

Laparoscopic pectopexy for patients with intraabdominal adhesions, lumbar spinal procedures, and other contraindications to sacrocolpopexy: a case series



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Laparoscopic pectopexy is an alternative to sacrocolpopexy utilizing fixation points in the anterior pelvis for vaginal vault suspension; it was originally developed for an obese population. This is a retrospective case series of 7 women who underwent laparoscopic pectopexy at one academic Institution between October 2019 and December 2020. The patients had preoperative vaginal vault prolapse (pelvic organ prolapse quantification system [POP-Q], stage 2 and 3). Pectopexy was performed because of relative contraindications to sacrocolpopexy, including use of antiplatelet therapy, extensive adhesions, and chronic back pain with lumbo-spinal fusion. No intraoperative complications were documented in this cohort. Average blood loss was 32.9 mL. All the patients were discharged home within 24 hours. One patient experienced urinary retention that required release of the retropubic midurethral sling placed at the time of pectopexy. The most recent follow-up examination occurred at an average of 127 days after the procedure. All 7 patients had a resolution of their prolapse (POP-Q ≤ 1). This case series highlights the application of pectopexy for patients with extensive adhesions, use of antiplatelet therapy and lumbar or sacral spinal surgical history. The complication rates and operative results are comparable with sacrocolpopexy at intermediate-term follow-up in this small case series, indicating that pectopexy may be a promising alternative for patients with relative contraindications to sacrocolpopexy. This is the first report of the application of the technique in North America.

Key words: contraindications, laparoscopic pectopexy, laparoscopic sacrocolpopexy, spinal surgery

Introduction

Sacrocolpopexy is regarded as the gold standard for apical pelvic organ prolapse repair and is noted to have a low recurrent prolapse rate and maintain a relatively natural axis of the vagina when compared to vaginal repairs.^{1,2} Relative

contraindications to laparoscopic sacrocolpopexy include obesity, extensive surgical history, and cardiopulmonary conditions incompatible with steep Trendelenburg positioning.^{3,4}

Pectopexy is an alternative technique for apical prolapse repair, with outcomes comparable with sacrocolpopexy.^{11,14–16} Pectopexy mesh attaches to the vaginal apex similar to sacrocolpopexy and follows the course of the round ligament to the pectineal ligaments bilaterally, thus avoiding deep pelvic dissection and lowering risk of bladder and/or bowel injury, presacral hemorrhage, and nerve injury.² A literature review in both Medline and the National Library of Medicine yielded 33 studies documenting the use of the procedure in Europe, Asia, and South America. This case series article reports use of the procedure for patients with back pathology and application of the technique in North America.

performed at an academic tertiary referral center between October 2019 and December 2020. Ethical approval was granted from Banner Health and the University of Arizona Institutional Review Boards. The relevant demographic, medical, and operative data were extracted from the electronic medical records. Descriptive statistics were used for analysis of the results.

Technique

The patients were extensively counseled on both sacrocolpopexy and pectopexy, including the paucity of longitudinal data on pectopexy, given its relatively new adoption among providers. Complications rates of pectopexy, including but not limited to, cystotomy, enterotomy, hemorrhage, recurrent prolapse, and de-novo stress urinary incontinence, are comparable to sacrocolpopexy. Patients were informed of the preliminary results from outside institutions, and they indicate that these complication rates are not higher for pectopexy;

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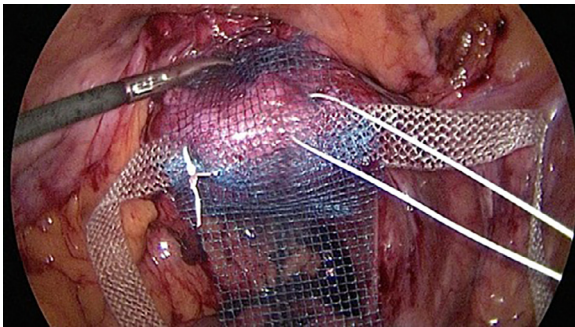
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Materials and methods

This retrospective case series includes all the 7 cases of laparoscopic pectopexy

FIGURE 1
Attachment of the Y-shaped polypropylene mesh to the vaginal cuff



Anterior attachment of the Y-shaped polypropylene mesh to the vaginal cuff is achieved with permanent monofilament polytetrafluoroethylene suture. The thin strip of the polypropylene mesh is fed underneath the previous mesh and sutured to the vaginal apex with a permanent monofilament polytetrafluoroethylene suture.

