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ORIGINAL ARTICLE

# Laparoscopic Ventral Rectopexy for Faecal Incontinence: Equivalent Benefit is seen in Internal and External Rectal Prolapse

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**Abstract**
*Aim* An external rectal prolapse (ERP) is often associated with faecal incontinence, and surgery is the recommended therapy. It has been suggested that correction of a high grade internal rectal prolapse (HIRP) is also worthwhile for patients with faecal incontinence. The aim of the present study is to compare the results of laparoscopic ventral rectopexy (LVR) in patients with faecal incontinence associated with either an ERP or a HIRP.
*Method* Consecutive patients suffering from faecal incontinence, who underwent a LVR between June 2010 and October 2012, were identified from a prospective database. All patients underwent preoperative defaecating proctography, anorectal manometry and ultrasound. Symptoms were assessed preoperatively and at 1 year after operation using a standardized questionnaire incorporating the Faecal Incontinence Severity Index (FISI; range 0–61) and the Gastrointestinal Quality of Life Index (GIQLI).
*Results* LVR was performed in 50 incontinent patients with a HIRP, and in 41 patients with an ERP. Preoperatively, the FISI was higher in patients with HIRP (HIRP 42 versus ERP 30, $P<0.01$). The recurrence rate at 1 year was similar in both groups (HIRP 6 % versus ERP 2 %, $P=0.156$). The FISI scores were significantly reduced in both groups (HIRP 48 % versus ERP 50 %, both $P<0.01$). GIQLI was equally improved in both groups (HIRP 17 % versus ERP 18 %, both $P<0.01$).
*Conclusion* Laparoscopic ventral rectopexy for the treatment of faecal incontinence achieves equivalent outcomes in both patients with an external rectal prolapse or high grade internal rectal prolapse.

**Keywords** Laparoscopic ventral rectopexy · Internal rectal prolapse · Intussusception · Rectocele · Enterocele · Faecal incontinence · Constipation · Urge urinary incontinence · Sexual dysfunction · Quality of life

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## Introduction

Rectal prolapse is a disabling condition, which is more common in females and increases in frequency with age. External rectal prolapse is associated with faecal incontinence in more than 50 % of cases.[1] Surgical treatment is the recommended therapy for external rectal prolapse.[2] Following surgical correction, continence is restored in 45 % of patients with external prolapse.[3]

Internal rectal prolapse, also referred to as rectal intussusception or occult rectal prolapse, seems to be a precursor of external rectal prolapse.[4] Therefore, it has been suggested that this condition also plays a causative role in the origin of faecal incontinence. Recently, Wijffels et al. found the presence of faecal incontinence in 56 % of patients with high grade internal rectal prolapse.[5] Surgical treatment of internal rectal prolapse has followed the same lines as that of external rectal prolapse, with many advocates suggesting LVR.

In our institution, internal rectal prolapse is recognized as an etiological factor for faecal incontinence, and proctography

is part of the standard investigations. Those patients with a high grade prolapse found on routine proctography are offered a laparoscopic ventral rectopexy (LVR) after failed maximum medical therapy, including 6 months of pelvic floor retraining or biofeedback.

Previously, we published our experience with LVR in 72 patients with faecal incontinence associated with a high grade internal rectal prolapse (HIRP).[6] We found a 56 % improvement in continence. The Leuven group retrospectively described their experience with over 400 laparoscopic ventral rectopexy operations.[7] Forty-six percent were performed for internal rectal prolapse with an improvement in faecal incontinence in 89 % compared with 85 % when the operation was performed for external rectal prolapse. Recently, the Bristol group found a similar improvement of 90 % in faecal incontinence in 429 patients with a high grade internal rectal prolapse.[8] Studies comparing changes in quality of life after prolapse repair for external or internal rectal prolapse are lacking.

The aim of the present study is to compare the functional results and quality of life after LVR in a consecutive series of patients with faecal incontinence associated with either a high grade internal rectal prolapse or an external rectal prolapse.

