Novel Hysteropexy Technique: Sacrouterine Tape Simulation

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Abstract

Sacrohysteropexy procedures require advanced suturing and dissection skills and are associated with complications such as mesh exposure, dyspareunia, ileus, de novo bowel dysfunction. New technique is composed of insertion of mid-urethral sling tape into the cervix vaginally and suspend of uterus bilaterally via free arms of tape under the peritoneal tunnel formed with the aid of modified semicircular disposable grasper. This novel hysteropexy technique is an easy, feasible and minimally invasive way to correct primarily apical or multicompartment defects with the advantages of a minimal mesh load, short operation time and anatomical result that mimics the normal sacrouterine ligament.

Tweetable abstract

Sacrouterine Tape Simulation technique is feasible and minimally invasive way to correct multicompartment defects

Key words : Sacrohysteropexy; tape simulation; apical uterine prolapse; hysteropexy; sacrouterine ligament

Introduction

Apical prolapse, alone or in combination with anterior/posterior vaginal wall prolapse, results from defects in the integrity of the uterosacral and cardinal ligaments.[1] Sacrocolpopexy and hysteropexy are accepted as the gold standard treatments for apical uterine prolapse.[2] This repair consists of securing the anterior and posterior vaginal walls to the anterior longitudinal sacral ligament just below the sacral promontory using Y-shaped mesh. Reduced blood loss, fast patient recovery and fewer incisional morbidities are achieved by laparoscopic sacrocolpopexy.[3] However laparoscopic sacrocolpopexy is a long and complicated procedure that requires specialized surgical skills, including precise dissection, suturing and the use of advanced laparoscopic equipment, or a robotic endoscopic unit to assist with suturing and dissection. Concomitant hysterectomy at the time of sacrocolpopexy, usually performed to facilitate access to the anterior and posterior vaginal walls, is associated with increased cost, morbidity and operation time.[4, 5] Uterus-sparing hysteropexy reduces mesh exposure, operative time, blood loss and surgical cost with no differences in prolapse recurrence. Despite a better understanding of apical support and advancements in surgical techniques, there are still several problems associated with the peritonization of mesh and a non-physiological position of the uterus or vagina, including a relatively high recurrence rate, frequent mesh exposure and complications such as ileus and ureter damage.

The novel operation technique presented here is an easy and minimally invasive way to correct apical defects/concurrent apical and anterior vaginal wall defects with the advantages of a minimal mesh load, short operation time and optimum anatomical results that mimic normal support.

Technique

The presented operation is performed in two steps, consisting of an initial vaginal surgery followed by a laparoscopic approach. The procedure begins by placing the patient in the dorsal lithotomy position

to permit access to both the vagina and abdomen, and is conducted under general anesthesia with broad-spectrum prophylactic antibiotics. The cervix is grasped with a tenaculum and downward traction is applied. An anterior 2-cm long transverse incision to the anterior cervix is made. The bladder is dissected through blunt and sharp dissection to the level of the isthmus. Posteriorly, a 2-cm long colpotomy is performed, and the peritoneum over the pouch of Douglas is opened at the level of the cervix. A type 1 macroporous monofilament is used to create a light mid-urethral polypropylene sling (40 cm length, 1 cm width; Figure 1). The mesh is inserted through the cervix from 8 to 10 way in right and from 2 to 4 way in left with the help of a clamp (Figure 2). The midpoint of the tape is fixed to the cervix with a 2/0 polypropylene suture. The free ends of the tape are inserted into the peritoneal cavity with the aid of ring forceps. Vaginal incisions are closed with a polyglactin 910 2/0 suture. A uterine sound is placed to allow gentle manipulation of the uterus and gloves are changed before starting the laparoscopic phase of the procedure. The vaginal approach is concluded with a low posterior colporrhaphy/perineoplasty and the placement of a mid-urethral sling.

