Improving Evidence-Based Practice: Use of the POP-Q System for the Assessment of Pelvic Organ Prolapse

Katherine Marchese

Pelvic floor disorders, which include pelvic organ prolapse, urinary and fecal incontinence, and dys-functional bowel and bladder symptoms, comprise a confluent series of medical conditions that negatively impact the quality of life for many women (Barber, 2005; Bo, 2006). Pelvic organ prolapse affects women of all ages and is often under-reported, under-diagnosed, and under-treated. Prevalence estimates are variable but range between 30% and 76% of the female population (Barber, 2005; Bo, 2006; Hagen, Stark, Maher, & Adams, 2006). Many women do not seek early medical care and postpone discussions with their health care provider until the symptoms become very troublesome and have a deleterious effect on their quality of life. It is expected that pelvic organ prolapse will increase in frequency as the population ages (Bo, 2006; Trowbridge, Rodriguez, & Fenner, 2005). It is important that clinicians become well-versed in the evaluation and diagnosis of pelvic organ prolapse, utilizing the upgraded assessment tools, such as the POP-Q and the Brink assessment scales. Conservative treatment options for this condition can be managed by clinicians with proper referral to urogynecologists or urologists for surgical management as needed. Each year, over 200,000 women undergo inpatient surgery to repair the prolapse at a cost of over $1 billion for hospitalization and physician fees alone (O’Dell & Morse, 2008).

**Key Words:** Pelvic organ prolapse, pelvic floor disorders, POP-Q assessment tool, Brink scale.

**Objectives**

1. Define pelvic organ prolapse.
2. Explain the etiology and risk factors of pelvic organ prolapse.
3. List symptoms of pelvic organ prolapse.
4. Discuss two tools for assessing pelvic organ prolapse.

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Note: Objectives and CNE Evaluation Form appear on page 224.
a complete utero-vaginal eversion may develop (Schaffer, Wai, & Boreham, 2005; Swift, Tate, & Nicholas, 2003).

Prior to the late 1990s, there was no universally accepted system for grading, staging, describing, or recording the evaluation of the pelvic floor support mechanisms, limiting the ability to assess reliability, reproducibility, and generalizability in clinical trials (Barber, 2005; Bump et al., 1996). In 1996, the International Continence Society, the American Urogynecologic Society, and the Society of Gynecologic Surgeons developed and standardized the Pelvic Organ Prolapse – Quantification System (POP-Q). This system, which describes specific anatomic sites to be measured for evaluation and staging of a pelvic organ prolapse, has become the most accepted evidence-based tool for gynecologists and urogynecologists (American College of Obstetricians and Gynecologists [ACOG] Committee on Practice Bulletins – Gynecology, 2007; Barber, Lambers, Visco, & Bump, 2000; Bump et al., 1996). Although used less frequently by other specialty practices, it is a valuable tool that all clinicians should embrace.

In the past, generic terms (such as cystocele, rectocele, and enterocele) were commonly used to describe the prolapse without any specific diagnostic information that identified the exact anatomical structure behind the vaginal wall weakness (ACOG Committee on Practice Bulletins – Gynecology, 2007; Bump et al., 1996). The recent terminology changes have suggested limiting the use of the terms rectocele, cystocele, and enterocele in order to describe, more accurately, the specific anatomic site of the vaginal wall weakness (Bump et al., 1996). If, however, ancillary studies, such as cystoscopy, ultrasonography, contrast radiography, CT, or MRI, are done and the particular organ of descent behind the vaginal wall weakness is identified, the terms urethrocele, cystocele, rectocele, or enterocele may be appropriately used (Bump et al., 1996).

Prolapses are now best defined in three anatomical terms based on the segment of the vaginal wall that has prolapsed. These are identified as an anterior vaginal prolapse, posterior vaginal prolapse, or apical/superior vaginal prolapse (Hagen et al., 2006). The anterior prolapse, indicating a prolapse in the anterior wall of the vagina, could include an urethrocele, a cystocele, or an anterior enterocele. The posterior prolapse, indicating a prolapse in the posterior wall of the prolapse, could include a rectocele or a posterior enterocele. The apical/superior prolapse, indicating a prolapse in the apical vaginal wall, could include the cervix, the utens, or the vaginal cuff.

