

# Laparoscopic Repair of Pelvic Organ Prolapse

Prof. Dr. R. K. Mishra

#### ■ INTRODUCTION

Pelvic organ prolapse (POP) happens when the muscles and tissues supporting the pelvic organs (the uterus, bladder, or rectum) become weak or loose. This allows one or more of the pelvic organs to drop or press into or out of the vagina.

The different types of POP depend on the pelvic organ affected. The most common types include:

- *Cystocele*: This is the most common type of POP. This happens when the bladder drops into or out of the vagina
- *Rectocele*: This happens when the rectum bulges into or out of the vagina
- Hysterocele: This happens when the uterus bulges into or out of the vagina. Uterine prolapse is sometimes associated with small bowel prolapse (called enterocele) where part of the small intestine, or small bowel, buges into the vagina

Apical prolapse is the descent of uterus cervis, or vaginal vault. POP affects millions of women worldwide. It is estimated that approximately 200,000 inpatient surgical procedures for prolapse are performed annually. About 11–19% of women will undergo surgery for POP or incontinence by age 80–85 years and 30% of these women will require an additional POP or moontinence surgery. Anterior vaginal wall prolapses without concomitant apical prolapse are uncommon and apical prolapse repair should be included in the majority of pelvic reconstructive surgery procedures.

Vaginal vault prolapse occurs when the apex of the vagina descends below the introitus. It is sequelae of incorrectly performed hysterectomy and occurs due to disruption of the ligaments that maintain vaginal support. Numerous surgical techniques have been proposed to prevent and correct this condition, including abdominal sacral colpopexy with interposition of a mesh between the prolapsed vaginal vault and anterior surface of the sacrum. Traditionally, open surgical procedure usually requires a midline abdominal incision and extensive bowel manipulation.

# INDICATIONS OF SURGERY

#### Symptomatic Prolapse

- Feeling of pelvic heaviness or full and low back pain
- Perception of lump at the opening of the vulva

- Mucosal erosion
- Bleeding
- Infection
- Splinting or digitation (the need to manually assist in reducing prolapse, often to void or defecate)

Concomitant symptoms may include the following:

- Urinary incommence symptoms such as stress, urgency, or postaral incommence
- Bladder storage symptoms such as frequency, urgency, or overactive bladder syndrome

Voiding symptoms such as hesitancy, slow stream, stream, incomplete emptying, or position-dependent voiding

- Sexual dysfunction symptoms such as dyspareunia or obstructed intercourse
- Anorectal dysfunction such as fecal incontinence, flatal incontinence, fecal urgency, straining to defecate, constipation, and incomplete evacuation

# CONTRAINDICATIONS

Many of the general contraindications to laparoscopic sacral colpopexy are the same for any laparoscopic surgical procedure. These may include the following:

- Anemia
- Bleeding diathesis or the need for anticoagulation
- Significant cardiac or pulmonary comorbidities
- Active infection such as cystitis, bacterial or fungal vaginal infection, pelvic inflammatory disease, or active sexually transmitted disease
- Active venous thromboembolism
- Uncontrolled hyperglycemia.

Other contraindications specific to laparoscopic sacral colpopexy include the following:

- Vaginal cancer, cervical cancer, or uterine cancer that is untreated or cannot be adequately treated due to advanced stage
- Fistulas such as vesicovaginal, rectovaginal, vesicouterine, or urethral fistulas
- Previous pelvic prolapse repairs with infected or exposed foreign material and erosions.

Relative contraindications include the following:

- Pelvic irradiation
- Previous pelvic surgery or prolapse repair, depending on the nature of the operation and the subsequent pathology, side effects, or complications (the existence of such may warrant additional diagnostic evaluation and may require additional surgical intervention or change of approach to prolapse repair)
- Concomitant cystocele, rectocele, or urinary incontinence (the existence of such pathology may require additional surgery, a vaginal approach, or a combined approach).

The advantages of a laparoscopic sacral colpopexy include a better view of the pelvis, precise hemostasis, smaller incision, and less manipulation of the viscera. Sacral colpopexy involves placing a Hammock of polypropylene mesh between the prolapsed vaginal vault and the anterior surface of the sacrum. Multiple permanent sutures attach one end of the mesh to the apex of the vaginal vault and the opposite end to either the hollow of the sacrum or to the sacral promontory.