Winget. Laparoscopic pectopexy among patients with contraindications to sacrocolpopexy. *Am J Obstet Gynecol Glob Rep* 2021.

however, long-term data have not yet been established.

Laparoscopic access is achieved and the patient is placed in approximately 45° in the Trendelenburg position. A vaginal manipulator is placed. The bladder is decompressed with a transurethral catheter. The vesicouterine

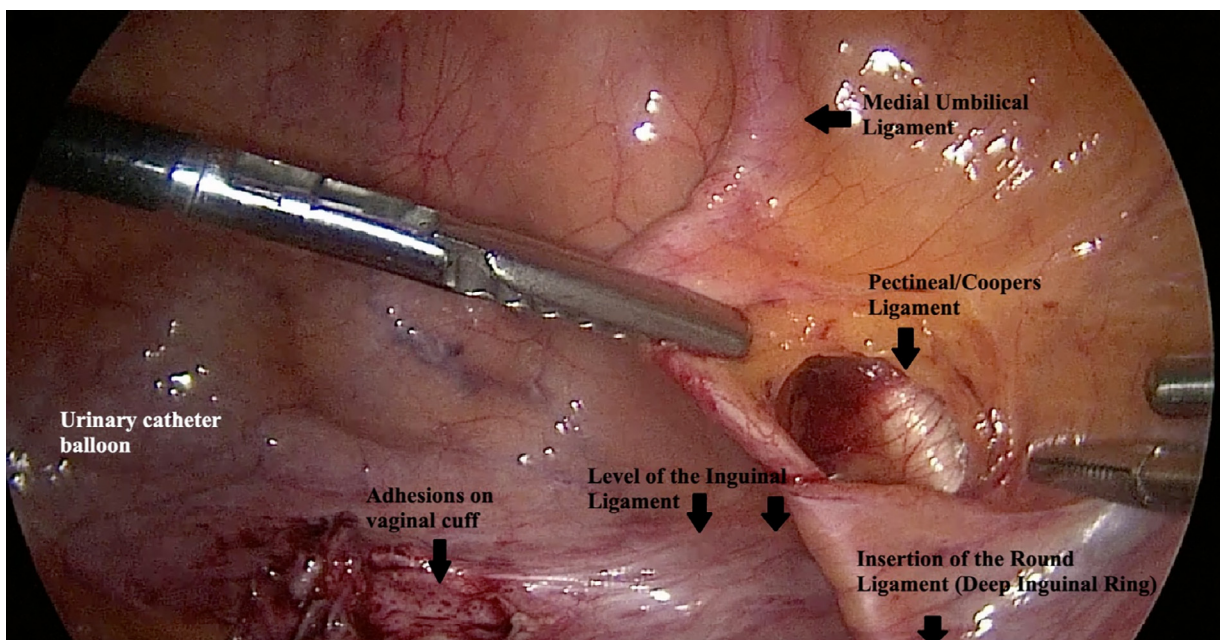
peritoneum is dissected from the vaginal apex in the standard manner for colpopexy. The medial umbilical ligament is identified, and the peritoneum is dissected laterally to further expose the pectineal ligament (Figure 1). This peritoneal incision is extended to the vaginal apex.

