

Contemporary Management of Pelvic Organ Prolapse

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Pelvic organ prolapse (POP) is defined as the downward descent of one or more pelvic structures: the uterine cervix, vaginal apex, anterior vagina (usually with bladder, cystocele), posterior vagina (usually with rectum, rectocele), or peritoneum of the cul-de-sac (usually with small intestine, enterocele).¹ Although POP can occur in young women, symptomatic POP may be seen more commonly in menopausal women. Because both advancing age and menopause are associated with POP, clinicians are likely to encounter menopausal women with symptomatic POP with increasing frequency as the population ages.

Risk factors for POP include parity (particularly vaginal birth),² menopause, advancing age, prior pelvic surgery, connective tissue disorders, a genetic predisposition and factors that cause an increase in intraabdominal pressure (such as obesity, straining to have a bowel movement and chronic coughing).^{2,3}

Epidemiology

The prevalence of POP varies considerably, and has been reported as high as 98% in population-based studies, but symptomatic prolapse is seen in only 4–10%.^{4,5} The risk for undergoing surgery for prolapse by age 80 has been estimated at 7%.⁶

Loss of vaginal or uterine support in women presenting for routine gynecologic care is seen in 43–76% of patients, with 3–6% demonstrating descent beyond the hymen.^{7,8} Recent data from the Women's Health Initiative (WHI) revealed that 41% of women ages 50–79 years demonstrated some amount of pelvic organ prolapse.⁹ However, there is currently

no consensus regarding what degree of prolapse represents a variation of normal support versus what represents clinically significant disease.

The prevalence of symptomatic POP has been largely extrapolated from data on surgical intervention for the condition. In aggregate, the rate of surgery for POP is between 1.5 and 4.9 cases per 1,000 women-years.^{2,6,10,11} Of those women undergoing surgery for POP, 13% will require a repeat procedure within 5 years.¹²

Interestingly, even though menopause is frequently cited as a risk factor for POP, most studies evaluating the relationship between hormonal status and prolapse have not demon-

strated an association between estrogen status and POP.^{2,4,13} When a subgroup of 270 women from the WHI who had not undergone hysterectomy and were randomly assigned to receive either oral conjugated estrogens and medroxyprogesterone acetate or placebo were assessed for POP 6 years after treatment, there were no differences in pelvic support between treatment groups.⁹

In general, the data regarding the relationship between selective estrogen-receptor modulators (SERMs) and prolapse are contradictory. There are some data suggesting that SERMs may have a negative impact on prolapse and other pelvic-floor disorders.¹⁴ However, in a long-term study, raloxifene specifically was not associated with prolapse.¹⁵

Pathophysiology

Support of the pelvic organs is generally thought to be provided by the levator ani muscles (pubococcygeus, puborectalis and iliococcygeus muscles) as well as the connective tissue attachments of the pelvic organs (endopelvic fascia).¹⁶ DeLancey has described the suspension of the vagina in terms of levels of support.¹⁷ The support of the upper third of the vagina to the pelvic sidewalls (level I) is via vertical fibers of the paracolpium, which is a continuation of the cardinal ligament. The middle third of the

vagina (level II) is attached to the paracolpium and laterally to the arcus tendineus and fascia of the levator ani muscles. Level III support of the lower third of the vagina is via fusion with the perineal membrane, levator ani muscles and perineal body. Disruption or dysfunction of any of these levels of support can lead to loss of support and subsequent prolapse.

Vaginal delivery may contribute significantly to the development of POP by both direct levator ani muscle trauma and/or neuropathic injury to these muscles.^{18,19} In addition, injury to the pelvic connective tissues has been associated with POP; disruption or stretching of these tissues can occur during vaginal delivery, hysterectomy, chronic straining or with normal aging.²⁰ Although it is a controversial topic, there are currently no data to support elective cesarean delivery (upon maternal request) as a means of decreasing the risk of developing prolapse.

History and Physical Examination

All patients with symptoms of prolapse should undergo a thorough history and physical examination. It is important to assess the nature and severity of symptoms as well as the extent of POP. Many women with POP are asymptomatic and need no further evaluation beyond the history and physical examination.

