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LESSON 22

Uterine-sparing Prolapse Repair

Learning Objective: At the conclusion of this continuing medical education activity, the participant will be able to clearly identify appropriate indications and contraindications, and perform evidence-based counseling for women who are interested in uterine-sparing prolapse repair.

This AUA Update aligns with the American Board of Urology Module on Neurogenic Bladder, Voiding Dysfunction, Female Urology, BPH, and Urethral Stricture. Additional information on this topic can be found in the AUA Core Curriculum sections on Anatomy & Physiology and Female Pelvic Medicine.



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KEY WORDS: pelvic organ prolapse, hysterectomy, vaginal reconstruction

INTRODUCTION

Review of increasing goals of uterine preservation. Pelvic organ prolapse (POP) affects women worldwide with increasing prevalence. The population of women suffering from POP in the United States is projected to double from 40.2 million in 2010 to 88.5 million women in 2050.¹ An estimated 12.6% of women will undergo surgical repair of prolapse in their lifetime.² Surgical repair of uterine prolapse can be performed with or without hysterectomy. **The decision for uterine preservation is often based on patient preference, physician recommendation, and/or uterine or cervical pathology.** A multicenter, national study of 218 women found reasons for desiring uterine preservation to include presumed importance for sexual health (40%), importance for sense of self (44%), and general concern about hysterectomy (60%).³

Other reasons for uterine-sparing surgery may include female autonomy and cultural or ethical beliefs.⁴ Interestingly, 36% of women preferred uterine preservation when presented with an equally efficacious surgical alternative, and 21% of women would opt for a uterine-sparing procedure even if it were less efficacious.³ Similarly, another population study found that 60 of 100 women would decline hysterectomy if presented with an equally efficacious alternative.⁵ Additionally, those with some degree of college education and patients who lived in the Northeast were more likely to desire uterine preservation.³ Decision-making factors included the physician's opinion, risk of surgical complications, and potential malignancy.⁵

Estimate of the number of uterine-sparing procedures being performed. The United States performs the highest number of hysterectomies for benign conditions worldwide, with an estimated 325/100,000 (0.325%).⁶ Although the exact number of uterine-sparing procedures performed per year is unknown, it is estimated that the number of prolapse procedures performed in the United States will increase from 210,700 in 2010 to 245,970 in 2050,⁷ and approximately 74,000 hysterectomies are performed yearly for POP.⁸

Relationship on quality of life and uterine preservation. **Uterine preservation surgeries in general require a shorter operative time, are a less morbid procedure, and are associated with a lower mean blood loss; however, the relationship of quality of life and uterine preservation is not well established.**⁹ Furthermore, the role that hysterectomy plays in regard to postoperative urinary incontinence is not well defined.⁸ Removal of the cervix at the time of hysterectomy was historically thought to cause sexual dysfunction, although this assumption has been disproven.¹⁰ The relationship between hysterectomy and postoperative sexual dysfunction is multifactorial and dependent on a variety of patient factors including hormonal status, presence of a partner, and mental health.¹¹ We believe it is vital that practitioners have a conversation with patients pre- and postoperatively regarding a patient's

current and planned future sexual activity and expectations prior to any prolapse surgery.

EVALUATION AND COUNSELING OF WOMEN UNDERGOING UTERINE PRESERVATION

Selection of women. The decision to pursue uterine-sparing prolapse surgery should be a shared decision-making process between the patient and surgeon. The patient's overall health status, sexual function, and personal factors, as listed previously, as well as degree of uterine prolapse must be considered prior to deciding if hysterectomy should be performed as part of POP surgery.