Risk Factors/Etiology

The etiology of pelvic organ prolapse may be related to multiple risk factors rather that a single cause (ACOG Committee on Practice Bulletins – Gynecology, 2007; Schaffer et al., 2005). Factors, congenital or acquired, that result in a weakened support mechanism predispose women to pelvic organ prolapse. Pregnancy, difficult and prolonged labor, forceps delivery, large birth weight babies, and incised parity are often cited (Herbst, 2008; Swift, 2000). Medical conditions, such as multiple sclerosis and muscular dystrophy, produce damaged or paralyzed muscles that cannot provide the normal supportive structures needed. Women with genetic collagen disorders, such as Marfan’s and Ehlers-Danlos Syndrome, have demonstrated a higher incidence of both urinary incontinence and pelvic organ prolapse (Carley & Schaffer, 2000), suggesting that connective tissues have a role in their development. Obesity, chronic constipation, and chronic cough related to tobacco abuse, asthma, or bronchitis result in significant increase in intra-abdominal pressure, which has also been linked to pelvic organ prolapse. Certain occupations linked to heavy lifting may also predispose women to prolapse. Ethnicity, age, menopause, and familial history of prolapse are additional factors postulated to increase the risk for pelvic organ prolapse. Previous pelvic surgeries, including hysterectomy and prior prolapse repair, are also risk factors (Swift, 2000).

Symptoms

Pelvic organ prolapse may be asymptomatic or present with such mild symptoms that no treatment is solicited or needed for years (Sasso, 2006). Only 10% to 20% of women seek medical assistance for this condition (Barber, 2005; Bo, 2006). Development of bothersome symptoms increases when the prolapse has descended to the level of the hymen, prompting health-seeking behaviors (Barber, 2005; Bo, 2006; Swift et al., 2003). Symptoms commonly associated with prolapse are characterized into 4 primary areas: lower urinary tract symptoms, bowel symptoms, sexual symptoms, and local symptoms (Bump et al., 1996; Ellerkamp et al., 2001). Patients may present with any or all of these symptoms and in varying degrees (Barber, 2005; Bo, 2006). Careful evaluation and discussion are needed to identify whether these symptoms are related to the prolapse condition or may be related to some other condition, such as pelvic or vaginal mass, hernias, interstitial cystitis, urinary tract infection, overactive bladder, irritable bowel syndrome, primary rectal disorder, or sexual disorder unrelated to the prolapse (Barber, 2005; Weber et al., 2001). Severity of presenting symptoms is not necessarily related to the progression of the prolapse.
Urine symptoms are related to the effect of the prolapse on the ability of the bladder to fill, empty, and maintain continence. Common symptoms include hesitancy, urgency, frequency, decreased force of stream, and incomplete emptying (Barber, 2005). Patients may need to develop compensatory adaptive mechanisms to empty the bladder, which could include manipulation of the prolapse or assuming multiple positions on the toilet to facilitate complete voiding.

Patients with pelvic organ prolapse may also present with bowel symptoms that include incontinence of flatus and feces, straining to defecate, incomplete emptying, increased urgency, and/or fecal blockage (Barber, 2005; Bo, 2006). Compensatory mechanisms for fecal evacuation may also be needed if the prolapse has placed increased pressure on the rectum. These patients may detail extensive procedures, including splinting and position changes, to facilitate bowel emptying.

Further symptoms experienced by patients with pelvic organ prolapse may include local “bulge” symptoms described as a sensation of fullness, protrusion in the vagina, or increased vaginal pressure (Barber, 2005). The bulge may be visible either internally in the vagina or externally past the hymen remnant. It may interfere with sexual activity and activities of daily living, and/or result in a decreased quality of life (Barber, 2005; Bo, 2006). Sexual dysfunction may be related to the presence of the prolapse in the vagina, causing dyspareunia, decreased sensation, and lubrication with subsequent avoidance of sexual encounters (Barber, 2005). Symptoms noted in other studies include low back pain, generalized pelvic pain, or blood-stained or purulent discharge. Blood stains or purulent discharge noted on the underwear or protection pads may be related to the erosion sores caused by the prolapse rubbing against skin, underwear, or protection pads (Barber, 2005; Bo, 2006; Swift et al., 2003).

