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Case Study

Laparoscopic Ventral Mesh Rectopexy: Evidence for treatment in rectal prolapse and future considerations

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Key Learning Points

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Surgery for rectal prolapse, including LVMR, aims to correct the anatomical component of pelvic floor in this complex multifactorial evacuatory mechanism, thereby improving overall bowel function.

The role of the surgeon and the MDT is important to determine whether the patient with rectal prolapse lies primarily on the anatomical or functional end of the spectrum of pelvic floor dysfunction. Patients on the anatomic end are likely to have a better response to surgery as opposed to those on the functional end. The latter would benefit more from a multidisciplinary non-surgical approach including physiotherapy, biofeedback, improved awareness, dietery advise, medication, irrigation and anal plugs. The most essential part of this whole process is the careful patient selection and counselling to provide the desired outcome and exhausting non-operative options before considering surgery.

Introduction

Rectal prolapse is an anatomical disorder defined as full-thickness intussusception of the rectal wall, which can remain above the anus internally or protrude externally, in which case it is called external rectal prolapse[1,2].

It is estimated to occur in 0.5% of the population and is thus uncommon, though experts believe this to be an underestimate of the incidence, due to under-reporting from shame and embarrassment[1,3]. Rectal prolapse (RP) itself is benign, however the associated faecal incontinence, constipation, mucus or blood seepage and physical discomfort causes considerable patient distress[4].

Mrs. C is a 37-year-old patient who underwent uneventful, re-do laparoscopic ventral mesh rectopexy (LVMR) for Grade V external rectal prolapse (ERP) in February 2020. She initially presented in 2013 with a combination of obstructive defaecation syndrome (ODS) and faecal incontinence (FI) secondary to ERP. Though her original prolapse was successfully treated with LVMR in 2014, five years later she presented again with a recurrence of her ERP and associated ODS and FI. In this case report, I will introduce Mrs. C and describe her clinical history. I will then compare the surgical approaches available to treat RP and discuss the evidence for their efficacy and safety. Finally, I will address the current public concern surrounding the use of meshes in pelvic floor surgery and their implications for future LVMR procedures.

Case Study: Mrs C, a young rectal prolapse patient

In May 2019, 36-year-old Mrs. C presented to the Pelvic Floor Clinic at the John Radcliffe Hospital (JRH) with a recurrence of full thickness, Oxford Grade V rectal prolapse. The main impetus to seek a second surgical intervention was her sense of "panic when I am outside". Due to FI, Mrs. C experienced anxiety around expedient, frequent access to public restrooms. She felt obligated to wear dark clothing to hide the faecal incontinence she experienced following fatty meals and feared exposure of the externally protruding prolapse. Concurrently, ODS caused additional distress and without Dulcolax three times daily, the patient could not open her bowels. Overwhelmingly, Mrs C felt her life was dominated by the physical discomfort of the prolapse and its associated bowel symptoms, restricting her daily activities and impairing her ability to live normally.

Her first surgical intervention for Grade V rectal prolapse was performed in 2014 when Mrs. C was 30 years old. Nulliparous and in otherwise excellent health, the LVMR resolved her associated bowel symptoms, significantly increased her Quality of Life (QoL) and reduced her anxiety. In 2019, she returned to the JRH and a repeat defeacating proctogram showed Grade V intussusception

Oxford Grading System for Rectal Prolapse		
Internal Rectal Prolapse		
Rectal Intussusception	Grade I	Descends no lower than the proximal limit of a rectocele
	Grade II	Descends into the level of a rectocele, but not into the anal canal
Rectoanal Intussusception	Grade III	Descends to the top of the anal canal
	Grade IV	Descends into the anal canal
External Rectal Prolapse	Grade V	Protrudes from the anus

The National Institute for Health and Care Excellence (NICE). Laparoscopic Ventral Mesh Rectopexy for Internal Rectal Prolapse.; 2018. https://www.nice.org.uk/guidance/ipg618/evidence/overview-final-pdf-4897863901.

with associated enterocele and rectocele and significant pelvic floor descent. She had no other significant co-morbidities and her relevant past surgical history included 2 caesarean sections and a large loop excision of the cervical transformation zone in 2008.