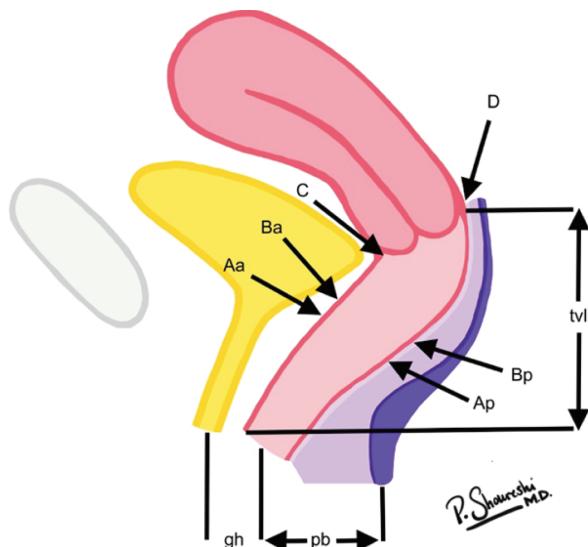
Contraindications for uterine preservation. **Uterine preservation is absolutely contraindicated in patients with pathological uterine abnormalities such as abnormal menstrual bleeding, postmenopausal bleeding, history of abnormal Pap smear (including cervical dysplasia), familial cancer syndromes that may put them at higher risk for endometrial or ovarian cancer (ie, BRCA1 and BRCA2, hereditary nonpolyposis colorectal cancer syndrome [Lynch syndrome]), tamoxifen therapy, and inability to comply with routine gynecologic surveillance, if needed.**^{8,12}

Another consideration, although not necessarily a contraindication, is an elongated cervix. This is not a common occurrence, but it may influence the type of procedure performed. The average length of the cervix is about 3-4 cm. If the cervix is longer, some women can palpate it, and interpret this as persistent prolapse after repair. Therefore, if a woman has a long cervix and does not desire hysterectomy during prolapse repair, a trachelectomy may be performed simultaneously. Also a consideration and not necessarily an absolute contraindication is severe uterine prolapse (stage IV) as this is associated with a higher rate of recurrence if uterine-sparing surgery is performed (specifically studied with sacrospinous ligament hysteropexy).^{12,13} Therefore, if a reconstructive procedure is chosen, the authors generally do not recommend uterine-sparing surgery with stage IV prolapse. Women with chronic pelvic pain (such as from adenomyosis) can have simultaneous uterine prolapse necessitating surgery. These patients can benefit from hysterectomy as part of their prolapse surgery, as hysterectomy can alleviate their pain. However, a full evaluation by gynecology is also recommended prior to surgery, as other causes of chronic pain, such as endometriosis, may require additional procedures.

Evaluation prior to surgery

Symptom assessment: A common symptom experienced by women with prolapse is a vaginal bulge. This is usually more noticeable with activity and at the end of the day, as increased abdominal pressure will push the prolapse out the vaginal canal. Other symptoms of prolapse include discomfort with vaginal intercourse, increased urinary urgency/frequency, and/or defecatory dysfunction.¹⁴

ABBREVIATIONS: pelvic organ prolapse (POP), Pelvic Organ Prolapse Quantification interactive assessment tool (POP-Q), uterosacral ligament suspension (USLS)



Anterior wall (Aa)	Anterior wall (Ba)	Cervix or cuff (C)
Genital hiatus (gh)	Perineal body (pb)	Total vaginal length (tvL)
Posterior wall (Ap)	Posterior wall (Bp)	Posterior fornix (D)

Figure 1. Pelvic Organ Prolapse Quantification diagram.

Severity of prolapse based on physical examination is standardized using the POP-Q (Pelvic Organ Prolapse Quantification interactive assessment tool), as illustrated in Figure 1. Prolapse is staged based on specific criteria, and physical exam findings are listed in the Table.

Gynecologic History: It is important to consider a woman's prior medical and surgical history, especially her gynecologic history, when discussing prolapse repair. A history of abnormal Pap smears or need for continued surveillance can help determine the type of procedure: reconstructive vs obliterative. The American College of Obstetrics and Gynecology does not recommend cervical cancer screening after the age of 65 when there are adequate negative prior screening results, which is defined as 3 consecutive negative cytology results, 2 consecutive negative cotesting results, or 2 consecutive negative high-risk human papillomavirus tests within 10 years before stopping screening.¹⁵

Imaging: In the absence of any concerning symptoms such as abnormal uterine bleeding or enlarged uterus on physical examination, routine imaging is not necessary prior to prolapse repair. For women with obstructed defecation symptoms, the authors feel that dynamic MRI with defecography is the best

Table. Pelvic Organ Prolapse Staging Criteria

Stage 0	Aa, Ap, Bp = -3 cm and C or D ≤ (tvL - 2) cm
Stage I	Stage 0 criteria not met and leading edge < -1 cm
Stage II	Leading edge ≥ -1 cm but ≤ +1 cm
Stage III	Leading edge > +1 cm but < (tvL - 2) cm
Stage IV	Leading edge ≥ + (tvL - 2) cm