In the symptomatic patient, the most common and specific symptom is the sensation of a bulge of tissue that protrudes past the vaginal opening or the sensation of “sitting on a ball.”²¹⁻²³ Other presenting symptoms associated with POP may include urinary incontinence, difficulty voiding or incomplete bladder emptying. Some women with severe apical prolapse can void more easily if they reduce the prolapse digitally. Women with symptomatic POP frequently

have symptoms related to bowel dysfunction, including a feeling of incomplete emptying, straining and the need to apply digital pressure to the posterior vagina or perineum (splint-

performed to rule out coexistent gynecologic or rectal pathology as well as to identify the presence of a rectocele and establish the integrity of the perineal body.

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ing) to initiate or complete defecation. It is important that clinicians ask specific questions to assess for urinary and defecatory dysfunction.

In order to assess the extent of prolapse and determine which aspects of the vagina are involved (anterior, posterior or apical) the patient is examined in the supine position with the head of the examination table at 45 degrees. A bivalve speculum is inserted to assess apical support (cervix or vaginal cuff). While the patient strains, the speculum is slowly withdrawn and descent of the vaginal apex or cervix is noted. The extent of prolapse of the anterior vaginal wall can be assessed by placing the posterior blade of a bivalve speculum in the vagina to retract the posterior vaginal wall. The patient is asked to strain and the extent of anterior vaginal prolapse is noted. The blade is then placed to retract the anterior vaginal wall while the patient strains again to reveal any posterior prolapse. Bimanual and rectal examinations are

Currently, two systems are employed to classify the physical examination findings: the Baden-Walker system (Table 1)²⁴ and the Pelvic Organ Prolapse Quantification (POP-Q) system (Table 2).²⁵ The Baden-Walker system is also viewed as the “half-way” method, as the grade of prolapse is based on how far the vagina or cervix prolapses in relation to the hymen. This system is generally considered adequate for clinical practice as long as descent or protrusion affecting all pelvic compartments (anterior, apical and posterior) is adequately assessed. The POP-Q system quantitatively defines the amount of POP observed during a pelvic examination by measuring 9 specific points on the anterior, posterior and apical segments of the vaginal wall in centimeters relative to the hymen. This assessment provides a highly reliable and reproducible staging system for POP, and is the method used in most clinical research trials.

In addition to assessing the extent of prolapse, the patient’s ability to

Table 1. Baden-Walker System^{24*}

Grade of Prolapse	Extent of Prolapse in Relationship to the Hymen
Grade 0	Normal position for each respective site
Grade 1	Descent halfway to the hymen
Grade 2	Descent to the hymen
Grade 3	Descent halfway past the hymen
Grade 4	Maximum possible descent for each site

*Each compartment (apical, anterior, posterior) is assessed based on its relationship to the hymen.

effectively empty her bladder should be evaluated as well. This is achieved by measuring the voided volume when she has a *comfortably* full bladder, followed by an assessment of the postvoid residual volume via catheterization or bladder ultrasonography. Valsalva and cough stress testing should be performed with the prolapse reduced to determine if the patient has stress urinary incontinence.

Additional testing. The need for testing in addition to the history and physical examination depends largely on the patient's presenting symptoms; most women will need little additional testing. Urodynamic assessment should be considered in women with substantial urinary incontinence, irritative voiding symptoms or voiding dysfunction, or in those who have had prior pelvic surgery. Anal manometry and/or defecography should be considered in individuals with defecatory symptoms, and endoanal ultrasound may be used in women who have fecal incontinence when an anal sphincter defect is suspected.

Nonsurgical Treatment Options

Nonsurgical treatment is first-line therapy for women at high risk for surgical or anesthetic complications, for those who do not desire surgery, and for women with contraindications to surgery. Patients with asymptomatic or mildly symptomatic prolapse can be counseled that treatment is appropriate only if they are symptomatic. Such women may be observed at regular intervals, with treatment initiated only when and if new, bothersome symptoms develop. The clinician cannot assume that nonspecific symptoms, such as back and lower extremity pain or pelvic pressure, will be alleviated with correction of the prolapse.

The option of conservative (nonsurgical) management should be presented to all women with POP.