### LAPAROSCOPIC SLING SURGERY FOR CYSTOCELE REPAIR

Factors that are linked to cystocele development include age, repeated childbirth, hormone deficiency, menopause, constipation, ongoing physical activity, heavy lifting, and prior hysterectomy (**Fig. 1**). Symptoms of bladder protapse include stress incontinence (inadvertent leakage oburine with physical activity), urinary frequency, difficult urination, a vaginal bulge, vaginal pressure or pain, painful sexual intercourse, and lower back pain. Urinary incontinence is the most common symptom of a cystocele.

Surgery is generally not performed unless the symptoms of the prolapse have begun to intervent with daily life. A staging system is used to grade the severity of a cystocele. A stage I, II, or III prolapse descends to progressively lower areas of the vagina. A stage IV prolapse descends to or protrudes through the vaginal opening. Surgery is generally reserved for stage III and IV cystoceles.



Fig. 1: Cystocele.

All surgical procedures were performed under general anesthesia. Every patient received a single dose of intravenous prophylactic antibiotics. The patients were placed in a lithotomy position. Laparoscopy was setup with the endoscope located at the 10-mm umbilical wound, two 5-mm trocar ports in the bilateral lower quadrant of the abdomen approximately 2 cm medial to the anterior superior iliac spine, and one 5-mm trocar port 7.5 cm left and lateral to the umbilicus. The peritoneum of anterior leaf of broad ligament should be opened on either side. In the midline, peritoneum should be opened at the uterovesical fold and bladder should be bluntly dissected to expose the anterior colpocervical junction (Figs. 2A to D). Long mesh, a synthetic T-shaped prolene mesh, should be delivered into the pelvic cavity (Fig. 3). The centerpiece of mesh should be fixed to the anterior vaginal fascia and cervix with 8-10 surgeons knot using polyester or silk suture (Figs. 4A to D). An extraperitoneal tunnel was created along the left round ligament in it reached a location 2 cm medial to anterior superior diac spine (Figs. 5A to D). One arm of the long mesh was pulled out along the tunnel underneath the round ligament and fixed with the fascia of the abdominal obligue muscle. The same procedure was repeated on the contradteral side. The bilateral round ligaments and the mesh arms were sutured continuously with 2-0 Vicryl Figs. 6A to C). After fixing the mesh, peritoneum should be closed with continuous suture to hide the mesh completely. www.tension of the mesh should be adjusted until the apical compartment is reduced to an appropriate position per the vaginal examination (Fig. 7).

### OPERATIVE PROCEDURE OF SACROCOLPOPEXY FOR VAULT PROLAPSE

Mechanical and antibiotic bowel preparation is given prior to the night of surgery. The vagina is thoroughly cleansed with an antiseptic before the procedure. The laparoscope is placed through the umbilicus and other instruments through three suprapubic 5 mm accessory trocars. The patient is placed in a steep Trendelenburg position and tilted to the left to move the bowel away from the operating field.

Before starting procedure, diagnostic laparoscopy is performed. The vagina is pushed up by a sponge on a ring forceps in the vaginal vault and adhesiolysis is performed as necessary. Peritoneum and connective tissue are removed from the vaginal apex until the vaginal fascia and scar are identified. While holding the vaginal apex with grasping forceps, the vesical peritoneum over the vaginal apex is incised using blunt dissection, hydrodissection, or scissors (Figs. 8A to C). The bladder is dissected from the anterior vaginal wall and the rectum from the posterior vaginal wall to expose approximately 4 cm of the vaginal vault (Figs. 9A to C). If a buttonhole gets made by mistake in the vagina, an inflated surgical glove is placed in the vagina to help maintain pneumoperitoneum.



Figs. 2A to D: Anterior leaf of broad ligament should be opened on either stue. In the midline, peritoneum should be opened at the UV fold and bladder is bluntly dissected to expose the anterior colpocervical junction.