Abbreviations: Aa, point A anterior; Ap, point A posterior; Ba, point B anterior; Bp, point B posterior; C, cervix or cuff; D, posterior fornix; tvL, total vaginal length.

modality to evaluate the functional anatomy of the pelvic floor. In women who have defecatory dysfunction with concurrent prolapse symptoms, MRI defecography should be performed to evaluate for concurrent enterocele and/or rectal prolapse.¹⁶ In this case, concurrent colorectal procedures such as a Moskowitz repair or rectopexy with or without sigmoid resection may be performed at the time of prolapse repair.¹⁷ Figure 2

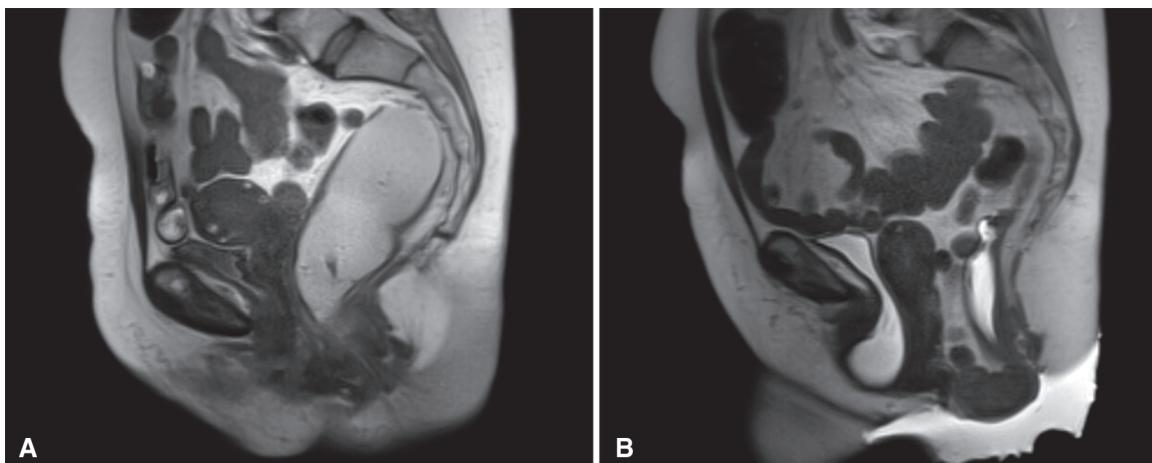


Figure 2. Preoperative MRI in woman with vaginal bulge symptoms and obstructed defecation. MRI defecography images before (A) and after (B) bearing down demonstrate moderate-sized cystocele and large enterocele/perineocele during evacuation.

illustrates a preoperative MRI defecography used for surgical planning.

SURGICAL OVERVIEW

Vaginal approach to uterine preservation. Manchester procedure: The Manchester procedure is included in this review for completeness; however, for all intents and purposes, it is a historical operation. It was first described in 1888 and involves transvaginal amputation of the cervix, colporrhaphy, and suspension of the cervical stump to the cardinal ligaments. The ideal candidate for this procedure is a woman with an elongated cervix and intact uterosacral-cardinal ligaments. Long-term outcomes and prolapse recurrence following this procedure are variable as studies have been largely retrospective, reporting recurrence rates between 4.6% and 20% at 8 weeks to 5.5 years.^{18,19}

Uterosacral ligament suspension: Uterosacral ligament suspension (USLS) and plication was first described by Williams in 1966.²⁰ The procedure involves creating a posterior colpotomy to enter the peritoneal cavity. The uterosacral ligaments are divided from the cervix, plicated across the midline, and reinserted on the opposite side of the cervix. Then the anterior cervix is suspended by midline plication of the cardinal ligaments. In Williams' original series of 19 women, there was a 15.5% failure rate at unknown follow-up time. A meta-analysis by Margulies et al described postoperative outcome success (stage 0 or I) in 98% of patients and repeat operation in 9.4% of women for symptomatic prolapse or stress urinary incontinence at 3-4.2 years postoperatively.²¹⁻²⁴ This is similar to findings from the OPTIMAL (Operations and Pelvic Muscle Training in the Management of Apical Support Loss) trial, demonstrating 11.9% retreatment rate (either pessary or repeat surgery) at 5 years.²⁵

The most common complication following USLS is ureteral injury given the proximity of the uterosacral ligament to the ureter and necessary entry into the peritoneal cavity. The rate of ureteral occlusion is reported to be between 1.8% and 10.9%.^{21,24} Although described here in the context of uterine-sparing prolapse repair, USLS is often performed following transvaginal hysterectomy as the peritoneal cavity is already open.