Results of Investigations	
Defecating Proctogram	Grade V intussusception Associated Enterocoele 3cm Rectocoele Excessive pelvic floor descent
CCFS	11
St. Mark's (Vaizey)	11
Altomare Score (ODS)	4

In contrast to Mrs. C, rectal prolapse is most commonly seen in elderly women, peaking in the seventh decade[1,3]. Risk factors include previous pelvic surgery, spinal cord neuropathology, increased intra-abdominal pressure and connective tissue disorders [3], none of which were present in Mrs. C's medical history during the time her original RP developed. In fact, up to 20% of patients with ERP are nulliparous or male. Underlying connective tissue disorders (eg. Ehlers-Danlos Syndrome) and epigenetic factors leading to decreased collagen and increased lytic proteases have been hypothesized as aetiological factors in these cases[5]. Faecal incontinence and constipation are seen in 50-75% and 25-50% of rectal prolapse patients respectively[1,2]. Faecal incontinence in particular can have a damaging effect on patients, leading to social isolation, low self-esteem and embarrassment[2,6].

Given Mrs. C's age and otherwise good health, a defaecating proctogram, and functional scales, such as the Cleveland Clinic Florida Incontinence Score (CCFS), St. Mark's (Vaizey) Incontinence Score and Altomare Score (ODS) were conducted to investigate her symptoms. Enterocoele and rectocoele are forms of pelvic organ prolapse where the small intestine and rectum bulge into the vagina respectively, and these commonly occur with rectal prolapse as an indication of general pelvic floor dysfunction[2].

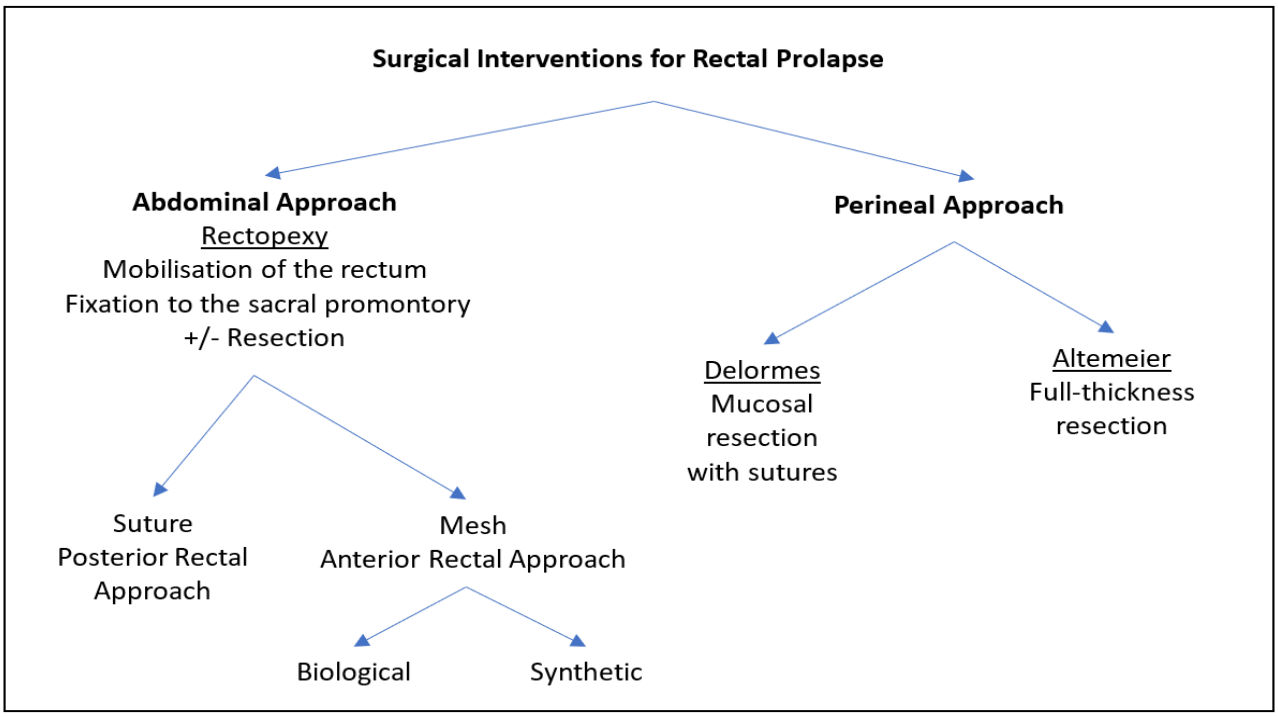
Functional scales play an important role in initial and post-treatment patient evaluation. A diverse range of physical defects contribute to defecation problems and their impact on QoL and functionality is heterogeneous[7]. Objective quantification of symptoms and their severity contributes to understanding patient specific pathophysiology. It also aids in selecting the appropriate treatment and assessing post-treatment improvement. The CCFS is one of the most widely used scores for anal incontinence, assessing frequency and type in a 20-point scale for full incontinence[8]. Adding to the clinical picture, the Vaizey score incorporates defecation urgency and the impact of medications for a maximum of 24 points for total continence[9]. To assess ODS, the Altomare score uses 8 Likert scales for a maximum of 31 points for severe constipation10.

