



Levator ani repair by transvaginal approach

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Introduction

Levator ani injury in women is mainly caused by obstetrical damage, but any kind of direct perineal trauma can be also the cause (e.g., pelvic fracture in a road accident). The symptoms of levator ani damage are essentially anal incontinence, dyschezia, pain, colpophony (sound from the vagina at unexpected moments) and/or sexual dysfunction. Indications for a levator ani, mostly a puborectalis repair, are symptomatic damage of the muscle resulting in a retraction and a defect of the levator ani on the damaged side. The damage can be assessed by a simple inspection, with a clear deviation of the anus from the midline, as shown in Fig. 1. By careful vaginal and rectal examination, it is possible to feel the defect. The damage can be confirmed by perineal, endoanal or transvaginal ultrasound and magnetic resonance imaging (MRI).

There is no description of levator ani or puborectalis repair in the recent surgical literature as reported in a recent Cochrane review [1]. We therefore aimed to present a step-by-step approach, allowing levator ani repair.

Surgical technique

We start the surgery by placing the patient in a lithotomy with the legs flexed as much as possible followed by the full disinfection of the perineal area. Antibiotic prophylaxis consists of a single dose of cephalosporin and metronidazole. No bowel preparation is used. On clinical examination, it is easy to feel the defect on the side of the damaged levator ani, which gives a good idea of where to find the retracted muscle. To prevent postoperative pain, we routinely perform a perineal bloc with a long lasting anesthetic agent: typically, 20 ml of Chirocaïne® 0.5% (AbbVie Inc, Lake Bluff, IL, USA) is injected. A Lone Star retractor (CooperSurgical Inc., Trumbull, CT, USA) is used. Infiltration of the rectovaginal septum is performed with a lidocaine 2% solution with adrenalin (Sintetica SA Pharmaceuticals, Couvet, Switzerland). We start the procedure with a semi circumferential incision on the vaginal wall with a cold blade (Fig. 2a). The retractor is then replaced and the dissection of the rectovaginal septum is performed up to the top of the vaginal vault dissecting off the mucosa and following the same plane of a posterior colporrhaphy (Fig. 2b).

We can then identify the damaged levator ani, which is freed from the surrounding tissue (Fig. 2c). The muscle can be partially or totally detached. In the first case we will find scar tissue with fenestration of the muscle and fat coming from the ischioanal fossa. When the muscle is totally detached it will be found under the rectum. A gentle dissection of the lateral wall of the rectum is begun from the ischial spine laterally to the upper part of the anal sphincter thereby showing the pubovisceral muscle. Once done, the muscle is reinserted by 2–5 U sutures of 2–0 Maxon GU46 (Covidien, Dublin, Ireland) (Fig. 2d, e). Sutures are placed at the border of the muscle with 0.5 cm distance between each. The fixation of the muscle is done on the inferior part of the pubic bone, this is helped by palpation of the bone itself. The needle is positioned to enter the bone then moved inferiorly, taking in fact the periosteum and the underlying tissues. Tension on the stitches is reduced to avoid necrosis of

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Fig. 1 Clinical manifestation of a levator ani damage on the right side with a clear deviation of the anus from the midline toward the opposite side in these two patients

the muscle. In case of wide perineal hiatus we add a vertical approximation of the levator muscle anteriorly to the rectum similar to the colpomyoraphy used by gynecologists. Once hemostasis is completed, the vaginal mucosa is closed with a resorbable monofilament running suture. Finally, a bladder catheter is inserted and a swab with estrogenic cream is introduced into the vagina for 24 h. Patients receive a small 125 ml enema on postoperative day 2 if they do not pass stools before that. Postoperative pain management is helped by a myorelaxant therapy (Tizanidin 4 mg per day).

The patients have to be informed they will feel discomfort at the level of the coccyx, so they will not be surprised. Patients will be asked to shower the vaginal wound 4–6 times per day with water only.

Discussion

This new technique restores the anatomy of the levator ani sling, allowing the recovery of perineum function and the decrease of symptoms, like colpophonia and incontinence.

The procedure is well tolerated and patients typically stay 2 days after surgery.

In our experience the risk of complications is very similar to the one described for a posterior colporrhaphy as the approach is similar. Bleeding and postoperative pain are the most common complications. A rectal or vaginal perforation is rarely seen and has to be identified and repaired intra-operatively. Late perforation of the rectum is rare as the dissection is performed mainly without electrocoagulation. A report on the results of this procedure is currently in preparation.

To our knowledge the only existing description of levator ani repair is from a case report by Rostaminian and colleagues who describe a transvaginal approach to repair a bilateral levator avulsion [2]. The muscle is found by inserting hooks under ultrasound guidance, the levators are accessed through vertical incisions on each side of the vagina and sutured to the pubic bone at the level of the arcus tendinous [4]. A dissection similar to the one we describe is part of a transvaginal iliococcygeus fixation for post-hysterectomy vaginal vault prolapse reported by Milani et al. [3, 4]. For this procedure access to the levators is obtained in similar way bilaterally. Liberation of the lateral part of the rectum begins from the ischial spine laterally with exposure of the sacrospinal ligament and ileococcygeus muscle under it. The vaginal apex is fixated to the ileococcygeus muscle and fascia distal to the ischial spine.

