuous positive airway pressure, *ACS* acute coronary syndrome

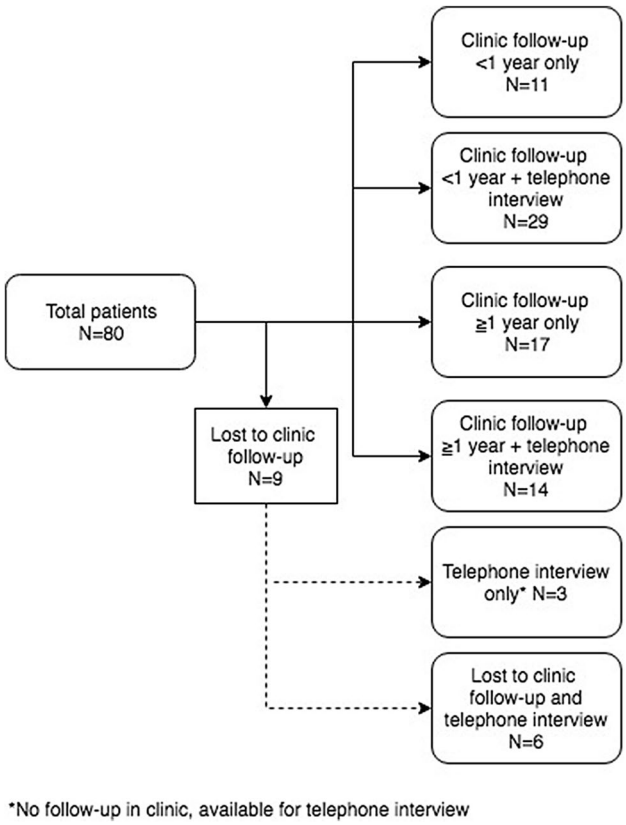

Fig. 2 Flow chart of follow-up

one patient a Delorme' procedure before the rectopexy. Seven of these eight patients had undergone a posterior suture rectopexy. One of these seven has undergone reoperation with a combined posterior suture and laparoscopic ventral mesh rectopexy, while a second is awaiting reintervention. The 8th patient with late recurrence had initially undergone a combination of ventral mesh and posterior fixation rectopexy for a recurrent rectal prolapse and was re-operated on for the re-recurrence in another hospital.

In the telephone interview population, recurrence of FTRP was associated with a history of multiple failed repairs (OR 8.33, 95% CI 1.38–50.47, $p = 0.02$) (Table 4).

Functional outcomes

Based on the data of the long-term telephone interview, there were 19 out of 46 patients (41%) with incontinence prior to surgery. Symptoms of faecal incontinence improved in 8 patients (42%) out of these 19, with complete resolution in an additional 3 (16%). However, 7 patients (37%) stated that incontinence was unchanged, while 1 (5%) other noted exacerbation of symptoms. Two patients (7%) of the 27 patients without faecal incontinence preoperatively reported new onset incontinence. In terms of constipation, there were 12 out of 46 patients (26%) with complaints preoperatively. There was no change in constipation in 8 patients (67%), with exacerbation of symptoms in 1 (8%), while 8 (24%) of the remaining 34 patients presented with new onset constipation. Two patients (17%) had improvement of symptoms and 1 patient (8%) had complete resolution of constipation.

The functional outcomes from clinical notes were based on available information from the 71 patients. Two out of 41 patients (5%) who had faecal incontinence prior to prolapse surgery had complete resolution of incontinence symptoms, 14 out of 41 patients (34%) had improvement, 6 patients (15%) had no change in incontinence, and 2 patients (5%) had exacerbation of incontinence.

Thirteen out of 60 patients (22%) without constipation prior to surgery had new onset constipation after rectopexy. Two out of 11 patients (18%) with constipation preoperatively had exacerbation of constipation, 8 patients (73%) had no change in constipation, and 1 patient (9%) had improvement of constipation.

Fifteen patients (21%) noted new onset evacuation problems after surgery. One of these 15 patients (7%) could not cope with the evacuation problem and had formation of a stoma 6 months after the rectopexy.

Twenty-two out of 71 patients (31%) had biofeedback therapy sessions for their persistent symptoms such as faecal incontinence, obstructive defaecation or constipation.