Sacrospinous ligament hysteropexy: Sacrospinous ligament hysteropexy offers an extraperitoneal approach to uterine suspension. The procedure involves making a midline

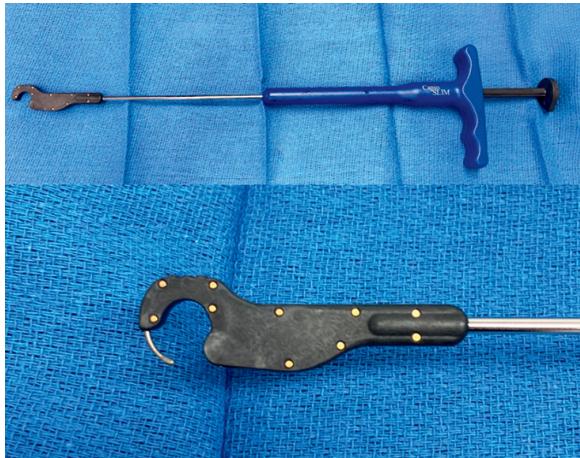
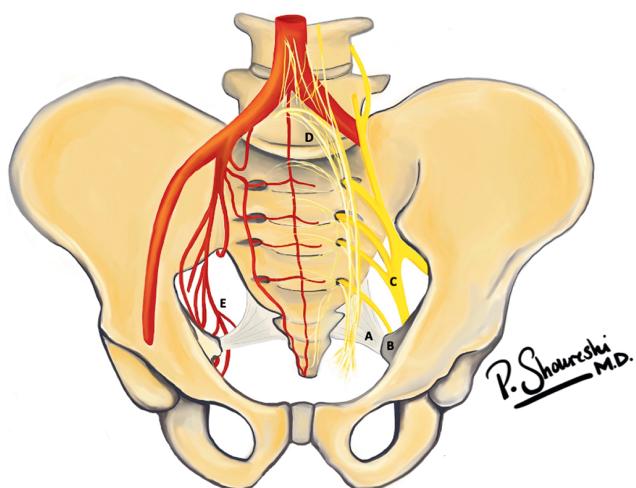


Figure 3. Capiro SLIM suture capturing device.

incision to the anterior or posterior vaginal wall and sweeping the bladder and uterus midline to reach the ischial spine. The sacrospinous ligament is then palpated. A suture is placed through the sacrospinous ligament, approximately 2 cm medial from the ischial spine, using a Deschamps needle ligature carrier, a Miyazaki hook, or a disposable suture device (Figure 3). Once the suture is secured through the sacrospinous ligament, it is then sutured to the cervix, and the suture is tied down to suspend the uterus. The procedure can be performed unilaterally or bilaterally, with absorbable or nonabsorbable suture. If a woman has an elongated cervix, consideration may be given to not performing a sacrospinous ligament suspension as the patient's postoperative palpation of the cervix could be interpreted as unsuccessful uterine suspension.

Careful placement of the sacrospinous sutures is vital to avoid complications related to surrounding nerve or vessel injury. Placement of the suture too medial to the ischial spine can result in injury to the pudendal neuromuscular bundle. Superior to the sacrospinous ligament lie the sciatic nerve and hypogastric nerve plexus, while medially lie the hemorrhoidal and posterior gluteal vessels. The significant anatomy is illustrated in Figure 4. Significant hemorrhage has been reported in 0.2%-2% of cases.^{22,26} Neuropathy with temporary gluteal and posterior thigh pain has been reported in 6.1%-13.7% of cases.²⁷⁻²⁹ Some centers advocate for using absorbable sutures to decrease the likelihood of postoperative buttock pain, but with higher risk of prolapse recurrence.³⁰

Sacrospinous ligament fixation with and without concomitant hysterectomy has been found to have equal long-term subjective success and satisfaction at mean follow-up of 13.3 years and reoperation rate of 2.9%.³¹ The OPTIMAL trial reported retreatment rate of 8.1% at 5 years (either pessary or surgery) for unilateral fixation.²⁵ Compared to USLS, sacrospinous hysteropexy has a lower risk of ureteral injury and granulation tissue formation.³²



Key:

- A = Sacrospinous ligament
- B = Ischial spine
- C = Sciatic nerve roots
- D = Hypogastric nerve plexus
- E = Branches of internal iliac artery

Figure 4. Anatomical considerations for sacrospinous hysteropexy.

