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# Robotic Combined Anterior & Posterior Repair of a Rectal Prolapse, Rectocele, and Sigmoidocele with a Mesh

**Authors' Contribution:**
**A** – Study Design
**B** – Data Collection
**C** – Statistical Analysis
**D** – Data Interpretation
**E** – Manuscript Preparation
**F** – Literature Search
**G** – Funds Collection

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**ABSTRACT:** RP is often seen in patients over the age of fifty, particularly women. These patients frequently suffer from other concomitant pathologies like rectocele, sigmoidocele, cystocele, or even enterocele. Rectopexy with a mesh has been an established treatment for rectal prolapse. The utilization of the robotic system allows for a successful repair within a confined pelvic space, especially for precise suture placement when working with the mesh. A 77-year-old female presented with ODS symptoms found to be caused by a progressive rectal prolapse. Her pre-operative ODS score was 9/20. Pelvic floor evaluation revealed concomitant rectocele and sigmoidocele. The patient was offered a robotic-assisted rectopexy with mesh placement to address the three concomitant pathologies. During the procedure, a posterior mesorectal mobilization with autonomic nerve preservation was performed to address the posterior leading edge of the prolapse. Subsequently, the vagina was separated from the anterior portion of the rectum and dissected down to the levator ani muscle and the perineal body. This allowed for the affixation of a polypropylene mesh to the anterior portion of the rectum. Anterior suspension of the mobilized rectum with the mesh addressed all three pathologies. No recurrence or complications occurred at two-year follow-up. The patient's ODS score decreased to 1/20.

**KEYWORDS:** combined robotic rectal prolapse repair, rectal prolapse, rectocele, sigmoidocele

## ABBREVIATIONS

**ARM** – anorectal manometry
**EAUS** – endo-anal ultrasound
**ERP** – external rectal prolapse
**FI** – fecal incontinence
**IRP** – internal rectal prolapse
**ODS** – obstructed defecation syndrome
**PNML** – pudendal nerve terminal motor latency test
**POP** – pelvic organ prolapse
**RP** – rectal prolapse
**SCD** – sequential compression devices
**TAH** – total abdominal hysterectomy

## INTRODUCTION

Proper function of the pelvic organs is ensured by the equilibrium of the pelvic floor and maintained by intrabdominal pressure and the fasciomuscular pelvic floor [1, 2]. When this equilibrium fails, a POP occurs [1, 2]. RP, a type of POP where the rectum protrudes through the anus, may be divided into three types: rectal intussusception, IRP, or ERP [1–4]. RP is usually seen in patients over the age of fifty and more commonly found in women than men (9:1 ratio, respectively) [4]. Female patients suffering from an IRP often have an accompanying rectocele, enterocele, or both [4]. A rectocele occurs due to a recto-vaginal septal defect that results in a herniation of the anterior rectal wall [5]. An enterocele occurs when the small bowel descends in between the anterior rectal wall and posterior vaginal wall [6]. Similarly, a sigmoidocele occurs when there is an abundant sigmoid colon in this space [6]. FI, ODS, or other functional abnormalities can result from RP and accompanying prolapses [2, 4, 6]. Although surgery is immediately indicated for ERP, IRP management is unclear and typically restricted to surgical intervention in the case of ineffective conservative management [4]. A sigmoidocele is often treated with a sigmoid resection; however, bowel resection with concomitant mesh placement creates the risk of mesh infection [7–9]. Management of RP by laparoscopic rectopexy has been widely accepted due to the general benefits of minimally invasive surgery and increased morbidity associated with the open approach [4]. There is no consensus on whether a robotic approach is more beneficial than a laparoscopic approach, although the robotic approach has not been proven to have a significantly different complication rate or functional outcome for rectopexy [4, 10]. The general advantages of the robotic approach include shorter learning curves, lower rates of conversion when compared to laparoscopic approaches, enhanced dexterity, tremor scaling, and a surgeon-controlled three-dimensional view [10, 11]. All of these features are particularly useful in pelvic surgery, especially when precise suture placement is crucial for successful mesh placement [10]. The use of a mesh has increased progressively in the treatment of POP [1]. Mesh is preferential to native tissue repair due to the high risk of failure with the latter method [10]. For these reasons, a robotic approach to POP utilizing mesh is a viable option. We present a case report of a female patient experiencing a posterior leading-edge RP with ODS caused by rectocele and sigmoidocele. These complaints were successfully managed with robotic surgical intervention.