A type 1 polypropylene mesh is then attached to the vaginal cuff anteriorly and posteriorly with a permanent polytetrafluoroethylene suture. Five figure-of-8 stitches are applied anteriorly and posteriorly. A second narrow strip of mesh is attached to the vaginal cuff, perpendicular to the first or the upper arm of the Y-mesh is divided longitudinally, thereby forming two thin strips of mesh. The narrow arms of this mesh are attached to the pectineal ligament bilaterally with 2 figure-of-8 stitches of a permanent polyester suture (Figure 2). A vaginal exam confirms the appropriate tension and support. The peritoneum is then reapproximated over the mesh with an absorbable suture. Cystoscopy is performed in all cases to confirm bladder integrity and ureteral patency. If indicated, other prolapse or incontinence procedures are then performed.

Results

All 7 patients had a longstanding vaginal vault prolapse, and 3 failed previous surgical repair, as noted in Table 1.

FIGURE 2
Anatomy of the internal abdominal wall



Labeled anatomy of the internal abdominal wall, including the course of the pectineal or Cooper's ligament, medial umbilical ligament, and insertion of the round ligament or deep inguinal ring.

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TABLE 1
Demographics

Characteristic	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Age (y)	67	61	66	68	77	65	73
BMI (kg/m ²)	28.6	37.8	24.3	28.2	30	41.2	22.8
Parity	6	3	3	4	3	5	3
Race	Other	Caucasian	Caucasian	Caucasian	Caucasian	Caucasian	Caucasian
Ethnicity	Hispanic	Hispanic	Not Hispanic	Hispanic	No Hispanic	Hispanic	Not Hispanic
Smoking (pack-y)	0	0	>30	0	0	0	0
Comorbidities	GERD, fibromyalgia	IBS, arthritis	IBS, diverticulitis, chronic bronchitis	CAD w/ stent, GERD, HTN, HLD	CAD, HTN, TIA, asthma, GERD	OSA, HTN, CAD	IBS, osteoarthritis, chronic back pain, back surgery
POP-Q stage	3	3	2	2	3	3	3
Previous hysterectomy type	TVH	TAH	TAH	TVH	TLH	TVH	TAH
Previous prolapse procedures	None	TAH w/ USLS	TAH w/ cystocele repair, Laparoscopic sacrocolpopexy with cadaveric fascia, MUS	TVH w/ anterior/posterior colporrhaphy	None	None	None
Previous abdominal surgeries	Appendectomy	Appendectomy, hernia repair	Port site hernia repair	Laparoscopic cholecystectomy	Appendectomy	Cholecystectomy	Cholecystectomy
Abdominal/pelvic infections	Vaginal cuff abscess	Gonorrhea	No	No	No	No	No
Indication for pectopexy	Vaginal cuff-large bowel adhesions	Large bowel adhesions	Recurrent diverticulitis	Large bowel adhesions	Antiplatelet therapy	Antiplatelet therapy	Adhesions, back pain or pathology, multiple back surgeries

BMI, body mass index; CAD, coronary artery disease; GERD, gastroesophageal reflux disease; HTN, hypertension; HLD, hyperlipidemia; IBS, irritable bowel syndrome; MUS, midurethral sling; OSA, obstructive sleep apnea; TAH, total abdominal hysterectomy; TIA, transient ischemic attack; TLH, total laparoscopic hysterectomy; TVH, total vaginal hysterectomy; USLS, uterosacral ligament suspension.

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Preoperatively, all patients had POP-Q stage 2–3 pelvic organ prolapse. Contraindications to sacrocolpopexy included extensive pelvic large bowel adhesions, continuation of antiplatelet therapy, history of 3 previous lumbosacral spinal procedures, and recurrent diverticulitis with abscess formation.

There were no intraoperative complications including cystotomy, enterotomy, or hemorrhage, as noted in Table 2. Blood loss was minimal for all cases (mean 32.9 mL; range 30–50 mL). Two patients had concomitant procedures: a midurethral, retropubic sling and a posterior colporrhaphy. All 7 patients were discharged home in a stable condition within 24 h of their procedure. Five patients passed a voiding trial before discharge, and the rest were discharged with transurethral urinary catheters.