Colpocleisis: Colpocleisis is an obliterative surgical option for a woman who is not currently and has no future plan to have penetrative sexual intercourse. A LeFort colpocleisis involves partial removal of the vaginal epithelium on either side of the cervix. Then, sequential rows of horizontal mattress sutures connecting the denuded anterior and posterior vagina are placed, imbricating the vaginal wall, and creating 2 drainage channels.

Depending on patient age and medical comorbidities, colpocleisis can be done with a shorter operative time and low risk of prolapse recurrence (nearly 100% cure rate).^{33,34} This procedure is contraindicated in a female who continues to need Pap smears. Additionally, depending on if she has a history of abnormal Pap smears and prior gynecologic history, the patient may need a transvaginal ultrasound and/or endometrial biopsy prior to surgery. Previous studies have demonstrated that colpocleisis does not alter female sexuality or body image.³⁵ The procedure is more often performed in older women, despite a higher potential risk of complication in frail patients.^{36,37} **In the authors' experience, LeFort colpocleisis is an excellent reconstructive alternative for older patients and can be done on an outpatient basis.**

Robotic/abdominal approach to uterine preservation. Preference for vaginal vs transabdominal surgery should be based on both patient and surgeon preference. Although there have been significant surgical advances in robotic surgery, these procedures often have a longer operative time than transvaginal repair, which can put patients at higher risk for venous thromboembolism.³⁸ Also, steep Trendelenburg with pneumoperitoneum may not be as well tolerated in patients with certain pulmonary comorbidities as it alters normal respiratory function.³⁹ Cardiac parameters and cerebral oxygenation were, however, specifically studied in a group of 18 women undergoing robotic sacrocolpopexy, and the procedure was determined to be safe due to minimal alterations found in cerebral oxygenation and autonomic perturbations.⁴⁰

Sacrophysteropexy: Sacrophysteropexy involves suturing a graft to the posterior cervix and suspending the cervix to the anterior longitudinal ligament of the sacral promontory, thereby elevating the uterus. Graft arms can also be brought through the broad ligaments to suture them to the anterior cervix as well. Sacrophysteropexy can be performed using either mesh or cadaveric tissue grafts. There is a paucity of prospective data comparing mesh vs biologic grafts in these patients; however, mesh appears to have more durable long-term outcomes.⁴¹⁻⁴³

A biologic graft is preferred in certain situations including concomitant colorectal surgery in which there is risk of contamination, increased risk of mesh exposure such as after radiation, or repair in women desiring a future pregnancy. In the authors' experience, the rate of recurrence is unacceptably high with biologic grafts, and we no longer perform them except under rare circumstances. There are limited data on sacrophysteropexy outcomes, but studies have shown comparable success rates to transvaginal suspension.^{44,45} Sacrophysteropexy using a biologic graft is illustrated in Figure 5.

Uterosacral plication: Plication of the uterosacral ligaments can also be performed through an abdominal approach. This is an appropriate alternative for someone who does not desire transvaginal surgery and has anatomy making access to the sacral promontory difficult (for example, a tortuous external iliac artery overlying the promontory). Although studied in the posthysterectomy setting, Niblock et al retrospectively compared laparoscopic uterosacral plication to McCall culdoplasty.⁴⁶ They performed the laparoscopic uterosacral plication by placing 3 helical sutures full thickness through the distal third of each uterosacral ligament and incorporated the posterior vagina. They found laparoscopic ligament suspension, compared to McCall culdoplasty, to have superior outcomes with less prolapse recurrence at 36-41 months postoperatively.

Uterine preservation: do these procedures adversely affect overall success?: Overall, the success rates of uterine-sparing procedures are inferior to sacrocolpopexy. A Cochrane meta-analysis comparing sacrocolpopexy to transvaginal native tissue prolapse repair (USLS and sacrospinous fixation) found that women were at least twice as likely to notice prolapse recurrence and have repeat surgery 2-4 years following native tissue repair.⁴⁷ This demonstrates the well-known durability of hysterectomy with sacrocolpopexy. The long-term outcomes for sacrophysteropexy compared to sacrocolpopexy have not yet been well studied.