## Patients and Methods

Data of all patients suffering from faecal incontinence, who were seen in the Department of Colorectal Surgery at the Oxford University Hospitals between June 2010 and October 2012, were entered into a database. All patients were preoperatively assessed with defecating proctography, ultrasound and anorectal manometry, as previously described.[9] A full colonoscopy or CT colonography was performed to exclude colonic disease. Proctograms were performed and reported by a radiologist with an interest in pelvic floor imaging. Prolapse grade was recorded using the Oxford Rectal Prolapse Grading System (Table 1). External rectal prolapse was defined as full-thickness protrusion of the rectal wall through the anal orifice (Oxford Grade 5). The diagnosis of external rectal prolapse was made clinically. High grade internal rectal prolapse was defined as an intussusception that descends onto or into the anal canal on proctogram or during examination under anaesthesia. Patients who described their involuntary loss of stool as disabling were considered for LVR when they had a small external anal sphincter defect (<90°) or failed previous overlapping sphincteroplasty.

Patients with a high grade internal rectal prolapse were offered a LVR if they had a preoperative Faecal Incontinence Severity Index (FISI) score higher than 30, and they did not respond to maximum medical treatment including 6 months of pelvic floor retraining. The pelvic floor retraining was provided by one of two specialist qualified pelvic floor nurses.[10] All patients attended a 1-h introductory session as well as subsequent 45-min follow-up appointments. This was for a period of 6 months. Patients were taught pelvic floor exercises to improve muscle strength and endurance using computer-assisted biofeedback equipment. Almost all patients with faecal incontinence required the use of electrostimulation (Pelvitone) to aid in strengthening of the correct muscle fibres. All the verbal advice was re-enforced with written material. Patients were asked to continue the treatment at home and at each follow-up session, their progress was reviewed. In some patients with HIRP, a trial sacral neuromodulation was performed before the LVR.

Preoperatively, prophylactic intra-venous antibiotics were administered. The patient was placed in the Lloyd-Davies position. A 30° laparoscope was placed via an umbilical Hassan port. Two 5-mm operating ports were inserted in the right iliac fossa. A superficial peritoneal window was made over the right part of the sacral promontory and extended caudally over the right outer border of the mesorectum down to the right side of the pouch of Douglas. In females, the vagina was retracted anteriorly and a careful dissection of the recto-vaginal septum was performed down to the pelvic floor. Its distal extent was confirmed by digital rectal and vaginal examination. The dissection performed in this procedure spares the hypogastric nerves and parasympathetic nerves from the lateral stalks and avoids mobilization of the mesorectum.

A strip of polypropylene (3×20 cm) mesh was introduced and sutured as distally as possible on the anterior rectal wall/

**Table 1** Classification of rectal prolapse

| | | Oxford rectal prolapse grade | Radiological characteristics of rectal prolapse |
|---|---|---|---|
| Internal (IRP) | Recto-rectal intussusception | I (low grade) | Descends no lower than the proximal limit of the rectocele |
| | | II (low grade) | Descends into the level of the rectocele, but not onto the sphincter/anal canal. |
| | Recto-anal intussusception | III (high grade) | Descends onto the sphincter/anal canal |
| | | IV (high grade) | Descends into the sphincter/anal canal. |
| External (ERP) | External rectal prolapse | V (overt rectal prolapse) | Protrudes from the anus |

perineal body with three, interrupted non-absorbable sutures (Ethibond Excel 00, Ethicon, Edinburgh, UK). The posterior wall of the vagina was fixed to the mesh using 2-0 PDS sutures. The mesh was then secured tension-free to the sacral promontory using three Protack staples (Autosuture, Covidien Healthcare, Gosport, UK). The mesh was peritonealized by suturing the free edges of the previously divided peritoneum over the mesh to provide additional ventral elevation of the enterocele and avoid small bowel adhesions to the mesh.

All patients were reviewed in the outpatient clinic at 3 and 12 months postoperatively and assessed for recurrence and morbidity. Patients with persistent symptoms underwent proctography. For symptom evaluation, all patients completed a standardized questionnaire before and 1 year after surgery. The questionnaire incorporated the Faecal Incontinence Severity Index (FISI), Wexner constipation score and Gastrointestinal Quality of Life Index (GIQLI) and urinary and sexual function questions.[11–13]

Statistical analysis was performed using the Statistical Package for Social Sciences, version 18.0 (SPSS Inc., Chicago, IL, USA). All data were treated as nonparametric and analyzed using the Mann–Whitney *U* test (continuous data) or Fisher's exact test (categorical data). Wilcoxon's signed-rank test was used to compare functional scores and quality of life before and 1 year after surgery. Comparison of these changes between patients with an internal rectal prolapse or external rectal prolapse was conducted using the Mann–Whitney *U* test. $P<0.05$ (two-tailed) was considered the limit of significance.

