New techniques for correcting vaginal apical prolapse

Abdominal sacral colpopexy is still the "gold standard" for this complicated problem. But early results with two minimally invasive procedures show promise for safely managing prolapse.

Apr 15, 2005
By: Richard S. Bercik, MD

Contemporary OB/GYN Technology Correcting apical vaginal prolapse can be a challenge for even the most experienced gynecologic surgeon. Many women with the condition have a history of pelvic surgery, co-existing medical conditions, are elderly, or present with a vaginal hernia sac that contains portions of the bladder, rectum, and peritoneum. Traditional surgery for vaginal prolapse involves either fixing the hernia through the abdomen or vagina or obliterating the vagina with a partial or complete colpocleisis. Newer, minimally invasive techniques build on our previous success with the well-described abdominal and vaginal procedures.

Cause and incidence

Vaginal apical prolapse is a failure of type 1 vaginal support, as defined by DeLancey.[1] Weakening of the uterosacral and cardinal ligament complex can result in type I prolapse with the uterus in place. Table 1 lists risk factors for apical prolapse. Women who have undergone hysterectomy may be predisposed to apical prolapse if continuity has not been re-established between the anterior vaginal muscularis, the pericervical ring of endopelvic fascia, and the rectovaginal fascia. During hysterectomy, the surgeon must be careful to recognize any weakness in the supporting structures—including enterocele—and address them.

The exact incidence of vaginal apical prolapse is difficult to measure. Formal graded pelvic examinations (POP-Q) performed on a population of gynecologic patients revealed that 2.6% of the women had stage 3 prolapse (within 1 cm of introitus) and none had stage 4 prolapse.[2] The rate of vaginal vault prolapse after hysterectomy is reported to be from 0.5% to 1.5%, but aging of the population likely will further increase the number of women affected. Estimates indicate that by the time they reach age 80, approximately 11% of women will have had a corrective procedure for pelvic organ prolapse or urinary incontinence.

Recognizing the problem

Women with vaginal prolapse often do not complain of any symptoms until the problem has progressed to stage 3—that is, the leading point of prolapse is within 1 cm of the vaginal introitus. At that time, the common complaint is of a vaginal protrusion or bulge that the patient first noticed while bathing. Early symptoms also include dyspareunia, feelings of pelvic pressure or fullness, and pain with prolonged standing. As the prolapse progresses, a woman may develop urinary or fecal frequency or urgency, symptoms of

urinary or fecal obstruction with incomplete voiding and straining, or the need to digitally reduce (splint) the prolapse in order to defecate or urinate. Advanced cases may result in urinary retention with urethral obstruction or ureteral blockage that leads to hydroureter and subsequent renal damage. Table 2 lists symptoms of vaginal prolapse by stage.

Nonsurgical management

Earlier stages of vaginal prolapse often can be managed without surgery. Pelvic floor muscle trainingis commonly recommended to women with stage 1 or 2 vaginal prolapse. However, a recent Cochrane Database Systemic Review determined that there is no evidence from randomized controlled trials to support the use of pelvic floor muscle training in management of pelvic organ prolapse.[3] Nevertheless, multiple observational studies have indicated subjective relief for patients treated with these techniques.

Local estrogen is a mainstay of treatment in menopausal patients for whom hormonal therapy is not contraindicated. It may help diminish symptoms in women with early-stage vaginal prolapse by increasing vascularity and collagen in the vaginal mucosa. Local estrogen typically is prescribed with a pessary to reduce the risk of eroding the vaginal mucosa.

Pessaries are integral to management of later-stage vaginal vault prolapse, and particularly helpful for women who cannot or should not have, or do not want surgery. Before prescribing a pessary, treat any active pelvic or vaginal infections and make sure the patient is willing to return for repeat examinations. Complications of pessary therapy, which are very uncommon, include vaginal discharge or odor, vaginal mucosal erosion, incarceration, and very rarely fistula formation. A recent survey of 104 pessary users showed that 70% of the women were satisfied or more than satisfied with the devices and 20% were unable to continue using a pessary, mostly because of repeated expulsion.[4]

Classic surgery

Surgical procedures for vaginal apical prolapse include abdominal, vaginal, laparoscopic, and combined approaches.