After MDT review, the LVMR was approved alongside pelvic floor exercises in the lead-up to surgery. A referral was made to Rheumatology to investigate any potential connective tissue disorder or hypermobility syndrome that might explain the excessive pelvic floor descent.

Discussion

Surgical Interventions for RP

Conservative management of rectal prolapse include dietary changes and pharmacological agents to treat the associated faecal incontinence and/or obstructive defaecation syndrome[2]. Biofeedback treatment, based on operant conditioning, enhance a patient's conscious perception of their body via pelvic floor exercises in conjunction with equipment that "feedback" the body's activities to the patient. This may help with faecal incontinence, but the evidence is unable to guide when the benefits of conservative treatment outweigh the



advantages of surgery, nor is there any evidence to suggest it potentiates surgical efficacy[11].

The recommended treatment for Grade V prolapse is surgery[1,12]. Evidence suggests delaying surgery in the long-term can damage the anal sphincters, leading to permanent faecal incontinence[6]. There are hundreds of variations in surgical procedures used, but they can broadly be divided into an abdominal approach or perineal approach[13]. Abdominal surgery is called rectopexy, can be open or laparoscopic, involves fixation of the rectum to the sacrum via sutures or a mesh, and may include resection[5]. The most common perineal repairs are Delormes and Altemeier which require a resection and suspension of the rectum via sutures with an anterior, then posterior rectal approach[13]. Typically, the abdominal approach is favoured for young patients while the perineal approach is reserved for the elderly, frail and patients contraindicated for general anaesthesia[14].

In Europe, LVMR has become the surgery of choice for RP, addressing defects in the anterior and middle compartments of the pelvic floor[2,12,15]. First introduced by D'Hoore in 2004, the procedure mobilizes the rectum anteriorly into the rectovaginal septum and secures the rectum to the sacral promontory via sutures or metal tacks[16,17]. It avoids posterior mobilization, which is associated with worsened or new onset constipation, and thus spares autonomic nerve function[17].

Retrospective studies and case series have demonstrated the safety of LVMR with a 30-day mortality rate of 0-0.1%[16,18]. An international retrospective review of 2023 patients over a 14-year period found a non-mesh complication rate of 11%, fairly evenly split between medical and surgical complications (5.4 vs 5.6% respectively). The most common non-mesh complication was post-operative pain at a rate of 7%[19], the majority of which was treatable with analgesics (73%)[18]. These results are supported by a prospective case series of 636 de novo LVMR procedures over a 16 year period with 21 months median follow-up, which found an operative complication rate of 9.9%[20]. Previous surgery, adhesions, male gender and a narrow pelvis predicted complications post-LVR[20,21]. The most recent systematic review of 17 studies and 2024 patients similarly found a mean complication rate of 12.4% (95% CI: 8.4–16.4)[22].

There is very little evidence to guide pregnant patients post LVMR. A 10-year retrospective review of 954 LVMR patients had only 8 patients who subsequently became pregnant. Though the sample size is too small to guide overall practice and the follow-up too short (9 months – 1 year), none of these patients experienced recurrence or mesh-related complications for the duration of the study[23].

Most importantly, LVMR effectively treats rectal prolapse with comparable increases in continence, decreased constipation and significantly improved QoL scores[5,20,24,25]. At least 70% of patients benefit from resolution of their high-grade rectal intussusception and significant improvement of their symptoms[26,27]. A systematic review including 18 studies reported an average of 86% reduction in obstructive defecation syndrome[28]. A second systematic review and meta-analysis of 4 studies and 346 patients found a reduction in reported constipation from 63% to 17% (OR=0.09, 95%CI 0.03-0.39, p<0.0001) and a significant reduction in faecal incontinence from 49% of patients to 12% (OR=0.17, 95% CI: 0.05-0.61, p<0.00001)[19]. Similar trends were found in a case series of 919 patients with reductions in constipation from 38% to 9%, median follow-up 34 months, p<0.0001)[25].