Conclusions

Levator ani damage has not been thoroughly studied and is difficult to manage, as no specific treatment exists. The new surgical technique we have described to repair levator ani defects and to restore pelvic floor anatomy and function appears to be safe and effective. Further studies are needed to confirm our preliminary findings.

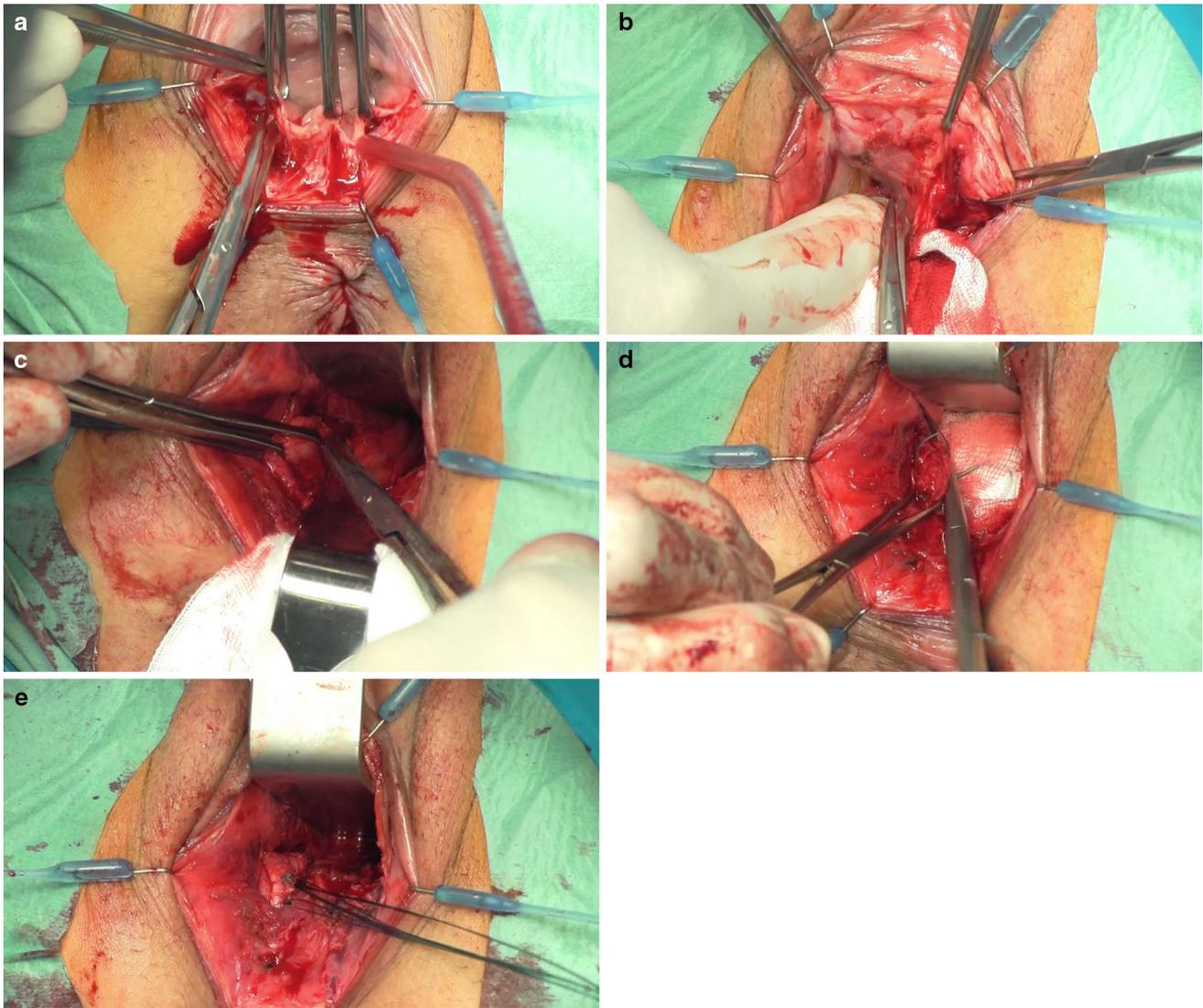


Fig. 2 **a** Placement of the Lone star retractor to allow the incision on the vaginal side. **b** Dissection of the rectovaginal space up to the vagina's vault. **c** The puborectalis muscle is then freed from the sur-

rounding tissues on a forceps. **d** Reinsertion of the puborectalis muscle with U shape stitches of monofilament sutures. **e** The puborectalis muscle is reinserted at his initial place and the gap is filled

Compliance with ethical standards

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

Ethical approval All procedure performed in this studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study

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