After abdominal preparation and induction of pneumoperitoneum, a 30° telescope is inserted through a 10-mm umbilical port. Two 5-mm ports are inserted at the right upper quadrant and one 5-mm port is inserted suprapubically. For better visualization, the bilateral ovaries can be fixed to the anterior abdominal wall with the aid of sutures and a straight needle, representing another novel technique used in the current procedure (optional). The bilateral ureters, sacrouterine ligament lines, L5-S1 and promontorium anatomies are carefully identified. For the right sacrouterine ligament tape simulation, the prevertebral parietal peritoneum is vertically incised over the sacral promontory with a harmonic scalpel and the anterior longitudinal ligament of the sacrum is revealed. A tunneler, modified by manually bending disposable clinched grasping forceps (Covidien, Mansfield, MA, USA) to form a 15-cm diameter semicircle (Figure 3), is used to make a tunnel parallel and medial to the sacrouterine fold. This modified grasping tunneler is inserted suprapubically after removing the suprapubic port. The free end of the tape is grasped and pulled, then it is fixed to the anterior longitudinal ligament with three 5-mm titanium helical tacks (Tacker Fixation Device, Covidien, Mansfield, MA, USA) avoiding excessive tension. After medialization of the sigmoid colon, a 2-cm incision of the peritoneum over the sacrum is made. The same technique for tunneling and passing of tape is then used. Alternatively, a 10-cm diameter semicircular mid-urethral sling applicator can be passed from the cervix to the sacrum medial to sacrouterine fold. Both techniques are shown in the accompanying video. The free end of the mesh is transfixed to the anterior longitudinal ligament, similar to that done on the right side. Excess mesh is cut with scissors and the peritoneum over the sacrum is closed with 2/0 polyglactin sutures and tied with an extracorporeal knot.

Experience

Fifteen sacrouterine tape simulation operations have been successfully performed. I have not encountered any complications related to the operation. One bladder perforation due to a concomitant retropubic mid-urethral sling was resolved by pulling and reinserting the tape. In one patient, meticulous dissection of the sigmoid colon, intestine and bladder was performed before tunneling and fixation. Other concomitant vaginal procedures have included anterior colporrhaphy, posterior colporrhaphy and perineoplasty. The tape can be inserted into the cervix in 10–20 minutes and the laparoscopy procedure can be completed in 20–30 minutes. All patients were hospitalized on the operation day, discharged within 24 hours and managed according to the ERAS protocol of the clinic. I believe that utilization of the special tunneler, designed with appropriate angle, rotation and diameter and easy attachment mechanism, improves the operation time. The median preoperative point C was +1 and median postoperative point C was -8. The median change from preoperative point C to postoperative point C was 9 cm ($P < 0.01$). All patients were followed up at 4 weeks postoperative, and they all had a Stage 0 Pelvic Organ Prolapse Qantification (POP-Q) score.

Discussion

Abdominal or minimally invasive sacrohysteropexy is regarded as the standard reference procedure for apical and multicompartment prolapse, especially in women who want a uterus-sparing procedure. Although it has a relatively high success rate, these procedures require advanced suturing and dissection skills and are related to complications such as mesh exposure, dyspareunia, ileus, *de novo* bowel dysfunction, and intraop-

erative bladder and intestine injury.[6] The technique described here has several advantages over conventional techniques.

The uterosacral ligament, which is 12–14 cm long, can be subdivided into cervical (2–3 cm), intermediate (5–6 cm) and sacral (5–6 cm) sections.[7] The cervical section of the ligament is made up of dense connective tissue containing small blood vessels and small branches of the hypogastric plexus. The novel intracervical placement of mesh described here mimics sacrouterine ligament insertion, providing strong attachment without the need for any anchor or suture, which may decrease the detachment and mesh exposure risks.

The stiffness and geometry of the uterosacral ligament play important roles in the biomechanics of apical uterovaginal prolapse.[8] By helping to maintain a symmetrical, anteflexed and anteverted position of the uterus, this technique can reconstruct the biomechanics that may cause anterior or posterior vaginal wall prolapse after other apical prolapse repair techniques.[9] The minimal use of polypropylene mesh and avoidance of mesh in the vaginal wall can eliminate the risk of mesh erosion or exposure. The calculated polypropylene mesh load surface area is 4 x 10^{-3} m^2 (0.3 g) for SUTS and 13 x 10^{-3} m^2 (1 g) for sacrocolpopexy mesh.