In comparison, Altemeier and Delorme procedures are perceived to have higher recurrence rates but lower morbidity rates than rectopexy[1]. A recent systematic review including 39 studies and 2647 patients established a pooled 16.6% recurrence rate for perineal procedures compared to 3.4%-6.5% for LVR treating rectal prolapse[22]. However, the PROSPER randomized trial, which did not include LVMR but compared abdominal to perineal surgery and suture vs resection rectopexy for 293 patients, found no significant differences in recurrence rates or symptom reduction rates between any of the procedures[29]. A more recent randomized, double blinded study of 50 patients aged 39.7 + 6.9 years similarly found no statistical differences between Delormes and LVMR, though follow up time was limited to 18 months[30].

Furthermore, a 2015 Cochrane Review collated 15 RCTs with 1007 patients to investigate how different surgical interventions affected rectal prolapse recovery. Due to low quality evidence, no conclusions could be drawn regarding the superiority or inferiority of any surgical repair technique for full-thickness rectal prolapse. There was no difference in QoL measures between the surgical approaches[31]. The data could not establish any difference in outcomes between mesh vs suture rectopexy but found laparoscopic rectopexy led to shorter hospital time and fewer post-operative complications when compared to open abdominal procedures. Thus, the laparoscopic approach is recommended over open abdominal as patient data demonstrates it is less painful and is associated with faster recovery[1]. This is supported by a wider body of evidence comparing laparoscopy to open surgery for multiple abdominal procedures, such as cancer resections, hernia repair, appendectomy and gastric bypass. Post-operative pain and wound infection risk are lower, hospital stays are shorter, and functional recovery is quicker with laparoscopic surgery[32–37].

One critical factor rarely addressed in any of the studies is the learning curve for LVMR as a surgical procedure and the years of expertise of the surgeons performing the surgery. Past studies suggest the learning curve for laparoscopic colorectal surgery is 100-150 cases, at least 60 required for safe operation duration and a minimum of 100 needed in order to achieve significant QoL and clinical outcomes[5,20,38]. This obviously impacts the complication and recurrence rate, alongside organizational factors, such as having an MDT review of cases.

Crucially, reviews to date have established an urgent need for RCTs with common outcomes of interest and standardized surgical approaches. Much of the evidence discussed thus far come from observational data with small sample sizes and short-follow up time. The large heterogeneity of existing trials weakens the depth of evidence and many studies suffer from methodological weaknesses[16,22,31]. At best, the evidence has generated hypotheses that from a pragmatic standpoint may best be answered through retrospective study of a prospectively collected registry database or through a large randomized control trial with sufficient funding for long-term follow-up and sufficient sample sizes.

LVMR: Post-surgical outcomes

After reviewing Mrs. C' case in Pelvic Floor MDT, her investigation results, such as the repeat defaecating proctogram, age, fitness for surgery, and the lower associated recurrence rate in abdominal surgery made a re-do LVMR the procedure of choice. The alleviation of symptoms following her first surgery suggested a direct link between

the procedure and anatomical correction of her prolapse. Questions to address on the operating table were: Given her previous caesarean sections, would adhesions complicate the procedure and recovery? Where was the original mesh and would it require removal, necessitating insertion of a new mesh? Fortunately, Mrs. C had surprisingly few adhesions in spite of her 2 caesarean sections and previous LVMR. The original mesh was still correctly placed in the rectovaginal septum and appeared well enveloped within healthy fibrous tissue. However, it was detached from the sacral promontory. The original mesh and rectum were re-mobilised and re-tacked to the sacral promontory. There were no post-operative complications and the patient was discharged the next day, well in herself and relieved to have her RP addressed.

Long-term concerns for both patient and surgeon are continued or recurring rectal prolapse and its associated symptoms and most importantly, mesh-related complications. The 2015 Cochrane review found 1/3 of patients experienced continued or worsened constipation, incontinence and/or reduced rectal compliance[31]. Many studies did not report whether anorectal physiology was investigated in patients via ultrasound, proctography and colonic transit studies prior to surgery. Conducting such investigations is important to ensure that only those patients undergo surgery, who have been thoroughly discussed in a pelvic floor MDT, whose anatomy can be rectified via the procedure, and whose desired outcomes align with the realistic outcomes of surgery.