Assessment and Diagnosis

The assessment of pelvic organ prolapse begins with a detailed history and follows with a five-component physical examination (Bump et al., 1996; Schaffer et al., 2005). The physical examination begins with an evaluation of the external genitalia (1), followed by the internal examination of the vaginal tissue (2) and the digital rectal-vaginal examination (3). Assessment of the muscle strength (4) and the evaluation of the prolapse (5) are done during the internal vaginal assessment.

History

Assessment of a female presenting with a prolapse begins with obtaining a complete medical history. This history should include age, weight, body mass index, number of pregnancies, birth weight of children, complications during delivery, and any familial history of prolapse (ACOG Committee on Practice Bulletins – Gynecology, 2007). Personal medical history should also include any medical condition, tobacco use, chronic constipation, or other conditions that may result in a chronic cough. In addition, the pertinent surgical history should include any pelvic or retroperitoneal surgeries, especially a hysterectomy and any prior prolapse repair.

Specific symptoms to be evaluated include pelvic pain, back pain, dyspareunia, abnormal bleeding, vaginal discharge, urinary symptoms, and defecatory symptoms (Ellerkmann et al., 2001; Kahn et al., 2005; Schaffer et al., 2005). Assessment of each symptom should be described separately and should include onset, duration, severity, precipitating or associated factors, alleviating factors, and any prior treatments. This in-depth assessment of each symptom is necessary to identify any possible differential diagnosis that may alter the treatment plan.

Physical Examination

The physical examination begins with inspection and palpation of the external genitalia, assessing for any discoloration, inflammation, irritation, discharge, rash, or lesions. The vaginal epithelium should also be assessed for vaginal atrophy, abrasions, erosions, and inflammation. The bimanual examination is done to assess for any abnormalities in the vaginal wall, abdomen, or rectum. Specifics of these examinations may be found in other sources and will not be covered in this article; they are a necessary component in the evaluation of a pelvic organ prolapse and can be instrumental in establishing the differential diagnosis, which is composed (Weber et al., 2001).

Brink scale. The Brink scale assesses the strength of the pelvic floor composed of the levator ani muscles, coccygeal muscles, and the related fascia, using a transvaginal or transrectal approach. The transvaginal approach is most common, with the examiner’s finger inserted 4 to 6 cm into the vagina, while asking the patient to squeeze the pelvic floor muscles without using the accessory muscles (FitzGerald et al., 2007). Three components of each pelvic floor muscle contraction (levator ani muscles and coccygeal muscles) are assessed: a) the muscle force, b) the vertical displacement of the examiners fingers during the contraction, and c) the duration of the contraction (FitzGerald et al., 2007). A 4-point ordinal scale is used by the examiner to assess each of the 3 components (see Table 1). The scores of the three components are added and provide an overall score ranging from 3 to 12, with higher scores reflecting increasing muscle strength contractions (Sasso, 2006).
Table 1.
Brink Assessment Scale

<table>
<thead>
<tr>
<th>Muscle Strength Rating</th>
<th>Vertical Displacement Rating</th>
<th>Duration Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – No response</td>
<td>1 – No response</td>
<td>1 – None</td>
</tr>
<tr>
<td>2 – Weak squeeze</td>
<td>2 – Finger base moves anteriorly</td>
<td>2 – Less than 1 second</td>
</tr>
<tr>
<td>3 – Moderate squeeze</td>
<td>3 – Whole length of fingers moves anteriorly</td>
<td>3 – Lasts 1 to 3 seconds</td>
</tr>
<tr>
<td>4 – Strong squeeze</td>
<td>4 – Whole finger moves anteriorly, gripped and pulled up</td>
<td>4 – Lasts more than 3 seconds</td>
</tr>
</tbody>
</table>

**Note:** Vertical displacement means how and where the examiner’s finger is gripped during the contraction and the degree to which it is pulled deeper into the vagina and pulled upwards.