The posterior parietal peritoneum is lifted with grasping forceps and the anterior sacral fascia exposed (Figs. 10A and B). Care is taken to avoid injuring the presacral vessels. Bleeding is controlled with bipolar electrodesiccation suture or clips. The peritoneal incision is extended downward to the vagina through the presacral space. The presacral space is entered through a vertical peritoneal incision at the right pararectal area using hydrodissection combined with the bipolar; this can be replaced by any cutting modality that the surgeon chooses. The peritoneal incision at the promontory is then extended along the rectosigmoid to continue over the deepest part of the cul-de-sac opening the recto- and vesicovaginal space. Some prefers to create a tunnel under the peritoneum avoiding later suturing. The lateral incision as well as the dissection downward toward the perineal body can be extended as far as required. This is the case when there is a large rectocele or when a concomitant rectopexy is required for rectal prolapse.

The following anatomic landmarks are identified to avoid bowel, ureter, and vessel injury is the right ureter, internal iliac artery and vein, descending colon, and presacral vessels. The sigmoid colon is reflected laterally to avoid injury to vessels in the sigmoid mesentery. The central 5 mm trocar above the symphysis pubis is replaced with a 10-mm trocar. The polypropylene mesh is rolled and introduced into the abdomen through the 10 mm suprapubic port. Three to five 1-0 nonabsorbable polybutilate coated polyester sutures are placed in a single row in the vaginal wall apex from one lateral fornix to the other. Each suture is placed through one end of the polypropylene mesh and tied loosely using extracorporeal or intracorporeal knot (**Figs. 11A to C**).

Two permanent sutures or staples are placed in the periosteum of the sacrum over anterior longitudinal ligament apart in the midline over S3 and S4 (Fig. 12). Care is taken to avoid vascular injury to paravertebral and perforating blood vessels in this area. Hemostasis is difficult even by laparotomy because of retraction of the severed vessels. The mesh is adjusted to hold the vaginal apex in the correct anatomic position without being tight. The excess mesh is trimmed from the strap (Fig. 13). The peritoneum is closed over the strap using continuous suturing (Fig. 14). Postoperatively, patients remain in bed for 24 hours. They are advised to avoid intercourse for 2 months. Their diet is advanced as tolerated and a mild laxative is prescribed to prevent constipation.





Figs. 5A to D: Pulling out along the tunnel underneath the round ligament.

Vaginal vault prolapse results from poor support of ligaments that normally maintain vaginal position. Several operative techniques are available to correct this problem. Abdominal colpopexy by suspending a mesh Hammock

between the prolapsed vault and sacrum has been reported with good results. The laparoscopic modification of this operation combines the advantages of several procedures. Proper anatomic relationships are restored by correcting



Figs. 9A to C: Dissection in between rectum and vagina.



Figs. 10A and B: Opening of peritoneum over sacral promontory.



Figs. 11A to C: Fixation of mesh over vaginal cuff.



Fig. 12: Fixation of mesh to anterior longitudinal ligament.



Fig. 13: Excess of the mesh is trimmed.



Fig. 14: Peritonization of mesh.

#### **Pectopexy Technique**

The peritoneum layer from midline is opened along the right round ligament toward the pelvic side wall and then same on left pelvic side wall. An incision in the medial and caudal direction was made with a harmonic scalpel **(Figs. 16A to D)**. Soft tissue in this area was dissected with blunt dissection, so an approximately 4–5 cm segment of the right iliopectineal ligament (Cooper's ligament) adjacent to the insertion of the iliopsoas muscle could be identified **(Figs. 17A and B)**. The same procedure was then repeated on the left side of the patient. The peritoneal layers on both sides were opened toward the vaginal apex and the anterior and posterior areas



Figs. 16A to D: Opening of peritoneum on either side and separating bladder.



Figs. 17A and B: Exposing pectineal ligament of either side.

of the vaginal apex were prepared for the mesh fixation. In patients with a preserved uterus, the anterior peritoneum of the uterus was dissected and the lower anterior segment of the uterus was prepared for the mesh fixation. After completion of dissections, a polyvinylidene fluoride monofilament mesh is inserted into the abdominal cavity. The center of T-shaped mesh is fixed to the cervix and anterior vaginal fascia (Fig. 18). The ends of the mesh were sutured to both iliopectineal ligaments via the intracorporeal suture technique using nonabsorbable suture or fixed with titanium tacker (Figs. 19A and B). The mesh in the tension free position was fixed to the vaginal apex or uterus of polydioxanone sutures and the vaginal apex of was provided with a hammock-like fixation. peritoneum above the mesh was sutured with an absorbable suture (Figs. 20A to D).