The vaginal approach for mesh insertion is a feasible technique and provides an opportunity to repair anterior and posterior vaginal wall defects and to perform a mid-urethral sling and perineoplasty. Fixation of mesh up to the bladder neck in the anterior vaginal wall and up to the levator ani muscle level in the posterior vaginal wall can ameliorate prolapse of the anterior and posterior vaginal walls, but it can also cause *de novo* pain or sexual dysfunction.[10] Therefore, conventional colporrhaphy may result in better anatomic outcomes without mesh-related pain.

De novo bladder dysfunction or bowel dysfunction can be seen after conventional hysteropexy or sacrocolpopexy operations. This impaired function can be due to inferior hypogastric plexus injury during dissection of the sacrum, dissection of the peritoneum medial to the sacrouterine fold or vaginal dissection.[11] The new tunneling technique described here uses an angled semicircular bended grasper, thereby avoiding vigorous dissection of the peritoneum and consequently minimizing ureter, nerve and vessel injuries. The use of a bended, disposable grasper without a port instead of rigid laparoscopic instruments is a practical idea that is also easy to perform. The reasons for bowel dysfunction after conventional hysteropexy can include the approximation of the uterus to the sacrum and compression of sigmoid colon between the sacrum and over the displaced uterus. This new technique permits bowel movements between the two tape arms.

Conclusion

The novel hysteropexy technique described here is an easy, feasible and minimally invasive way to correct primarily apical or multicompartment defects with the advantages of a minimal mesh load, short operation time and a result that mimics normal anatomical structures.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Consent

Written informed consent was obtained from the patient for publication of this video article and any accompanying images.

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Figure 1: Type 1 macroporous monofilament polyprolene tape designed for transobturator tape procedure. (Betamix® BSS Vaginal Tape System, Betatech Medical Corporation, Istanbul, Turkey). Standart sizes of 40 cm length, 1 cm width were used.

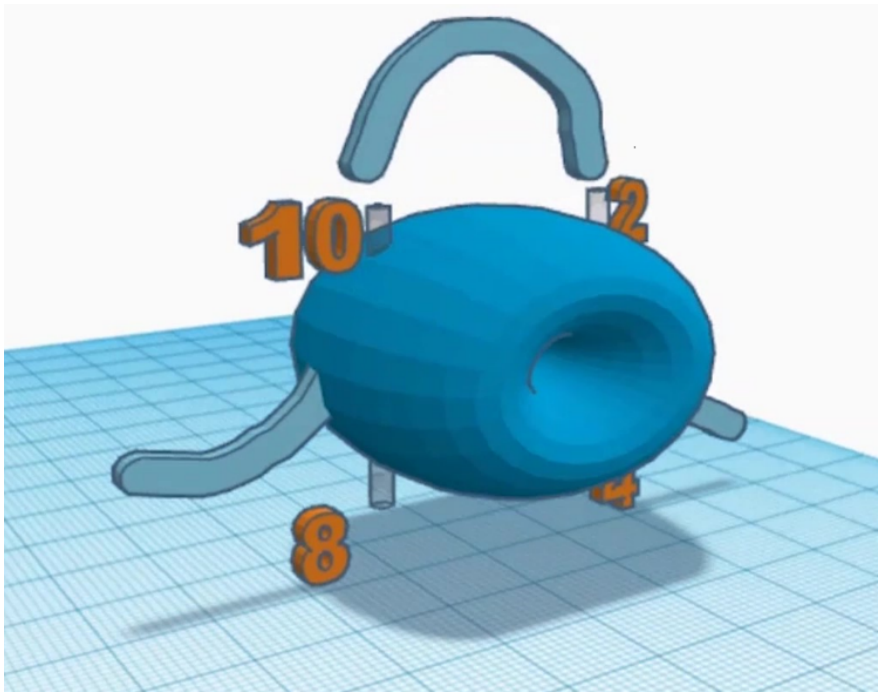

Figure 2: Three dimensional illustration showing uterine cervix and route of mesh inserted to cervix. The mesh is inserted through the cervix from 8 to 10 way in right and from 2 to 4 way in left with the help of a clamp.

Figure 3: The manually bended disposable disposable clinched grasping forceps to form a 15-cm diameter semicircle (Covidien, Mansfield, MA, USA).

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