## Results

A total of 96 patients underwent a LVR for faecal incontinence between June 2010 and October 2012. LVR was performed in 52 incontinent patients with a HIRP, and in 44 patients with an external rectal prolapse (ERP). Two patients with a HIRP (4 %) and three patients with an ERP (7 %) declined to respond after 1 year and were excluded from the study. The baseline characteristics of the remaining 91 patients are listed in Table 2. The response rate on the sexual questions was 44 % in the patients with HIRP, and 20 % in patients with an ERP; 84 % of patients did not want to disclose personal details and 16 % of patient said that they were not sexually active.

### LVR for High Grade Internal Rectal Prolapse

The high grade prolapse was diagnosed in 43 patients with a proctogram (86 %) and in 7 patients (14 %) after examination under anaesthesia, following an inconclusive proctogram. Previous, not prolapse related, operations performed included hysterectomy ($n=21$), overlapping sphincteroplasty ($n=4$) and failed trial sacral neuromodulation ($n=13$). There was no postoperative mortality or major morbidity after LVR. Minor postoperative complications occurred in two patients (4 %). One patient had a urinary tract infection, and one was readmitted for pain. Three (6 %) patients had recurrent or

**Table 2** Baseline characteristics of patients with a high grade internal rectal prolapse or an external rectal prolapse

| | High grade internal rectal prolapse | External rectal prolapse | *P* value |
|---|---|---|---|
| Number of patients | 50 | 41 | |
| Median age | 59 (30–87) | 63 (18–91) | 0.07 |
| Male/female | 2/48 | 3/38 | 0.65 |
| Concomitant rectocele (%) | 43 (86) | 28 (68) | 0.07 |
| Concomitant enterocele (%) | 14 (28) | 16 (39) | 0.13 |
| Perineal descent (%) | 18 (36) | 18 (44) | 0.22 |
| Sphincter defect (IAS/EAS) (%) | 11 (22) | 11 (27) | 0.63 |
| MARP (mmHg) | 58 (20–100) | 52 (13–95) | 0.36 |
| MASP (mmHg) | 102 (53–200) | 94 (48–190) | 0.73 |
| SPT-volumes (cc of air) | | | |
| FS (cc) | 50 (11–120) | 35 (15–70) | 0.14 |
| EUD (cc) | 100 (50–220) | 85 (30–200) | 0.47 |
| MTV (cc) | 180 (100–320) | 145 (50–280) | 0.25 |

Values are presented as median and ranges

*MARP* maximum anal resting pressure, *MASP* maximum anal squeeze pressure, *IAS* internal anal sphincter, *EAS* external anal sphincter, *SPT-volumes* sensory perception thresholds–volumes, *FS* first sensation, *EUD* earliest urge to defaecate, *MTV* maximum tolerated volume

persistent internal rectal prolapse (IRP) as demonstrated at postoperative proctography with recurrent or persistent symptoms. The recurrent prolapse was mainly on the posterior side and subsequently these patients underwent a redo rectopexy with posterior mobilization. During 1-year follow-up, four patients were referred to the urological service because of new-onset urge urinary incontinence. Six patients (12 %) reported improvement of urinary symptoms.

At 1 year, the FISI score was significantly reduced (median 42 to 25; $P<0.01$) (Table 3). In total, eleven patients were completely continent 1 year after surgery (22 %). A reduction in FISI score of at least 50 % was observed in 26 patients (52 %). Seven patients (14 %) experienced a mild deterioration of continence with a mean increase in FISI score of 8 (Range 2–14). The reduction in FISI score was not affected by prior sacral neuromodulation or overlapping sphincteroplasty.

At 1 year follow-up, 12 patients (24 %) with persistent faecal incontinence underwent an additional surgical procedure for persistent faecal incontinence. Nine patients underwent sacral neuromodulation and in three patients repeat rectopexy was performed because of recurrent rectal prolapse.

The Wexner constipation score significantly improved ($P=0.01$). None of the patients described worsening of their constipation symptoms. The quality of life (GIQLI) was significantly better after the LVR ($P=0.01$). Nine percent of the patients with HIRP experienced a deterioration of sexual function after the operation. Sexual function was improved in 64 % of sexually active patients.