Laparoscopic pectopexy is an effective and alternative procedure for women with POP and a good option for preserving fertility. We found that prepare did not adversely affect the short-term success of laparoscopic pectopexy and vice versa.

#### POTENTIAL RISKS AND COMPLICATIONS

Although laparoscopic colposuspension has proven to be very safe, as in any surgical procedure, there are risks and potential complications. Potential risks include:

- Bleeding: Although blood loss during this procedure is relatively low compared to open surgery, a transfusion may still be required if deemed necessary either during the operation or afterward during the postoperative period.
- Infection and erosion of bladder: All patients are treated with intravenous antibiotics prior to the start of surgery to decrease the chance of infection from occurring within the urinary tract or at the incision sites. Women having vaginal erosion should be prescribed a vaginal estrogen cream two to three times daily for few weeks.
- *Adjacent organ injury*: Although uncommon, possible injury to surrounding tissue and organs including bowel,



Fig. 18: Suturing middle of T-shaped mesh with cervix and vaginal fascia.

vascular structures, pelvic musculature, and nerves could require further procedures. Transient injury to nerves or muscles can also occur related to patient positioning during the operation.

- Hernia: Hernias at the incision sites rarely occur since all port entry incisions are closed under direct laparoscopic view.
- Conversion to open surgery: The surgical procedure may require conversion to the standard open operation, if extreme difficulty is encountered during the laparoscopic procedure (e.g., excess scarring or bleeding). This could result in a standard open incision and possibly a longer recuperation period.
- *Urinary incontinence*: Preexisting urinary incontinence will typically be addressed at the time of surgery with a bladder sling suspension; however, minor incontinence may still exist, which typically resolves with time. On occasion, medication may be required.
- Urinary retention: As with urinary incontinence, postoperative urinary retention is uncommon and usually is present in patients who undergo concurrent bladder sling suspension. Temporary intermittent selfcatheterization may be required postoperatively.
- Vesicovaginal fistula: A fistula between the bladder and vagina is a rare complication of any pelvic surgery



Figs. 19A and B: Mesh is fixed on either side of pectineal ligament.



Figs. 20A to D: Peritonization of mesh.

involving the vagina, uterus, and bladder. A vesicovaginal fistula typically manifests with symptoms of continuous urinary leakage from the vagina. Although rare, these fistulas can be managed conservatively or by surgical repair through a vaginal incision.

Abdominal sacrocolpopexy, laparoscopic sacrocolpopexy, and laparoscopic pectopexy have comparable perioperative complications and short-term anatomical and subjective outcomes. Although the complication rates were not significantly different between the groups, the laparoscopic sacrocolpopexy and pectopexy groups had less morbidity. Moreover, laparoscopic pectopexy is a novel promising method for POP correction that offers some practical advantages such as shorter operating times when compared with laparoscopic sacrocolpopexy, so that it can be added to a surgeon's methods to more adequately react in complex presacral area dissections.

#### BIBLIOGRAPHY

- Akladios CY, Dautun D, Saussine C, Baldauf JJ, Mathelin C, Wattiez A. Laparoscopic sacrocolpopexy for female genital organ prolapse: establishment of a learning curve. Eur J Obstet Gynecol Reprod Biol. 2010;149:218-21.
- 2. Alkatout I, Mettler L, Peters G, Noé G, Holthaus B, Jonat W, et al. Laparoscopic hysterectomy and prolapse: a multiprocedural concept. JSLS. 2014;18:89-101.
- Baessler K, Schuessler B. Abdominal sacrocolpopexy and anatomy and function of the posterior compartment. Obstet Gynecol. 2001;97:678-84.