Table 2. Pelvic Organ Prolapse Quantification (POP-Q) System^{25*}

Anterior Wall (Aa) 3 cm proximal to urethral meatus (Range: -3 to +3)	Anterior Wall (Ba) Most distal part of anterior wall from vaginal cuff	Cervix or Cuff (C) Most distal edge of cervix or leading edge of vaginal cuff
Genital Hiatus (gh) Middle of urethral meatus to posterior hymenal ring	Perineal Body (pb) Posterior margin of genital hiatus to mid-anus	Total Vaginal Length (tvL) Greatest depth of vagina when point C or D is replaced
Posterior Wall (Ap) Midline 3 cm proximal to hymen (Range: -3 to +3)	Posterior Wall (Bp) Most distal part of posterior wall from vaginal cuff	Posterior Fornix (D) (Omitted if there is no cervix)

*Negative numbers (-) are above the hymen, positive numbers (+) are external to the hymen.

Stage	Extent of Prolapse
0	No prolapse is demonstrated
1	Most distal portion of prolapse is >1 cm above the hymen (all points negative [-])
2	Most distal portion of prolapse is ≤1 cm proximal to or distal to the plane of the hymen (≥-1 cm ≤+1 cm)
3	Most distal portion of prolapse is >1 cm below the hymen but prolapses no further than 2 cm less than the tvL in cm (>+1 cm but <+[tvL-2] cm)
4	Complete eversion (total prolapse)

Pessaries are the only evidence-based nonsurgical treatment modality for POP; however, pelvic floor muscle rehabilitation is also a treatment option, even though there are no data to support its use in preventing or correcting POP.^{26,27} The role of hormones, especially estrogen, in pelvic support has not been fully elucidated. Presently, there is no evidence to support the pharmacologic use of estrogen to treat or prevent POP.¹

Pessaries. A pessary is inserted into the vagina to reduce the prolapse by providing support to the pelvic structures, and to relieve pressure on the bladder and bowel.²⁸ Indications for pessary use in the menopausal patient include contraindications to surgery or the patient's desire to avoid surgery. Clinicians should consider pessaries as a treatment option for all women with symptomatic prolapse, and such devices should always be

considered before surgical intervention. Pessaries are available in a variety of shapes and sizes, and can be categorized as supportive (such as a ring pessary) or space-occupying (such as a donut pessary). The most commonly used pessaries include rings (with and without support), the Gellhorn, donut and cube. Advanced prolapse²⁹ and sexual activity³⁰ are not contraindications to pessary use.

Pessaries can be fitted in most women with prolapse, regardless of the stage or site of predominant prolapse, and are a reasonable option as first-line therapy.³¹ Fitting a pessary usually requires one, perhaps two, office visits. When fitting a pessary the clinician should consider the extent of the prolapse, including which compartment is most affected, and the patient's cognitive status, manual dexterity and level of sexual activity. For most patients a supportive-type

pessary will be effective. Supportive-type pessaries are easier to manipulate by the patient, and may allow sexual activity. The incontinence ring may be useful for women with anterior prolapse and urinary stress incontinence. A space-occupying pessary is usually necessary in women with severe vaginal vault prolapse and/or a capacious vagina. Although these devices are efficacious, they are difficult to remove and sexual intercourse is not possible with them in place.

The size of the vagina is estimated and the appropriate size and shape of pessary is inserted so that the prolapse is reduced and the patient is comfortable with the device in place. The clinician should be able to sweep a finger between the pessary and the vaginal walls. The patient should be asked to stand, walk and perform a Valsalva maneuver to ensure that the pessary is not expelled or slides into an uncomfortable position. She should be able to void without difficulty with the pessary in place before leaving the office.

The type of pessary that is ultimately used is most closely related to the severity of prolapse. In a study by Clemons et al³² ring pessaries were inserted first, followed by a Gellhorn if the ring did not stay in place. The authors reported that the ring pessaries were used more successfully in patients with stage II (100%) and stage III (71%) prolapse, while stage IV prolapse more frequently required a Gellhorn (64%).³² A trial-and-error approach is usually necessary; several pessaries may need to be tried before finding one that is most suitable for an individual patient.

