Annals of Robotics and Automation


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Dates: Received: 15 February, 2017; Accepted: 10 March, 2017; Published: 11 March, 2017
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https://www.peertechz.com

Introduction
Laparoscopic ventral mesh rectopexy (LVMR) is the treatment of choice for external rectal prolapse (ERP) and there is good evidence to support its use for symptomatic internal rectal prolapse (IRP) [1]. A significant number of patients who undergo LVMR for symptoms attributable to IRP either do not improve or have a recurrence, as do 4% of patients who have had LVMR for ERP [2]. A proportion of the recurrence is thought to be due to significant residual posterior and/or lateral prolapse [3]. Ventral rectal fixation addresses anterior prolapse directly, but only elevates remaining circumferential prolapse indirectly. A modification of the LVMR, known as modified Orr–Loygue rectopexy (MOLR), aims to treat posterior IRP and ERP by suture or mesh fixation of mesorectum to the sacral promontory. However, posterior rectopexy has a high rate of recurrence [4,5]. Fixation of mesh to mesorectum will only indirectly secure the underlying rectal wall [6,7]. Additionally, fixation of mesh to mesorectal fat is insecure. Fixation points between mesh and rectal muscle or the anterior longitudinal ligament have a failure pressure higher than the maximum human intra-abdominal pressure, but fixation of mesh to mesorectum will fail at a lower pressure [8]. A narrow posterior dissection is needed to avoid rectal denervation [9]. This limits the distal extent of dissection. Theoretically, dissecting to Waldeyer’s fascia will allow suture fixation of mesh to the muscular rectal tube. This inherently stronger fixation may reduce recurrence, especially for low take-off IRP and ERP. This narrow distal dissection is achievable more readily using a robotic platform rather than a laparoscopic approach.

Workup
The preoperative workup consists of anorectal physiology studies, anal ultrasound, and defecating proctography. In equivocal cases, examination under anesthesia using a circular anal dilator is useful to assess the size, mural thickness, and location of take-off of the prolapse (Figure 1).

Operation
After general anesthesia with spinal infiltration, Intravenous antibiotic prophylaxis is administered and an indwelling urinary catheter is placed. A modified lithotomy position is used where the patient’s legs are placed in adjustable stirrups with sequential calf compression and the arms are wrapped and tucked alongside the body. A ‘Pink Pad’ (Figazzi Patient Positioning System™, Xodus Medical and New Kensington, PA USA) is used to secure the body and a body warmer is applied.

A 12mm trocar is inserted supra-umbilically and a
Dissection determines the width of the mesh (Dynamesh® PRS side of Denonvilliers' fascia to reduce the risk of nerve damage. and the rectovaginal plane identified. Dissection is continued to the pouch. A reverse J incision is made in the pouch to the pelvic promontory is exposed, and the lateral rectal peritoneum is separated. Dissection is limited before the lateral rectal columns are reached necessitating a narrow mesh. Reaching the posterior rectal muscle tube without undue traction on the lateral rectal columns is extremely challenging using laparoscopy, but achievable robotically.

The da Vinci patient cart is docked near the left hip of the patient, aligning the patient cart and camera port in a straight line that crosses the anterior superior iliac spine. A zero-degree camera is used, along with scissors with monopolar diathermy, and a needle holder in arm-1, fenestrated bipolar diathermy forceps in arm-2, and a da Vinci Cadiere® forceps (428005) in arm-3. The uterus (in women) or the recto-vesical pouch (in men) is elevated using a sling introduced through the skin above the pubis. The sigmoid colon is retracted and the epiploic fat is secured to the left flank using a Hem-o-lok® ligation system (5mm; Teleflex Medical, Wayne, PA, USA).

An incision is made over the right side of the sacral promontory, the transverse ligament over the sacral promontory is exposed, and the lateral rectal peritoneum is dissected to the pouch. A reverse J incision is made in the pouch to the pelvic floor. In men, dissection should be on the rectal side of Denonvilliers' fascia to reduce the risk of nerve damage. Deep pouches should be excised. The width of the ventral dissection determines the width of the mesh (Dynamesh® PRS soft, PV350527; FEG Textiltechnik MbH, Aachen, Germany) to be used (2–3cm in men and 5cm in women). The length (16–18 cm) is the same in women and men (Figure 3). The anterior mesh is stitched to the zero-muscular rectum using 3-0 PDS II sutures (E91035; Ethicon Endo-Surgery Inc., Johnson & Johnson, Cincinnati, OH, USA) from the sphincters cranially in two parallel strips every 1.5cm and continued 2–3cm proximal to the peritoneal reflection to secure any high take-off prolapse. Additional pelvic floor fixation should be attempted. The mesh is not fixed to the sacral promontory at this stage. Examination under anesthesia of the anorectum is performed, and if the rectal prolapse has been reduced, the ventral mesh is fixed to the promontory. If elements of the prolapse remain, an MOLR is performed. The unsecured ventral mesh is used for traction.

A narrow posterior window created between the hypogastric nerves and the dissection is continued in the presacral plane to the muscular rectal tube. A 2x15cm Dynamesh patch is sutured to the rectal tube and proximally to the mesorectum. The posterior and anterior mesh is then secured to the sacral promontory using an Ethibond® suture (E6193S; Ethicon). The peritoneum is closed transversely with 2-0 coated Vicryl™ (E9902S; Ethicon). The retractions are then released and the ports closed. A vaginal pack is inserted and removed the following day. Ibuprofen, paracetamol and laxatives are prescribed for 6 weeks and codeine may be used as required.

The advantages of robotic surgery include stereotactic vision, a stable camera platform, improved access to the narrow pelvis, and less pelvic nerve damage [10].

Further, fixation of mesh to rectal muscle rather than to mesorectum may reduce the recurrence rate found with LVMR, whether performed for IRP or ERP. Outcome data for the first 32 cases performed by the authors are included in Table 1. The patients were followed up at 3 months, 6 months and 1 year and discharged unless there was ongoing problem.

Conclusion

A robotic MOLR is safe and feasible for patients with symptomatic IRP or ERP. Given that the long-term recurrence rate after LVMR for ERP is already low, we would only recommend robotic MOLR for ERP if there are additional symptoms of obstructive defecation syndrome. However, the long-term outcomes using this modified procedure are presently unknown.
Table 1: Series - robotic MOLR.

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Indication</th>
<th>Length of Stay in days</th>
<th>Complications</th>
<th>Follow up in months</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range 18-89 years</td>
<td>Female: 28</td>
<td>External rectal prolapse: 10</td>
<td>1 to 13</td>
<td>One case of port site hernia</td>
<td>Range: 3-32</td>
<td>So far no cases of recurrence detected</td>
</tr>
<tr>
<td>Median 54 years</td>
<td>Male: 4</td>
<td>Internal Rectal Prolapse: 22</td>
<td>Median 2</td>
<td></td>
<td>Median: 9</td>
<td></td>
</tr>
</tbody>
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References