### LVR for External Rectal Prolapse

Forty-one patients underwent LVR for external rectal prolapse (Table 2). Previous, not prolapse related, operations performed included hysterectomy ($n=15$) and overlapping sphincteroplasty ($n=2$). There was no mortality. Three patients had a minor complication (7 %) which included one patient with a wound haematoma, and two patients with a urinary infection. One male had a recurrent external rectal prolapse within 1 year of follow-up. Two patients were referred to the urologists because of new-onset urge urinary incontinence. Three patients reported satisfactory relief of urinary leaks.

The FISI score was significantly improved after 1 year (27 versus 15; $P<0.01$) (Table 3). Worsening of faecal incontinence symptoms was observed in two patients. Twenty patients (49 %) had a major improvement in FISI score of more than 50 %. The constipation score was improved, and quality of life was better after 1 year. Sexual function was not affected in sexually active patients with an ERP.

**Table 3** Incontinence, constipation and quality of life of patients with high grade internal rectal prolapse (HIRP) or external rectal prolapse (ERP)

| | Preoperative | 1-year post | *P* value |
|---|---|---|---|
| FISI | | | |
| HIRP | 42 (30–61) | 25 (0–56) | <0.01 |
| ERP | 27 (0–61) | 15 (0–61) | <0.01 |
| Wexner constipation score | | | |
| HIRP | 10.3 (0–23) | 7.2 (0–21) | <0.01 |
| ERP | 11.4 (1–30) | 6.6 (0–19) | <0.01 |
| GI-QOL | | | |
| HIRP | 79 (32–130) | 92 (41–136) | <0.01 |
| ERP | 89 (24–136) | 105 (33–144) | <0.01 |

Data are given as median and ranges

*IRP* high grade internal rectal prolapse, *FISI* Faecal Incontinence Severity Index (0–61), Wexner constipation score (0–30), *GIQLI* Gastrointestinal Quality of Life Index (0–144)

### LVR for External Versus High Grade Internal Rectal Prolapse

The baseline patient characteristics were similar in both groups (Table 2). The number of postoperative complications did not differ between groups. The recurrence rate at 1-year follow-up was similar in both groups. Preoperatively, the FISI was higher in patients with HIRP (HIRP 42 versus ERP 27, $P<0.01$). (HIRP 6 % versus ERP 2 %, $P=0.156$). The FISI scores were similarly reduced in both groups (HIRP 40 % versus ERP 44 %). The reduction of the Wexner constipation score was significant in both groups; however, the amount of reduction was significantly larger in patients with an ERP (HIRP 30 %, ERP 42 %, $P=0.02$). GIQLI was equally improved in both groups (HIRP 17 % versus ERP 18 %).

## Discussion

It is agreed that surgery is the only suitable treatment for patients with external rectal prolapse. Internal rectal prolapse, however, remains more controversial. There has been long standing debate amongst colorectal surgeons about the relevance and treatment of internal rectal prolapse. This study shows that laparoscopic ventral rectopexy for the treatment of faecal incontinence achieves equivalent outcomes in both patients with an external rectal prolapse or high grade internal rectal prolapse.

Faecal incontinence in patients with an external rectal prolapse may result from injury to the nerve supply and subsequent denervation of the pelvic floor.[14] It is also thought that there is direct and repetitive damage to the anal sphincters caused by chronic stretching. Rectal prolapse often precedes faecal incontinence, and in these patients, it seems probable that the external prolapse itself is caused by an initial weakness of the pelvic floor muscles. This has been described in patients with cauda equine lesions.[15]

The mechanisms responsible for restoration of continence after rectopexy are not fully understood, although improved internal anal sphincter function might be of importance.[16] The recovery of continence is also associated with abolition of high-pressure rectal waves, which are responsible for producing maximal inhibition of sphincter activity before operation.[17] Furthermore, recovery of electromyographic activity of the internal anal sphincter and improvement in anorectal sensation have been reported following rectopexy.[18–20] Regardless of the mechanism involved, most authors agree that an external rectal prolapse must be operated on before irreversible damage to the anal sphincters has occurred.