During each contraction, the examiner rates the ability of the patient to contract the pelvic floor muscles and the ability of the patient to tighten the muscles around the base of the examiner’s finger or the whole finger. The duration of the contraction is assessed as well. When the examiner learns this technique, it may take more than one contraction to assess adequately. The patient is instructed to completely relax the pelvic muscles before beginning the next contraction. It is very important to explain to the patient exactly which muscles to contract and how to contract those specific muscles.

**POP-Q assessment tool.** Standardized terminology identifying the degree, grade, and anatomical points of prolapse were needed to advance the science underlying the etiology, assessment, and prolapse treatment efficacy (Bump et al., 1996; Weber et al., 2001). Use of the POP-Q system (see Figure 1) requires assessment of the prolapse at maximum protrusion (Bump et al., 1996; Trowbridge et al., 2005). After voiding, the patient is usually placed in the dorsal lithotomy position and asked to perform a Valsalva maneuver, exerting maximum strain to simulate maximal protrusion (Barber et al., 2000). If necessary, assisting the patient into a standing position may be beneficial to achieve maximal strain (Bump et al., 1996; Trowbridge et al., 2005).

Table 2.
POP-Q Grid for Recording Values

<table>
<thead>
<tr>
<th>Aa</th>
<th>Ba</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gh</td>
<td>Pb</td>
<td>Tvl</td>
</tr>
<tr>
<td>Ap</td>
<td>Bp</td>
<td>D</td>
</tr>
</tbody>
</table>

**Note:** Please refer to Figure 1. The numerical values placed in each of these squares are obtained by using the pre-marked swab and recording the distance of that particular point from the hymen. Gh and Pb are also measured with the pre-marked swab but identify the distance between different points as indicated in Figure 1.

**Anatomic Landmarks**
Assessment of a prolapse begins with the identification of the hymen. This becomes the fixed point of reference, and the six defined anatomical points in the vagina are given a value in centimeters based on their position relative to the hymen, either above or below. There are two points on the anterior portion of the vaginal wall, two points on the posterior wall, and two points on the apical/superior wall.

Symbols used to identify these six points include lower case letter “a” (representing the anterior vaginal wall) and lower case “p” (representing the posterior vaginal wall). Capital letters “A” and “B” reflect the proximal (A) and distal points (B) on the anterior and posterior vaginal walls. Capital “C” represents the cervix or posterior vaginal cuff. Capital “D” represents the posterior fornix (see Figure 2). Figure 3 shows the pre-marked swab used for measuring displacement.

**Ordinal Stages of Pelvic Organ Prolapse**
Following the assessment of the POP-Q and completing the POP-Q grid (see Table 2), an ordinal stage is assigned. The prolapse is graded from 0 to IV based on the extent of maximal protrusion. The stage of prolapse should be entered into the progress notes along with the POP-Q grid. The most common stages are I and II (Sasso, 2006; Swift, 2000). Refer to Table 3 for staging specifics.

**Conservative Management**
Treatment options for conservative management of prolapse are dictated by results of the GU examination, assessment of the prolapse stage, and patient preferences (Herbruck, 2008). These conservative options include lifestyle modifications, use of a pessary, pelvic muscle therapy,
Procedure

Wash hands.
Explain procedure to patient. Have patient empty her bladder prior to the examination.
Assist patient into dorsal lithotomy position.
Don gloves.
Examine external genitalia for any abnormalities.
Identify the hymen. Begin the measurements.

Gh can be documented at rest and with strain.
At rest (no straining), measure the distance from the external mid-urethral to the midline hymen using the pre-marked swab. Record the value.
Have patient perform a Valsalva for maximum strain. Again, measure the distance from the external mid-urethra to the midline hymen using the pre-marked swab, noting any change in the distance. Record the value.

Pb can be measured at rest and with strain.
At rest (no straining), measure the distance from the midline hymen to the mid-anal orifice using the pre-marked swab. Record the value.
Have the patient perform a Valsalva maneuver for maximum strain. Measure the distance from the midline hymen to the midline anal orifice, noting any change. Record the value.