Sacral colpopexy. The "gold standard" is abdominal sacral colpopexy, which has the lowest rate of long-term failure of all the procedures. Rates of success (defined as no apical prolapse) with sacral colpopexy range from 78% to 100% and the mean re-operation rate is 4.4%. The procedure is quite complicated and ensuring surgical competence generally requires advanced training. Compared to a vaginal approach, sacral colpopexy takes longer, entails more blood loss, requires a longer hospitalization, and is associated with higher rates of bowel and ureter complications. Long-term complications

include urinary incontinence, voiding dysfunction, and erosion of vaginal mucosa overlying mesh material (mesh erosion).[5]

Vaginal procedures. Vaginal approaches to surgical correction of apical prolapse usually entail either a sacrospinous ligament fixation or uterosacral ligament suspension (which also can be done laparoscopically) to secure the vaginal apex in the hollow of the sacrum. These procedures can be done at the time of hysterectomy or posthysterectomy for vault prolapse. They generally require less postoperative analgesia, a shorter hospital stay, and faster recovery than the abdominal approach.

Sacrospinous ligament fixation can be performed unilaterally or bilaterally, but the latter has not proven to produce better results than the former. Advanced anatomic knowledge and surgical skills are requirements for safely performing the procedure. A prospective comparison of abdominal sacral colpopexy and sacrospinous ligament fixation showed a higher rate of reoperation (33%) for prolapse with the vaginal procedure.[6] Other authors have published lower re-operation rates for this procedure in retrospective reviews.[7,8] Complications described include temporary sciatic nerve irritation (7.5%), partial ureteral obstruction (5.5%), proctotomy (2.7%), and excessive hemorrhage (1.1%).[8,9]

High uterosacral ligament suspension also can be done as the primary operation for prolapse or for a recurrence of the condition. Although originally described as a vaginal procedure, it has been performed laparoscopically. The laparoscopic approach requires advanced laparoscopic suturing skills and entails longer operative times. There are only a few published case series delineating the success rates with this technique and failure rates (defined as recurrence of apical prolapse) vary from 0% to 31% with 1-year follow-up.[10, 11]

More reliable data exist for high uterosacral ligament suspension done transvaginally. Success rates for this procedure (defined as no reoperation for prolapse) range from 92.5% to 100%, with average pa-tient satisfaction of 90%. Complications include ureteral occlusion (2.4%-11.0%), small bowel injury (0.5%), and suture erosion (6%).[12-14] Cystoscopy is required to ensure that no ureteral injury occurs when the sutures are placed through the ligaments or the ligaments are strongly plicated for support. If such an injury does occur, it usually can be managed by removing the sutures and replacing them in a more medial location

Newer surgical techniques

Devices and techniques recently introduced for vaginal apical prolapse are designed to effectively and safely manage the problem with less invasive procedures. Two such advances are the Straight-In system from American Medical Systems and the Posterior Intravaginal Slingplasty (IVS) from US Surgical.

Straight-In. Figure 1 shows the Straight-In system, a preformed, Y-shaped silicon-coated polypropylene mesh with a suture-anchoring system. The device can be used for abdominal or laparoscopic sacral colpopexy. The procedure is performed in the usual fashion, with dissection and exposure of the vaginal cuff, excision and correction of any enterocele, re-establishment of continuity between the anterior and posterior endopelvic fascia, and 6 to 10 sutures to connect the mesh to a broad area of both the anterior and posterior vaginal cuff. A single-use vaginal distender elevates the vaginal cuff and provides a platform against which the vaginal sutures can be placed.

Figure 1. The Straight-In system (Courtesy of American Medical Systems, Inc., Minnteonka, Minn.)