Operation satisfaction

Based on the telephone interview, patients scored a mean of 3.5 (scale 1–5) for satisfaction with the operation. Three out

Table 4 Recurrence at long term of 46 patients (telephone follow-up)

	No recurrence	Recurrence	Odds ratio (95% CI)	*p* value
Age ≥ 70 (years)	14/32	2/14	0.21 (0.04–1.12)	0.09
BMI ≥ 25 (kg/m^2)	19/32	9/14	1.23 (0.34–4.52)	1
History of abdominal and/or pelvic surgery	21/32	11/14	1.92 (0.44–8.36)	0.50
One previous prolapse repair	11/32	8/14	2.55 (0.70–9.21)	0.20
Previous prolapse repairs > 1	2/32	5/14	8.33 (1.38–50.47)	0.02

BMI body mass index

of 46 patients (7%) were very dissatisfied (score 1) with the repair versus 10 patients (22%) who were completely satisfied (score 5). Reasons for not being satisfied were mainly due to recurrence of prolapse. Thirty-four patients (74%) stated that their expectation of the operation was met.

Discussion

Rectal prolapse is a problem that is addressed by several operative techniques and there is no worldwide consensus on which to use [16, 17]. The first double-blind randomised study by Lundby et al. showed no significant difference in functional outcome between laparoscopic ventral mesh rectopexy and laparoscopic posterior sutured rectopexy [18]. The procedures in this study were all posterior suture rectopexy except in 6 of 80 patients when a ventral mesh technique was used and in 2 when both approaches were employed. This is a large case series of a consistent technique, performed by two surgeons with considerable experience in laparoscopic rectal surgery and without conversion to open surgery. The only previous publication on the outcome of long-term laparoscopic suture rectopexy included 179 patients combining data from 4 centres [10]; thus, our study is the largest from a single centre with a consistent protocol for follow-up. The conversion was zero, there was no operative mortality, and the morbidity rate was low.

Our recurrence rate of FTRP (17/74 (23%) at median FU of 4¾ years) is similar to the outcome of the PROSPER study which reported recurrence up to 26% with an abdominal approach at a median of 13.5 years [16]. Long-term studies have shown that recurrence rates after FTRP repair increase over the years [9, 10]. Our study population had a median age of 66 years, which is slightly higher than in most studies and may partially explain this effect [17]. In addition, almost half of the patients had a history of recurrent FTRP and multiple failed repairs were strongly associated with recurrence. Patients with recurrence may have an inherent tissue weakness and chronic pelvic floor laxity which contribute to recurrence. The study by Fu et al. showed similar high recurrence of prolapse (29.6% of all recurrences) in patients who had the previous surgical repair of prolapse [19] and the study by Foppa et al. also showed recurrence of 20% with suture rectopexy technique [10]. More stitches were inserted in this cohort of patients than many surgeons normally describe. There was a high preponderance to recurrence in this population (as 44% of the population were being treated for recurrence) and it may indicate that even the insertion of multiple stitches will not prevent recurrence in a significant proportion of the population when the follow-up is long enough. This may represent the true recurrence rate from inclusive cohort studies. Most of the studies published to date with the outcome of ventral mesh rectopexy have been cross-sectional with a mixture of short- and long-term outcomes. Whether ventral mesh rectopexy will reduce the recurrence rate is not clear and more studies are needed which present all the raw data to evaluate the true, long-term, outcome of ventral rectopexy. Whenever possible the use of mesh was avoided because of the likely incidence of late complications secondary to erosion. Furthermore, laparoscopic rectal mobilization is likely to decrease blood loss in comparison with traditional open suture rectopexy but whether the latter results in additional adhesions and reduces recurrence is speculative [17].

This study was limited by several factors. There was attrition bias inherent with long-term follow-up. We had missing data due to patients being lost to follow-up and exclusion of ten patients, because they refused participation or were deceased. The long-term follow-up was by telephone interview and did not include a review in clinic. The outcomes of the surveys were, therefore, subjective and an FTRP could not be objectively confirmed. Furthermore, not all patients underwent anorectal physiological testing pre- and postoperatively, or had formal functional assessment using incontinence and constipation scores. We also relied on the clinical notes for many of the functional outcomes and prolapse characteristics.

Conclusions

Laparoscopic rectopexy is a safe method for addressing FTRP. However, recurrences occur in the long-term and are associated with the previous prolapse repairs.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This study was completed as a service audit, approved by the Research and Development Department of the London North West Hospitals NHS Trust.

Informed consent For this service audit, formal consent is not required in the United Kingdom.

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