Vaginal Examination
Slightly lubricate the speculum and insert into the vagina, assessing epithelial tissue. Identify presence/absence of cervix at the vaginal apex and any signs of erosion or abnormal tissue.

TVL
Patient is in resting position (no straining).
Reduce the prolapse, if necessary, to obtain true vaginal length.

Holding the cotton-tipped portion of the pre-marked swab, slide the swab stick into the vagina to its greatest depth, identifying point C and/or D. Record the value of TVL, C, and/or D.

Apical (Superior) Aspect of Vaginal Wall
Point C
Holding speculum with one hand, measure the distance from the midline hymen to the most distal aspect of the cervix or the vaginal cuff if the patient has had a hysterectomy and the cervix is missing. Record this value.

Point D
This point is only measured if the patient still has a cervix. While the speculum is still in position, advance the swab stick past the cervix into the posterior fornix (pouch of Douglas). Record this value.
Remove the speculum and separate the blades. Discard the upper portion of the blade.

Anterior Aspect of Vaginal Wall

Aa
Slide the single blade of the speculum into the vagina retracting the posterior portion of the vaginal wall. Identify the urethrovesical crease on the anterior portion of the vagina, if present. Slide the pre-marked swab 3 cm in from the external urethral meatus (should approximate the urethrovesical crease). Gently hold the swab in that position and ask the patient to slowly bear down to again achieve maximal straining. Observe the distance that the swab stick moved back out of the vagina. Measure the distance from that point to the urethral meatus and record.

Range of -3 (no prolapse) to +3 (maximal prolapse).

Ba
With the speculum remaining in that position, visually identify the most dependent portion of the anterior wall. Place the pre-marked swab at that point, and again, have the patient bear down to achieve maximal straining. Measure the distance from that point to the urethral meatus. Record that value.

Range of -3 (no prolapse) to + value equal to length of vaginal eversion.

Posterior Aspect of Vaginal Wall

Ap
Adjust the blade of the speculum to retract the anterior wall of the vagina. Slide the pre-marked swab 3 cm in from the external urethral meatus on the posterior wall of the vagina. Gently hold the swab in that position and ask the patient to slowly bear down to again achieve maximal straining. Observe the distance that the swab stick moved back out of the vagina. Measure the distance from that point to the urethral meatus and record.

Range of -3 (no prolapse) to +3 cm (maximal prolapse).

Bp
With the speculum remaining in that position, visually identify the most dependent portion of the posterior wall. Place the swab at that point, and again, have the patient bear down to achieve maximal straining. Measure the distance from that point to the urethral meatus. Record that value.

Range of -3 (no prolapse) to + value equal to the length of the vaginal eversion.
**Figure 2.**
**Anatomical Markings Identifying Points on the POP-Q Examination**

- **Gh:** Genital hiatus, a normal value of less than 4 cm. Values larger than 4 cm may indicate weakened levator ani muscle strength.
- **Pb:** Perineal body, site from posterior midline of the hymen to the mid-anal opening.
- **Hymen:** The hymen is given a value of “0.” Replaces an imprecise term “introitus.”
- **Aa:** Site at midline on anterior vaginal wall, site of urethrovaginal crease, approximately 3 cm from external urethral meatus. May be palpable in some patients or indistinguishable.
  Value: -3 cm (no prolapse) to +3 cm (indicating a prolapse).
- **Ba:** This is the 2nd point on the anterior vaginal wall. It represents the most dependent (distal) point on this wall. Value will be -3 cm (no prolapse) up to any value the length of the vagina (indicates some level of prolapse).
- **Ap:** Site at midline on the posterior vaginal wall, approximately 3 cm from hymen. Value, relative to hymen -3 to +3 cm.
- **Bp:** This is the 2nd point on the posterior vaginal wall. It represents the most dependent (distal) point. Value -3 cm (no prolapse) up to any value the length of the vagina.
- **C:** Most dependent (distal) aspect of cervix or vaginal cuff (post-hysterectomy).
  Value: With no prolapse = negative number equal to TVL. With prolapse = positive number up to or equal to TVL.
- **D:** Site that identifies fornix. Only has a value if cervix is present.
  Value: With no prolapse = negative number equal to TVL. With prolapse = positive number up to or equal to TVL.
- **TVL:** Length of vagina from the hymen to vaginal greatest depth, with prolapse reduced and at rest, no straining.