There is no universally accepted standard regarding how frequently patients should be examined after a successful pessary fitting; it is generally recommended that patients be seen every 4–6 weeks. Women who have the manual dexterity and will-

ingness to insert, remove and clean their pessary require fewer visits than those who do not. Patients should be questioned about the development of new symptoms and the vagina should

invasive intervention that may improve pelvic muscle function.³⁷ There are currently no studies demonstrating that pelvic muscle training improves prolapse. Nevertheless, pelvic muscle

All patients with urinary symptoms should be encouraged to keep a bladder diary.

be inspected for irritation and erosions. Should an erosion develop, the pessary is removed and vaginal estrogen cream applied until completely healed. Vaginal estrogen cream also should be considered in all patients with vaginal atrophy.

Women who are properly fitted and whose prolapse symptoms (bulge, pressure) are successfully managed with a pessary tend to be satisfied with this treatment modality. Overall, 70–90% of prolapse symptoms and 40–50% of urinary symptoms are resolved.³³ In addition, 40–60% of women note improvement in sexual activity.³⁴ Approximately half of all patients who have successfully been fitted with a pessary will continue its use beyond 1 year.^{35,36} Women who are more likely to use a pessary for more than 1 year include those older than 65 years, those who have severe comorbidities, and those who maintain urinary continence with the pessary in place.³²

Pelvic floor muscle rehabilitation. Other nonsurgical treatment options include weight loss, if necessary, as well as exercise, in addition to therapies targeted at specific symptoms. Although weight loss and exercise (either aerobic exercise or pelvic floor muscle exercises) have not been proven beneficial specifically for prolapse treatment or prevention, such recommendations are appropriate as a general health guideline.¹

Pelvic muscle training, sometimes referred to as Kegel exercises, is a non-

training has been shown to benefit women with urinary and/or fecal symptoms. Therefore, it is commonly prescribed for women with prolapse who have other pelvic floor symptoms, in addition to other forms of therapy (such as a pessary).¹

Concomitant symptoms. Lastly, bladder or bowel dysfunction should be addressed. Patients with defecatory problems, such as incomplete emptying and straining, often benefit from dietary modification, such as increased dietary fiber. Women with urinary urgency and/or incontinence can be successfully managed with relatively simple interventions such as scheduled voiding, fluid intake management, pelvic muscle rehabilitation and medication. All patients with urinary symptoms should be encouraged to keep a bladder diary.

Surgical Management

Women with symptomatic POP who decline a pessary or for whom pessaries fail may be candidates for surgery. Surgical treatment can be either “reconstructive” (eg, anterior repair, vaginal/uterine suspension, posterior repair) or “obliterative” (eg, colpocleisis). The goal of reconstructive surgery is to correct the prolapsed vagina (and alleviate associated symptoms) while maintaining the ability to have vaginal intercourse. Reconstructive surgery may be performed via an abdominal or vaginal route, with approximately 80–90% of procedures for the correction

of POP performed vaginally.^{6,10,11} Obliterative surgery corrects POP by moving pelvic viscera back into the pelvis; the vaginal canal is closed off partially or totally. While uncommon, prolapse of a single compartment of the vagina can occur. But because POP usually involves multiple compartments, surgical management frequently addresses the anterior, apical and posterior vaginal walls.

While the morbidity associated with POP surgery has been reduced overall, it should be noted that the risk of complications following vaginal urogynecologic surgery—such as blood loss, pulmonary edema and congestive heart failure—is higher in women over 75 years of age.³⁸ Complications also are more common in those who have reconstructive rather than obliterative surgery.^{38,39} In addition, mortality has been shown to be increased with each decade of life—1 in 10,000 for women younger than 60 years, up to 28 per 10,000 for women 80 years and older—in women who had undergone inpatient urogynecologic procedures.³⁹

Apical uterine/uterovaginal prolapse correction. Traditionally, hysterectomy has been the surgical treatment of choice for women with apical (uterine or uterovaginal) prolapse. However, removal of the uterus does not address the issue of concomitant descent of the vaginal apex. Therefore, when performing a hysterectomy for uterine prolapse, the vaginal cuff must be suspended to prevent future vault prolapse.