CONCLUSIONS

The decision to pursue uterine-sparing prolapse surgery involves a conversation between surgeon and patient, taking into account the patient's personal, religious, medical, and sexual history, in addition to surgeon preference and comfort. Depending on the type of uterine-sparing procedure performed, long-term outcomes may not be as durable as certain procedures with hysterectomy.

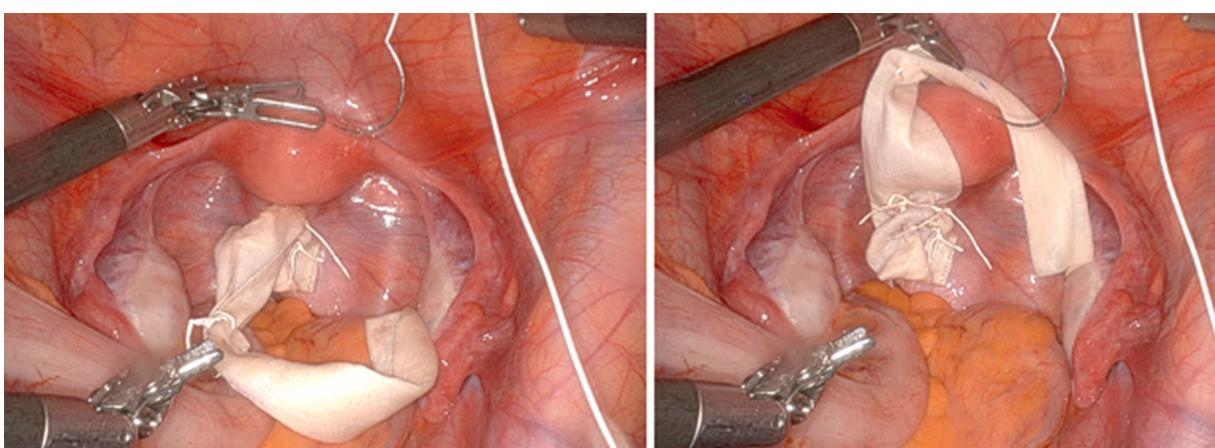


Figure 5. Biologic graft suspension to the posterior cervix in a nulliparous patient with apical prolapse resulting in sigmoid colon obstruction.

DID YOU KNOW?

- The decision to pursue uterine-sparing prolapse surgery should be a shared decision-making process between the patient and surgeon.
- In the absence of any concerning symptoms such as abnormal uterine bleeding, enlarged uterus on physical examination, or defecatory dysfunction, routine imaging is not necessary prior to prolapse repair.
- The most common complication following USLS is ureteral injury given the proximity of the uterosacral ligament to the ureter and necessary entry into the peritoneal cavity.
- Sacrospinous ligament fixation and uterosacral ligament suspension have good long-term outcomes for treatment of prolapse, but higher risk of recurrence compared to hysterectomy with sacrocolpopexy.
- Colpocleisis is an excellent alternative for patients who do not have penetrative intercourse and prefer a uterine-sparing procedure.

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Study Questions Volume 42 Lesson 22

1. A woman with POP-Q stage III uterine prolapse is complaining of obstructive defecatory symptoms and pelvic pressure. What is the best imaging modality for further evaluation?
 - a. CT scan of the pelvis without contrast
 - b. Fluoroscopic defecography
 - c. MRI defecography
 - d. Transvaginal ultrasound
2. An 85-year-old woman with bothersome prolapse desires definitive treatment with surgery. She has a history of a kidney transplant and is not sexually active. What is the best surgical option?
 - a. Uterosacral ligament suspension
 - b. Sacrospinous ligament fixation
 - c. Colpocleisis
 - d. Sacrohysteropexy
3. What is the most common complication following uterosacral ligament suspension?
 - a. Ureteral occlusion
 - b. Hematoma
 - c. Gluteal nerve neuropathy
 - d. Pudendal nerve neuropathy
4. In relation to the ischial spine, where should the suture(s) be placed when performing sacrospinous ligament fixation?
 - a. 1 cm medial
 - b. 1 cm lateral
 - c. 2 cm medial
 - d. 2 cm lateral
5. A 37-year-old female with stage IV prolapse is interested in the most durable surgical procedure with the highest rates of success. What operation would you recommend?
 - a. Uterosacral ligament suspension
 - b. Sacrospinous ligament fixation
 - c. Sacrocolpopexy with hysterectomy
 - d. Sacrohysteropexy