and surgery (ACOG Committee on Practice Bulletins – Gynecology, 2007; Herbruck, 2008). Discussion should begin with patient education regarding the risk factors for developing a prolapse and possible techniques to prevent worsening of the prolapse. Asking the patient to identify her goals regarding these health concerns is important and can provide the template for discussion. Patients most satisfied with their treatment choice and outcomes have identified specific goals regarding expected outcomes.

Basic goals for conservative management involve increasing the strength and support mechanisms of the pelvic floor muscles, which may prevent worsening of the prolapse or perhaps delay the need for surgery. Teaching patients about healthy bowel and bladder habits is also a factor in conservative management (Shariati, Maceda, & Hale, 2008). Lifestyle changes, such as increasing fluid intake, increasing daily consumption of fruits and vegetables, increasing fiber through diet or supplements, and exercising, can improve constipation, which will reduce straining to defecate (Kahn et al., 2005; Shariati et al., 2008). Weight loss, reduced straining with defecation, and proper lifting techniques can lessen the increase in abdominal pressure considered to be a risk factor for prolapse (Kahn et al., 2005). Smoking cessation programs may reduce a chronic smoker’s cough, which also might reduce the sudden increase in intra-abdominal pressure (Schaffer et al., 2005). Pelvic floor muscle training can be done by physical therapists or nurses. Formalized plans involving written instructions, demonstration and return demonstration, and periodic follow up improve the efficacy of pelvic floor muscle training as a treatment option (Trowbridge et al., 2005). Electrical stimulation and biofeedback are additional treatment options for conservative management.
Pessaries have been used for years to treat both pelvic organ prolapse and urinary incontinence. The choice of which pessary to use may be based on the type of prolapese identified and the presenting symptoms (Trowbridge et al., 2005). They can reduce the symptoms of the bulge or pressure sensations, as well as reduce the need for splinting and improve urinary incontinence (Komesu et al., 2007; Trowbridge et al., 2005). However, pessaries are less effective in reducing defecatory problems and may worsen these symp- tombs (Komesu et al., 2007). The key to success with pessary usage is proper choice of a pessary, proper fit, and one with minimal complications (Trowbridge et al., 2005).

Implications for Practice

Pelvic organ prolapse is an increasingly common problem, one that is expected to increase as the population ages, and is one that has serious implications on an individual's quality of life. Many times patients are reluctant to discuss their symptoms, their incontinence, or their splinting habits to empty their bowel or bladder. They develop complicated adaptive behaviors to adjust to their symptoms. All patients should be specifically queried regarding their health status to validate their symptoms and behaviors, and educate them about their treatment options. Without the proper in-depth assessment, patients may not be aware how treatable their symptoms are.

Clinicians at all levels who are involved in women's health must be well versed in the assessment of pelvic organ prolapse, utilizing evidence-based practice to improve patient care outcomes. Multiple clinical trials have validated the Brink scale tool and the POP-Q scale (Bump et al., 1996; FitzGerald et al., 2007; Kahn et al., 2005; Swift et al., 2003; Weber et al., 2001). The Brink scale and the POP-Q assessment tool represent an acceptable standardized means of assessing the prolapse and provide a reference for treatment recommendations (ACOG Committee on Practice Bulletins – Gynecology, 2007; FitzGerald et al., 2007; Weber et al., 2001). Clinicians need to be proficient in performing these examinations to provide optimal care (Weber et al., 2001).

Conclusion

As nursing research opportunities increase, clinicians must be
proficient in the use of the validated research tools available. The POP-Q system and the Brink scale tool represent the most commonly used tools to assess and document pelvic organ prolapse and pelvic muscle strength by urogynecologists and urologists. In order to improve generalizability of studies, common terminology regarding prolapse stage is mandatory.

References

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