The risk of recurrence for RP has ranged from 0-9.6% depending on study design and follow-up time16,39. A systematic review including 17 RCTs, prospective and retrospective studies with 1242 patients reported a weighted recurrence rate of 2.8% during a median follow-up of 23 months[22]. In contrast, a recent prospective cohort study of 224 patients reported a much higher recurrence rate of 9.6% with a 5 year follow-up duration[24], while a retrospective cohort study of 231 patients with 47 months median follow-up found 11.7% of patients experience recurrence, though this definition included multiple forms of pelvic floor prolapse and not just RP[21]. In both effective and adverse outcomes, the observational data deviates from trial data, again underpinning the need for more robust evidence and longer study periods.

Mesh-related morbidity, such as infection and erosion, has caught the attention of the US Food and Drug Administration (FDA), the UK government and the public. Warnings regarding the use of meshes in pelvic prolapse surgery were first raised in 2008 by the FDA following reports of transvaginal mesh erosion and significant patient morbidity. In 2017, urogynaecological use of meshes was reclassified as Class III, requiring the most stringent approval pathway for medical devices40. In July 2018, a high vigilance restriction period for the use of meshes to treat stress urinary incontinence and pelvic organ prolapse was implemented by NHS England and is currently ongoing while an independent review takes place into surgical mesh procedures and patients adversely affected by them[16]. Sling The Mesh is a growing public awareness campaign launched by journalist Kath Sansom, herself personally affected by mesh related complications, and represented by medical negligence legal advisors from Thompsons Solicitors[41]. It calls for a temporary moratorium on all vaginal and rectal mesh surgery while an audit is carried out and a national register is implemented to appropriately follow up and monitor mesh surgery patients[42].

The evidence suggests the risks of mesh complications is low. A recent systematic review of 18 studies and 939 patients reported only 5 patients (0.5%) experienced mesh-related morbidity[28], while an older systematic review of 13 observational studies including 866 patients found a mesh erosion rate <1% for both biological and synthetic meshes over a 1 year period[43]. In contrast, long-term observational studies have found higher rates. A retrospective study of 919 LMVR patients followed over a 10-year period calculated a 4.6% rate of mesh-related complications[44] while a more recent multi-center retrospective study involving 2203 patients over a 14 year period with an average follow-up of 36 months reported a mesh complication rate of 2.0%[18]. The majority (76%) of erosions occurred within 36 months but erosions still occurred 60 months post-surgery[18]. Sufficient time for mesh related complications to be observed and recorded is essential to future study design with research suggesting an average of 21-29 months[18,20].

Importantly, the type of mesh and sutures used are significantly associated with mesh erosion. Polyester meshes have a much higher risk compared to polypropylene or titanium-coated polypropylene meshes ($p<0.00006$) and erosion rates are higher for synthetic meshes compared to biological meshes (2-7% vs 0.38%)[16,18,20,43,45]. Ethicon polyester sutures are similarly associated with post-operative complications, which suggests polyester may act as an antigen with sutures as an infection nidus[18]. Patient factors that contribute to erosion are smoking, diabetes mellitus, previous pelvic irradiation or surgery and vaginal oestrogen status[12].

Conclusion: The Future for LVMR

This case demonstrates important best practice principles, such as full investigations of the rectal prolapse, MDT review, and use of multi-disciplinary treatment[12], which have been reiterated in recent literature due to the growing public concern surrounding mesh surgery[1,4,27]. Investigation into the use of transvaginal meshes has spread to the use of meshes generally, despite preliminary evidence suggesting that the risk of mesh erosion for LVMR is much lower than for transvaginal mesh use during pelvic organ prolapse or stress urinary incontinence surgery[18,27]. The current public distrust is evidence of how critical communication is in understanding risks and patient expectations. In order for LVMR and indeed any mesh surgery to be viable for the future, a combination of strong evidence from surgical trials is needed alongside improved surgical clinical practice. This will mean not only optimizing patient selection but improving the operational system of surgery. Alongside individual level communication, surgical practice would benefit from a regular process of patient follow-up via registry and audits to manage outcomes, demonstrating dedication to surgical research and long-term patient outcomes.

Conflicts of interest

None.

Funding

None.

Consent

The patient has consented to the publication of this case.

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