Next, the presacral peritoneum is opened at the sacral promontory and the incision is extended caudally, as appropriate. Two suture anchors are placed 1.5 to 2.0 cm apart at the level of S3 in the sacrum. The anchors have a prefixed double arm of monofilament or braided #1 suture, which is used to secure the vaginal mesh. They are loaded into the Straight-In device until the suture exits from the handle. Pulling on the suture helps ensure that the anchors are adequately seated in the device. With that done, the mesh is secured to the sacrum using standard open or laparoscopic tying techniques. Because a smaller sacral area needs to be exposed to apply suture anchors than a standard needle, anchors require less presacral dissection. Thus, there may be less risk of injuring the ureter and the fragile presacral veins.[15]

Once the mesh has been secured to the sacrum, the peritoneum is carefully closed, with ureteral kinking avoided and as much of the mesh as possible covered. Success and complication rates for this procedure are unknown, as no short- or long-term studies of outcomes have yet been done.

Posterior intravaginal slingplasty (IVS). This procedure is performed vaginally, using ribbon-shaped tension-free polypropylene mesh for vaginal support. The mesh acts as a lattice for collagen in-growth, with the synthetic material and the patient's own tissue combining during scar formation to create a strong support structure. Originally described by Petros,[16] posterior IVS can be performed in an ambulatory setting, does not take long or require general anesthesia, and can be combined with corrective repair of other pelvic support defects, such as cystocele, rectocele, and incontinence procedures. Success rates with posterior IVS are 91% to 94% with up to 4.5 years' follow-up. The nylon tape originally used in the procedure was associated with an 8% erosion rate observed in two series of patients, but no erosions have yet been reported with the polypropylene tape.[17,18]

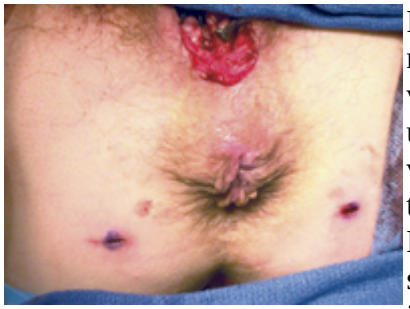

Figure 2. The IVS Tunneller is introduced into the ischiorectal fossa through two gluteal incisions.

Posterior IVS is done either during a posterior vaginal repair or with incision of the upper third of the posterior vaginal wall. Since the tape is attached to the undersurface of the most superior portion of the posterior vaginal vault, the surgeon should be careful to leave a 1.5- to 2.0-cm segment of the posterior vaginal wall intact. Next any enterocele sac is dissected and reduced in standard fashion, and the ischial spines on each side are identified through the vaginal incision.

Bilateral gluteal incisions are created 3 cm lateral and 3 cm inferior to the anal verge and the IVS Tunneller (Figure 2) is introduced through them to thread the polypropylene tape. The surgeon then advances the device into the ischiorectal fossa (Figure 3) with one hand while placing his/her other hand in the vagina to feel for the Tunneller's tip through the levator ani muscle. The blunt tip is directed toward the ischial spine so that it will perforate the levator ani muscle just distal to the ischial spine. The surgeon must be careful not to advance the device behind the ischial spine, which would risk injury to the pudendal nerve and artery.

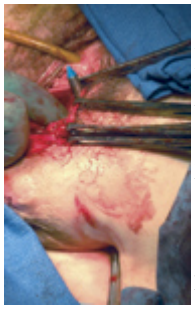

Figure 4 . The tip of the device is brought through the vaginal incision.

Next, the Tunneller is brought through the levator ani muscle and fascia into the vaginal incision (Figure 4). With the plastic stylet reversed (Figure 5), the tape is threaded through the eye of the stylet (Figure 6) and pulled into the body of the device. The entire device then is retracted through the gluteal incision to thread the tape through the ischiorectal fossa. A rectal exam is done to ensure that there is no injury, and the procedure is repeated on the contralateral side. The tape must be kept untwisted and flat so that it can be secured to the vaginal apex along a broad area of mucosa (Figure 7). Six- to eight-delayed-absorbable sutures should be used to secure the tape to the vaginal wall. At that point, the tape should be left lax.