## METHODS

### Patient selection and workup

A 77-year-old thin female (BMI 18.6 kg/m$^2$) presented with ODS symptoms found to be caused by a progressing rectal prolapse,


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with an obvious posterior leading edge on exam. The patient's ODS score was evaluated according to the five-item ODS scoring system developed by Renzi et al., and determined to be 9/20 [12]. This ODS score consisted of excessive straining rated at 3 (usually), incomplete rectal evacuation rated at 2 (sometimes), use of enemas/laxative rated at 1 (rarely), vaginal/perineal digital pressure rated at 2 (sometimes), and abdominal discomfort pain rated at 1 (rarely).

Physical examination revealed evidence of a suspected enterocele in addition to the posterior leading-edge RP. Prolapse diagnostic work-up included colonoscopy, diatrizoate colon study, EAUS, PNML test, ARM, and a defecogram. During colonoscopy, the patient was unable to hold air in the colon due to her patulous RP. Her sigmoid was notably twisted, and thus safe endoscopic navigation of the sigmoid proved impossible. Diatrizoate-based imaging evaluation of the colon demonstrated redundant sigmoid and provided suspicion of a sigmoidocele. PNML indicated normal pudendal nerve motor latency bilaterally. ARM, however, found low compliance of the rectum, with a low resting pressure and near-absent squeeze pressure. Defecogram confirmed an anterior rectocele, with residual contrast in the rectum after evacuation.

The patient met with the colorectal surgery team to discuss prolapse treatment options. The patient had a history of diverticulitis and hyperlipidemia. She underwent a TAH 22 years ago. The patient opted for a surgical intervention in the form of a rectopexy.

## Pre-operative preparation

A mechanical bowel prep was completed prior to the procedure. Antibiotics were administered 30 minutes prior to initial incision according to the Surgical Care Improvement Project (SCIP) guidelines. SCD were placed in the pre-operative unit. The patient was classified as ASA II. Appropriate consent was obtained from the patient per our institutional protocol.

## Equipment preference card

- DaVinci Si Surgical System (Intuitive Surgical Inc., Sunnyvale, CA);
- Laparoscopic setup (camera system, monitors);
- Veress needle and insufflation device;
- 8-mm robotic trocars x3;
- 12-mm trocar;
- 10-mm 0° laparoscope;
- 5-mm trocar;
- Polypropylene mesh;
- 2-0 Ethibond sutures;
- 3-0 Vicryl sutures;
- 3-0 V-lock sutures;
- Monocryl reverse cutting sutures for skin closure;
- Exploratory laparotomy tray (on standby).

## Procedure

(Link to video of the procedure: https://umich.box.com/v/PJSrectopexy)

The patient was initially placed in the supine position. Following an uncomplicated induction of general anesthesia, a Foley catheter was placed. The patient was then repositioned in a modified lithotomy position by using Allen stirrups and a bean bag, with all pressure points well padded. The patient's abdomen and perineum were prepped with povidone-iodine solution and draped in the usual, sterile fashion.

An initial periumbilical incision was made, and a Veress needle was subsequently used to gain access to the peritoneal cavity. The abdomen was then insufflated using carbon dioxide to a pressure of 15 mmHg, which the patient tolerated well. A 12-mm trocar replaced the Veress needle. A 10-mm 0° laparoscopic camera was then introduced and used to inspect the abdomen. Under direct vision, two 8-mm robotic trocars were placed in the lower left and right abdominal quadrants in addition to one 8-mm robotic trocar in the left flank. A 5-mm trocar was placed suprapubically. Visual inspection of the abdominal cavity revealed a very redundant sigmoid colon and a fairly deep cul-de-sac with visible herniation, but no adhesions. Laparoscopic hook electrocautery was then used to completely mobilize the sigmoid colon from the left lateral abdominal wall.