Postoperative urinary tract infection was documented in 1 patient and

treated with nitrofurantoin. None of the patients experienced ileus or bowel obstruction. The average length of follow-up was 127 days (range 11–369 days). At the most recent follow-up, all 7 patients had successful anatomic correction of prolapse (POP-Q less than or equal to 1) without mesh complications, persistent symptoms or pain (pain level of 0 on a scale 0–10). One patient required midurethral sling release because of postoperative urinary retention; her urinary symptoms resolved with the release of the mesh sling.

Comment

Traditionally, patients with contraindications to laparoscopic sacrocolpopexy were offered vaginal repairs or abdominal sacrocolpopexy. Sacrocolpopexy, a time-tested technique for vaginal vault suspension, has a lower rate of recurrent prolapse than vaginal techniques.⁵ Abdominal sacrocolpopexy, however,

accrues an increased risk of postoperative surgical site infection and wound dehiscence.^{1,4,9}

Relative contraindications to laparoscopic sacrocolpopexy include morbid obesity, chronic obstructive pulmonary disease, extensive surgical history, severe gastroesophageal reflux disease (GERD), ascites, pregnancy, large hernias, and pelvic fibrosis.⁴ Steep Trendelenburg positioning and significant large bowel retraction are required for dissection at the sacral promontory; this increases airway pressures and challenges adequate ventilation among patients with cardiopulmonary conditions and obesity. In addition, Trendelenburg positioning increases the risk of aspiration, especially among those with severe GERD.⁴

A growing body of evidence supports pectopexy as an alternative technique for apical prolapse repair, with preliminary outcomes and complication rates

TABLE 2
Operative results

Complication	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
EBL (mL)	30	50	30	30	30	30	30
Immediate postoperative pain (0–10 scale)	10	5	4	3	8	7	7
Average postoperative pain (0–10)	6	5	4	5	6	4	4
Pain at most recent follow-up visit (0–10 scale)	0	0	0	0	0	0	0
Additional procedures ^a	None	MUS, posterior colporrhaphy	Posterior colporrhaphy	None	None	Proctoscopy	None
Intraoperative complications	None	None	None	None	None	None	None
Discharge day	1	1	1	0	1	1	0
Passed voiding trial before discharge	Yes	No	Yes	No	Yes	Yes	Yes
Postoperative complications	None	None	None	None	UTI	None	None
Recurrent prolapse	No	No	No	No	No	No	No
Reoperation	No	Yes	No	No	No	No	No
Reoperation procedures	NA	Suprapubic urinary catheter, MUS release	NA	NA	NA	NA	NA
Time to follow-up (d)	369	242	175	45	28	19	11

EBL, estimated blood loss; MUS, midurethral sling; UTI, urinary tract infection.

^a Cystoscopy performed in all cases.

Winget. Laparoscopic pectopexy among patients with contraindications to sacrocolpopexy. *Am J Obstet Gynecol Glob Rep* 2021.

comparable with sacrocolpopexy.^{8,15} The procedure was originally described by Noé et al in 2010 for use in obese patients and has since been reported in the international literature for use in other patient populations and compared with sacrocolpopexy.^{3,9,15} The pectineal or Cooper's ligament is the fixation point for suspension and is stronger than the sacrospinous ligament in cadaveric models.⁶ In experienced hands, pectopexy can be performed in as little as 50 to 135 minutes.^{7,8,11} This technique yields consistently shorter operative times than sacrocolpopexy, even during the learning curve.⁸ Pectopexy is associated with a lower average blood loss and risk of hemorrhage (1.7% compared with 0.3–7.1% for sacrocolpopexy).^{7,9,16}

Severe spinal complications from sacrocolpopexy, including vertebral osteomyelitis and spondylodiscitis, are exceedingly rare. However, many women (up to 82%) with preoperative back pain or pressure before surgery

endorse persistent or worsening symptoms after sacrocolpopexy.¹⁸ In addition, certain lumbar surgical procedures, including anterior lumbar intrabody fusion, may render the anterior longitudinal ligament compromised or resected entirely.¹⁹ One patient in this series underwent pectopexy because of multiple lumbosacral procedures, including an anterior approach to spinal fusion; this represents an expanded indication for use of this procedure in patients with inadequate anterior spinal ligament fixation points. Furthermore, patients with chronic low back pain may favor pectopexy as an alternative to sacrocolpopexy.