- 4. Banerjee C, Noé KG. Laparoscopic pectopexy: a new technique of prolapse surgery for obese patients. Arch Gynecol Obstet. 2011;284:631-5.
- 5. Beer M, Kuhn A. Surgical techniques for vault prolapse: a review of the literature. Eur J Obstet Gynecol Reprod Biol. 2005;119: 144-55.
- 6. Bundesministerium des Innern. Demography Report: Report of the German Federal Government on the Demographic Situation and Future Development of the Country. Berlin: German Federal Ministry of the Interior; 2011.
- 7. Cosson M, Boukerrou M, Lacaze S, Lambaudie E, Fasel J, Mesdagh H, et al. A study of pelvic ligament strength. Eur J Obstet Gynecol Reprod Biol. 2003;109:80-7.
- 8. El-Hamamsy D, Fayyad AM. New onset stress urinary incontinence following laparoscopic sacrocolpopexy and its relation to anatomical outcomes. Int Urogynecol J. 2015;26:1041-5.
- 9. Faure JP, Hauet T, Scepi M, Chansigaud JP, Kamina P, Richer JP. The pectineal ligament: anatomical study and surgical applications. Surg Radiol Anat. 2001;23:237-42.
- 10. Irvine L, Shaw R. The effects of patient obesity in gynaecological practice. Curr Opin Obstet Gynecol. 2003;13:179-84.
- 11. Kumar S, Malhotra N, Chumber S, Gupta P, Aruna J, Roy KK, et al. Control of presacral venous bleeding, using thumbtacks. Arch Gynecol Obstet. 2007;276:385-6.
- 12. LeClaire EL, Mukati MS, Juarez D, White D, Quiroz LH. Is de novo stress incontinence after sacrocolpopexy related to anatomical changes and surgical approach? Int Urogynecol J. 2014;25: 1201-6.
- 13. Lee RK, Mottrie A, Payne CK, Waltregny D. A review of the current status of laparoscopic and robot-assisted sacrocolpopexy fo
- Pervic organ prolapse. Eur Urol. 2014;65:1128-37.
  14. Maher C, Feiner B, Baessler K, Adams EJ, Hagen S, Glazener W. Surgical management of pelvic organ prolapse in vertee. Cochrane Database Syst Rev. 2010;4:CD004014.

- 15. Noé KG, Schiermeier S, Alkatout I, Anapolski M. Laparoscopic pectopexy: a prospective, randomized, comparative clinical trial of standard laparoscopic sacral colpocervicopexy with the new laparoscopic pectopexy-postoperative results and intermediateterm follow-up in a pilot study. J Endourol. 2015;29:210-5.
- Noé KG, Spüntrup C, Anapolski M. Laparoscopic pectopexy: a 16. randomised comparative clinical trial of standard laparoscopic sacral colpo-cervicopexy to the new laparoscopic pectopexy: short-term postoperative results. Arch Gynecol Obstet. 2013;287:275-80.
- 17. North CE, Ali-Ross NS, Smith AR, Reid FM. A prospective study of laparoscopic sacrocolpopexy for the management of pelvic organ prolapse. BJOG. 2009;116:1251-7.
- 18. Nygaard IE, McCreery R, Brubaker L, Connolly A, Cundiff G, Weber AM, et al. Pelvic Floor Disorders Network Abdominal sacrocolpopexy: a comprehensive review. Obstet Gynecol. 2004;104:805-23.
- 19. Sarlos D, Brandner S, Kots L, Gygax N, Schaer G. Laparoscopic sacrocolpopexy for uterine and post-hysterectomy prolapse: anatomical results, quality of life and perioperative outcome-a prospective study with 101 cases. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19:1415-22.
- Sarlos D, Kousel, Ryu G, Schaer G. Long-term follow-up of 20. laparoscopic sacrocolpopexy. Int Urogynecol J. 2014;25:1207-12.
- Snyder TE, Krase KE. Abdominal-retroperitoneal sacral colpo-21. the correction of vaginal prolapse. Obstet Gynecol. :944-9,

abak LI, Waetjen LE, van den Eeden S, Thom DH, Vittinghoff E, while the United Sector of the States. Obstet Gynecol. 2001;98:646-51. 28. Whitehead WE, Bradley CS, Brown MB, Brubaker L, Gutman RE,

Warner RE, et al. Gastrointestinal complications following abdominal sacrocolpopexy for advanced pelvic organ prolapse. Am J Obstet Gynecol. 2007;197:78.e1-7.

# Contact us

- World Laparoscopy Hospital
- Cyber City, Gurugram, NCR Delhi
- INDIA: +919811416838
- World Laparoscopy Training Institute
- Bld.No: 27, DHCC, Dubai
- UAE: +971523961806
- World Laparoscopy Training Institute
- 8320 Inv Dr, Tallahassee, Florida
- USA: +1 321 250 7653