The surgeon proceeded to perform an anterior and posterior rectal dissection. The robot was then docked, and robotic instruments introduced. The peritoneum was opened on the right side of the sigmoid and rectum, this maneuver allowed the surgeon to deepen the dissection down to the posterior mesorectal plane. This dissection was continued posteriorly in the peri-mesorectal plane to the levator ani muscle and then to the rectal hiatus in order to address the posterior leading edge of the prolapse. No lateral dissection was performed, thus preserving the nervi recti of the rectum. Anterior dissection was also carried out in the plane between the vagina and the anterior rectal wall. A sponge-stick was used to manipulate the vagina in order to assist with identification of the rectovaginal septum due to severe laxity of the tissues. Once the vagina was separated from the anterior wall of the rectum, the entire anterior rectum was dissected down to the levators. Care was taken to avoid any injury to the vagina or the rectum.

Following this dissection, a precut, 18-cm segment of the polypropylene mesh was affixed to the rectovaginal septum and anterior portion of the rectum using interrupted 2-0 Ethibond sutures. The mesh was further secured to the posterior wall of the vagina and the posterior aspect of the rectum with 2-0 Ethibond sutures. The mesh was then retracted superiorly to the previously dissected sacral promontory. The assistant pressed against the promontory with a laparoscopic instrument to ensure proper placement of two additional 2-0 Ethibond sutures used to secure the mesh to the sacral promontory periosteum. Care was taken to avoid placing the sutures through the intervertebral disk. The laparoscopic assistant checked proper placement of the sutures by pulling them towards the anterior abdominal wall. Hemostasis was obtained following the confirmation of secure mesh tension.

The resultant pelvic peritoneal defect was closed with two running 3-0 Vicryl and 3-0 V-lock sutures. This completely isolated the mesh from the peritoneal cavity. The robot was then undocked. All trocar sites were injected with a bupivacaine hydrochloride and epinephrine anesthetic and a liposomal bupivacaine suspension, per our institution's enhanced recovery protocol. The 12-mm port was closed with a single suture. All remaining skin incisions were closed with reverse cutting Monocryl sutures. No complications were reported upon conclusion of the surgery. The patient was successfully extubated and brought to the post-anesthesia care unit (PACU) in stable condition.

### Role of team members

- Colorectal team, involving the attending colorectal surgeon and the robotic fellow performed the entire prolapse repair. The attending surgeon performed all critical aspects of the procedure;
- A general surgery resident was present to assist with the exchange of robotic instruments through the trocars and to provide laparoscopic assistance.

### Postoperative management

The patient's post-operative course was unremarkable. The patient was discharged on postoperative day (POD) 1. At two-year follow-up, the patient has not experienced any recurring symptoms of ODS or rectal prolapse. The patient's ODS score had decreased to 1/20, with a feeling of incomplete rectal evacuation rated at 1 (rarely).

## RESULTS

### Tips, tricks, and pitfalls

- When dissecting down the mesorectal plane posteriorly, care needs to be taken not to injure the hypogastric or sacral splanchnic nerves;
- By introducing a retractor into the vagina and opening the peritoneum with cautery, one can facilitate separation of the unusually redundant vagina from the anterior portion of the rectum and complete the entire dissection of the rectum all the way to the perineal body, in order to address the rectocele. Care must be taken here to avoid injuring the vagina or rectum during this dissection;
- Following fixation of the mesh, care must be taken to ensure the mesh tension is sufficient to avoid a future prolapse. A laparoscopic assistant can help verify appropriate tension of the sutures when securing the mesh, due to the robot's lack of haptic feedback;
- Ethibond is a good suture to use as it allows for easy tying of knots;
- Multiple studies have shown that unicompartmental approach to POP management can prove detrimental – worsening existing symptoms or introducing new symptoms [1, 13]. A pre-surgical multicompartmental assessment and management is critical for optimal patient's outcome through addressing all possible pathologies [1];
- Due to the potential for stretching and prolapse recurrence, absorbable or partially absorbable meshes are not recommended [4].

## CONCLUSION

We have presented a case where a posterior leading-edge rectal prolapse, rectocele, and sigmoidocele were successfully managed via robotic rectopexy with no sigmoid resection. The patient's obstructive defecation syndrome was resolved, with the ODS score decreasing from 9/20 to 1/20, and no complications occurred during the post-operative course. With no recurrence of symptoms or prolapses at two-year follow-up, we have demonstrated that robotic rectopexy is a suitable choice for treating multi-faceted pelvic organ prolapse.

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Competing interests: The authors declare that they have no competing interests.



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