Surgical options for patients with apical prolapse (for post-hysterectomy vaginal vault prolapse or as part of the current procedure) include abdominal sacral colpopexy; sacrospinous ligament(s), uterosacral ligament or iliococcygeus fascia or muscle suspension; and newer techniques that utilize synthetic mesh.

The two most frequently employed approaches for correction of apical prolapse are abdominal sacral colpopexy (suspends the upper vagina from the sacral promontory, usually with synthetic mesh) and sacrospinous ligament suspension (attaches either the upper vagina or cervix to the sacrospinous ligament, via a transvaginal approach). A 2007 Cochrane review of the surgical management of prolapse concluded that abdominal sacral colpopexy, when compared with sacrospinous ligament suspension, yielded less apical failure, postoperative dyspareunia and stress incontinence, but was associated with a higher complication rate.⁴⁰ The relative risk for recurrence of vaginal vault prolapse was substantially lower with abdominal sacral colpopexy than with sacrospinous ligament fixation, but operating time and patient recovery were longer with the colpopexy procedure. There are currently only a few case series and one cohort study examining the efficacy of laparoscopic sacral colpopexy, which has the benefit of avoiding a laparotomy. It appears that this method is as successful as the open technique, although there is a significant learning curve associated with the procedure.⁴¹⁻⁴⁴

Of the vaginal approaches, the most commonly described is the sacrospinous ligament suspension. In a comprehensive review of 22 studies on sacrospinous ligament suspension, Sze and Karram noted an 18% prolapse recurrence rate after 1 month to 11 years of follow-up.⁴⁵ Recurrent prolapse in patients who undergo uterosacral ligament suspension occurs in 4–18% of patients after follow-up of up to 4 years.^{46,47} To our knowledge, these two procedures have not been compared in a randomized trial.

When recommending a particular surgical approach clinicians should consider the individual patient's risks,

weighing potential complications of a given procedure against the potential for recurrent prolapse, while considering the woman's preferences.

Colpocleisis

Obliterative procedures, such as total colpocleisis or LeFort's procedure, are usually reserved for women who are elderly, medically compromised and no longer sexually active. These procedures correct POP by moving pelvic viscera back into the pelvis and closing off the vaginal canal either partially or totally.⁴⁸ The advantages of obliterative surgery are shortened operative time, decreased perioperative morbidity and a very low prolapse recurrence risk. The major disadvantage is elimination of the potential for vaginal intercourse. It is essential to provide preoperative counseling when considering an obliterative versus reconstructive procedure. The patient—and, if applicable, her partner—must be completely comfortable with the prospect of losing vaginal sexual function before an obliterative operation can be considered.

Hysteropexy

There is increasing interest in preserving the uterus at the time of prolapse repair, and a variety of surgical options exist. For women who desire surgical management and prefer uterine conservation, the same procedures performed vaginally or abdominally can be performed without a hysterectomy. With regard to the abdominal approach specifically, a sacral mesh hysteropexy, in which the lower uterus and/or upper vagina are suspended from the sacrum, may be employed. Transvaginal apical suspension procedures can be used for uterine preservation, and include iliococcygeus ligament fixation, high uterosacral ligament suspension and McCall culdoplasty.⁴⁹ Complications include

those seen with other vaginal and abdominal procedures. Newer transvaginal “tension-free” procedures have been described recently, but efficacy and complication data are limited.⁵⁰

Most of the medical literature regarding the treatment of apical prolapse is based on retrospective reviews of case series.¹ The overall reported failure rates for all of the above-mentioned procedures for apical prolapse varies from 0–20%.^{1,45}

Anterior vaginal prolapse correction. Anterior vaginal prolapse (cystocele) may be repaired with traditional midline anterior colporrhaphy, with or without mesh or graft material, and via paravaginal repair (performed vaginally or retropubically). Anterior colporrhaphy is a technique in which the fibromuscular layer of the anterior vaginal wall is plicated. In randomized trials, success rates of this procedure range from 40–60%.^{49,51,52} The paravaginal defect repair is accomplished by reapproximating the vaginal tissue that has torn from the lateral supporting arcus tendineus fascia pelvis, thereby restoring anterior vaginal support. Paravaginal repairs have a reported 67–100% success rate, although the vaginal approach has a high complication rate.^{53,54}