In our series, continence was improved in 44 % of patients with an external rectal prolapse. These results are concomitant with those obtained in other studies on the effect of rectopexy on external rectal prolapse.[2,3]

An internal rectal prolapse is a common finding in asymptomatic patients. This is yet to be explained. The question remains whether an internal rectal prolapse becomes symptomatic once it is deemed to be high grade. Wijffels et al. showed a natural history of slow age-related progression through various grades of IRP to ERP using a prolapse grading scale.[4] Evacuation proctography reveals that an internal rectal prolapse starts at the same level as an external rectal prolapse.[21,22] Therefore, we consider internal rectal prolapse to be a stage towards the development of an external rectal prolapse; however, progression to an ERP is not inevitable. We have previously reported that high grade internal rectal prolapse can be associated with faecal incontinence.[5,6] It seems likely that the extent of IRP and the severity of preoperative symptoms are related to the outcome after prolapse repair. Therefore, we consider LVR in symptomatic patients with a high grade IRP, but LVR cannot be recommended prophylactically in patients with asymptomatic IRP.

Surgical treatment of high grade internal rectal prolapse in our unit has followed the same lines as that of external rectal prolapse. There have been only a few reports that specifically focus on restoration of continence after surgical repair of this condition. Recently, we published our experience with LVR in 72 patients with faecal incontinence associated with a high grade internal rectal prolapse.[6] There was a 56 % improvement in continence. Similar successful results were reported by the Leuven and Bristol groups.[7,8] The possible mechanisms responsible for restoration of continence after LVR are still unclear.

This study has some limitations. Firstly, there was a lack of data with reference to anorectal manometry and pelvic floor imaging following LVR. It might be possible that persistent faecal incontinence in some of our patients is due to recurrent HIRP. However, in our series, there was only one recurrence after LVR for ERP. Therefore, our fixation technique seems to be adequate. Another limitation is that we cannot distinguish urge or passive faecal incontinence from postdaefaecatory incontinence in this study. The improvement in faecal incontinence can mainly be caused by correction of the prolapse resulting in better rectal emptying. However, the preoperative Wexner constipation score was less than 10 in the HIRP group and 11 in the ERP group, whilst a score of 15 or more suggest significant obstructed defaecation symptoms. Another bias is that we offer LVR only in symptomatic patients with HIRP, whilst there will be asymptomatic patients treated with ERP. Surprisingly, the baseline symptoms were comparable in both groups, although theoretically patients in the ERP should have more "stretch" of the pudendal nerve and injury to the sphincter complex. The FISI scores were probably higher in the internal prolapse patients because incontinence was the primary indication for surgery. By contrast, the external prolapse group was operated on predominantly for a lump. Regardless, the patients' satisfaction following surgery is one of the most useful tools, and both patients groups showed a similar improvement in quality of life.

Over the years, other treatments have been proposed for IRP including stapled trans-anal rectal resection (STARR). Boenicke et al. showed that new-onset faecal incontinence can be associated with the reduction of rectal lumen size after STARR.[23] Therefore, we suggest that STARR is contraindicated in patients with faecal incontinence associated with internal rectal prolapse. Furthermore, internal and external rectal prolapse rarely occur in isolation. It has been demonstrated that most patients with an internal rectal prolapse have other types of pelvic organs prolapse. In our series, over 80 % of patients had concomitant pelvic floor disorders, as rectocele, enterocele or uterovaginal prolapse. LVR has the advantage of dealing with some of these abnormalities.

Recently, we showed that patients without high grade internal rectal prolapse have higher success rate of test and permanent sacral stimulation than patients with high grade internal rectal prolapse.[24] Therefore, the question arises whether correction of the prolapse, e.g. by LVR might be considered as the treatment method for faecal incontinence in patients with high grade internal rectal prolapse with possible neurostimulation added later if the desired effect is not achieved. However, LVR can be associated with more serious postoperative complications as mesh-erosion. Furthermore, LVR is an intra-abdominal procedure requiring general anaesthesia and usually requiring overnight hospital admission. In contrast, neurostimulation is a same day surgical procedure, which can be performed under local anaesthesia, albeit at significant equipment cost. A randomized trial comparing SNS and LVR in patients with high grade internal rectal prolapse is warranted.

Our study shows that in a sub-group of patients with faecal incontinence associated with HIRP, a LVR is a worthwhile treatment option. We recommend using a scoring system, such as the Oxford scoring system, to determine which patients

may benefit from repair of an IRP. Furthermore, it is important to adhere to strict inclusion criteria. We offered patients a LVR only if they had a FISI score of more than 30, and they did not respond to maximum medical treatment including 6 months of pelvic floor retraining or biofeedback. What our study reiterates is the complexity of incontinence treatment. No present therapy has perfect results; however, it appears that LVR should play a role in the treatment algorithm of faecal incontinence.

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