Defecatory disorders, most commonly chronic constipation, are experienced by 17% to 37% of patients following sacrocolpopexy.¹⁵ More serious bowel complications, including ileus and small bowel obstruction, occur in 0.1% to 5% of patients.^{2,10} Sacrocolpopexy narrows the pelvic outlet and risks injury to the hypogastric nerve.¹⁵

By contrast, pectopexy mesh follows the anatomic course of the round ligament without crossing the bowel, ureter, or hypogastric nerve and does not narrow the pelvic outlet.^{3,13} No studies have associated pectopexy with defecatory disorders.^{8,11}

Laparoscopic sacrocolpopexy has an average success rate of 83.8% (failure defined as POP-Q ≥ 2).^{4,15} In a randomized control trial, 2.3% of patients experienced recurrent prolapse following pectopexy compared with 9.8% following sacrocolpopexy at 20 months follow-up (RCT).¹¹ In meta-analysis, laparoscopic sacrocolpopexy has been noted to have a prolapse reoperation rate of 4.1%, significantly lower than vaginal repairs.⁵ There were no cases of recurrent apical prolapse with pectopexy in other studies nor in this case series.^{16,17} Likewise, no patients in this case series required repeat surgery for prolapse during the follow up period.

Historically, prolapse repairs that do not obliterate the Pouch of Douglas,

including techniques with anterior fixation points, were associated with higher rates of posterior compartment prolapse or enterocele recurrence.²⁰ Risk of proximal posterior wall defects can be minimized by attaching the posterior arm of the mesh to the most distal portion of the rectovaginal septum, which is easily approached laparoscopically. Distal posterior compartment defects are best addressed with concomitant vaginal procedures. This strategy can be applied to pectopexy to minimize the risk of posterior wall defects. The RCT by Dr Noe failed to demonstrate an increased risk of posterior compartment recurrences with pectopexy.¹¹ None of the patients in this series had postoperative posterior prolapse recurrence.

Pectopexy and sacrocolpopexy have similar rates of urinary complications. In direct comparison, the rate of de novo stress urinary incontinence was 3.5% for pectopexy and 7.1% with sacrocolpopexy (range of 5–37.6% for sacrocolpopexy in the literature).^{4,11,12,15} In this series, 1 patient had urinary retention following a concomitant anti-incontinence procedure. The symptoms resolved with the release of the midurethral sling; this complication was presumably related to the anti-incontinence procedure rather than pectopexy itself.

Satisfaction is high with pectopexy. One study indicated greater improvements in self-reported sexual function with pectopexy than sacrocolpopexy.¹⁴ No patients in this series had postoperative complaints of dyspareunia or other dysfunctions. In addition, low postoperative pain scores were observed among all patients at the postoperative visit, as noted in [Table 2](#).

This series supports the use of pectopexy as an alternative to sacrocolpopexy, especially among those with relative contraindications to sacrocolpopexy, including lumbar spinal pathology, procedures, or pain that might render fixation at the sacral promontory dangerous or anatomically impossible or challenge the patient's recovery from chronic back pain. This study is limited in its design as a small retrospective case series; thus,

the data may not be generalizable to a larger population. This cohort has intermediate-term follow-up, limited to 127 days on average, which does not demonstrate the long-term outcomes of this repair. Larger, randomized control studies with longitudinal data are needed to further define the role of pectopexy in the repertoire of prolapse repair techniques. Likewise, a larger cohort with a history of back surgeries is necessary to characterize the role of this procedure in that population.

Conclusion

Preliminary data on laparoscopic pectopexy indicate that it may be an option for patients with relative contraindications to sacrocolpopexy. Further studies are necessary to define its place among other apical prolapse repair techniques. This retrospective series highlights the use of pectopexy for indications other than obesity, including lower back pathology, antiplatelet therapy, recurrent diverticulitis, and adhesive disease. This may be the first report of its application in North America. ■

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