Posterior vaginal prolapse correction. Posterior vaginal prolapse (rectocele) has traditionally been surgically managed with the posterior colporrhaphy, which entails midline plication of the subepithelial posterior vaginal tissue. In the past, plication of the medial portion of the levator ani muscles was often performed in addition to a posterior colporrhaphy; however, this has been largely abandoned due to increased rates of postoperative dyspareunia. Also described is the defect-directed posterior repair in which a specific “defect” in the vaginal muscularis or adventitia is identified and repaired.^{55,56} A randomized trial com-

paring three techniques for the management of rectoceles showed that midline fascial plication and a site-specific repair provided superior *anatomical* outcomes to a site-specific repair augmented with porcine

mesh erosion has occurred in some cases. Subsequently, some surgeons began using allograft (cadaveric) fascia in order to decrease the risk of mesh erosion. However, due to increased rates of recurrent prolapse, the

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xenograft.⁵⁷ *Functional* outcomes were similar between the groups.

Colorectal surgeons have utilized a transanal approach to rectocele repair, plicating redundant rectal mucosa and anterior rectal muscle. However, when transanal and transvaginal approaches have been compared,^{3,57} the transvaginal repair has provided more subjective symptomatic relief as well as less objective recurrence of posterior vaginal wall prolapse.

Graft materials. Both biologic and synthetic graft materials have been utilized to augment traditional prolapse repairs. These grafts are thought of as replacing absent or attenuated vaginal tissue or reinforcing existing vaginal tissue in order to increase the durability of the repair. In the treatment of apical prolapse, new techniques using materials attached to specific trocars are used to provide pelvic organ support. Despite the lack of risk–benefit information, many new techniques and products are being incorporated rapidly into clinical practice, even while continuous modifications are taking place in an attempt to reduce complications, particularly those related to mesh erosion, contraction (resulting in vaginal shortening and narrowing) and fistula.¹

The synthetic mesh used for the abdominal sacral colpopexy has provided good pelvic support; however,

use of cadaveric fascia for abdominal sacral colpopexy has largely been abandoned.^{58–61}

Although the use of mesh in surgery to correct POP is becoming increasingly common, there are limited published safety and efficacy data. A recent American College of Obstetricians and Gynecologists Practice Bulletin stated “given the limited data and frequent changes in the marketed products (particularly with regard to type of mesh material itself, which is most closely associated with several of the postoperative risks, especially mesh erosion), these procedures should be considered experimental and patients should consent to surgery with that understanding.”¹

Summary and Conclusions

Many menopausal women with symptomatic POP may present to their clinicians with explicit complaints of a vaginal “bulge” or “protrusion”. Alternatively, women may have other pelvic symptoms as their presenting complaints—such as urinary incontinence, constipation or pelvic pain—and prolapse may be found on physical examination.

Women with POP who are asymptomatic or mildly symptomatic may be observed at regular intervals, with treatment initiated only if new and bothersome symptoms develop. In

most symptomatic women, the clinician should first attempt the most conservative treatment prior to recommending surgical management. The option of pessary use should be discussed with all women who have POP. These devices can be fitted in most patients regardless of the stage or site of predominant prolapse. In addition, pessary use should be considered prior to initiating a surgical intervention in women with symptomatic prolapse. When management with a pessary fails, the usual recommended treatment is surgical. Abdominal sacral colpopexy with synthetic mesh offers the best long-term outcome, although vaginal approaches are associated with less morbidity.

Options for women with prolapse who desire uterine preservation include uterosacral or sacrospinous ligament fixation via the vaginal approach, or sacral hysteropexy via the abdominal approach. Unfortunately, none of these procedures have been well-studied. Although several new procedures utilizing various devices and synthetic meshes are becoming increasingly popular, their safety and efficacy have not yet been proved in clinical trials. ■

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- SUDDEN, SEVERE HEADACHE WITH NO KNOWN CAUSE

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