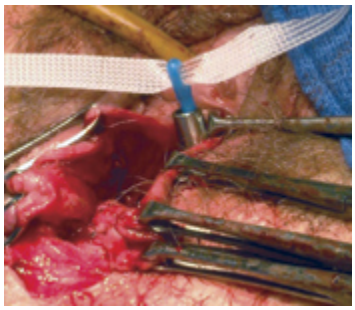

Figure 6. The tapered polypropylene tape is threaded through the stylet's eye and retracted into the Tunneller's sheath.

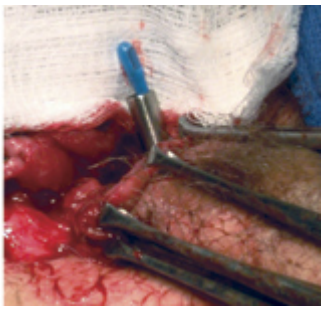

Figure 5. The blue stylet is reversed, placing the eye at the vaginal end of the device.

Once the remainder of the posterior repair is completed, the vaginal mucosa is closed with delayed-absorbable suture. The vaginal apex is then placed deep into the hollow of the sacrum and held in place while excess tape is trimmed at the skin surface. The gluteal incisions can be closed with skin adhesive or steri-strips. Vaginal packing can be used, if that is the

surgeon's custom.

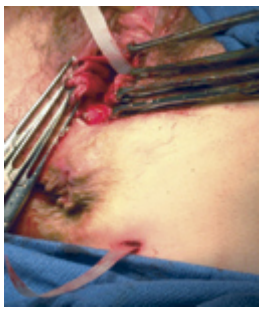

Figure 7. At bottom, two ends of the polypropylene tape can be seen exiting from the gluteal incisions. The section of mesh attached to the tape is for correction of a rectovaginal fascial defect.

Conclusion

Few surgical procedures for correcting vaginal apical prolapse are effective over the long term. Many also present significant risks to patients, who tend to be older and have multiple medical comorbidities. To address these concerns, newer procedures have been developed that use a minimally-invasive approach to a difficult surgical situation. Short-term results with these techniques have been promising, but long-term follow-up studies are needed to determine if the outcomes will endure.

REFERENCES

1. DeLancey JO. Anatomic aspects of vaginal eversion after hysterectomy. *Am J Obstet Gynecol*. 1992;166:1717-1724.

2. Swift SE. The distribution of pelvic organ support in a population of female subjects seen for routine gynecologic health care. *Am J Obstet Gynecol*. 2000;183:277-285.

3. Hagen S, Stark D, Maher C, et al. Conservative management of pelvic organ prolapse in women. *Cochrane Database Syst Rev*. 2004;(2):CD003882.

4. Bai SW, Yoon BS, Kwon JY, et al. Survey of the characteristics and satisfaction degree of the patients using a pessary. *Int Urogynecol J Pelvic Floor Dysfunct*. 2004 Dec 1; [Epub ahead of print].

5. Nygaard IE, McCreery R, Brubaker L, et al; Pelvic Floor Disorders Network. Abdominal sacrocolpopexy: a comprehensive review. *Obstet Gynecol*. 2004;104:805-823.

6. Benson JT, Lucente V, McClellan E. Vaginal versus abdominal reconstructive surgery for the treatment of pelvic support defects: a prospective randomized study with long-term outcome evaluation. *Am J Obstet Gynecol*. 1996;175:1418-1422.

7. Smilen SW, Saini J, Wallach SJ, et al. The risk of cystocele after sacrospinous ligament fixation. *Am J Obstet Gynecol*. 1998;179:1465-1471.

8. Lantzsch T, Goepel C, Wolters M, et al. Sacrospinous ligament fixation for vaginal vault prolapse. *Arch Gynecol Obstet*. 2001;265:21-25.