

MASTER CLASS

A Vaginal Approach to Pelvic Floor Prolapse



BY CHARLES E. MILLER, M.D.

safe and effective remedy for this disorder. As a review, the ischial spine is located approximately halfway between

In a recent Master Class (OB.GYN. NEWS, Aug. 1, 2007, p. 24), abdominal sacral colpopexy via a laparoscopic approach was featured for the treatment of vaginal vault prolapse. However, for the gynecologic surgeon who is more adroit with vaginal surgery, sacrospinous vaginal vault suspension also offers a

the pubic bones and the sacrum. Posterior to the spine is the sacrospinous ligament with the overlying coccygeus muscle. The sacrospinous ligament marks the posterior limit of the pelvic diaphragm.

Because he is a nationally recognized expert in the vaginal approach to pelvic floor prolapse, I have asked Dr. Peter Sand to discuss vaginal vault suspension, the evolution of the procedure, and the prevailing literature that compares this technique with abdominal sacral colpopexy.

Dr. Sand is currently a professor of ob.gyn. at Northwestern University, Chicago, and the director of urogynecology and reconstructive pelvic surgery at Evanston (Ill.) Northwestern Healthcare. Dr. Sand is a prolific re-

searcher and much-sought-after lecturer. As this year's scientific program chairman of the American Association of Gynecologic Laparoscopists' Global Congress of Minimally Invasive Gynecology, I invited Dr. Sand to present a surgical tutorial on the vaginal approach to prolapse. Just as the participants found his discussion interesting and informative, I am sure our readers will feel the same. ■

DR. MILLER is clinical associate professor, University of Chicago and University of Illinois at Chicago and President of the AAGL. He is a reproductive endocrinologist in private practice in Schaumburg, Ill., and Naperville, Ill., and the medical editor of this column.



BY PETER SAND, M.D.

Sacrospinous Vaginal Vault Suspension: Variations on a Theme

Vaginal vault prolapse is one of the most frequently occurring types of pelvic organ prolapse, and with our aging population, it is a problem

for which increasing numbers of women likely will seek treatment. Dr. Christopher F. Maher and his associates have estimated the incidence of posthysterectomy vaginal vault prolapse requiring surgery to be 36 per 10,000 person-years.

A variety of operations now exists for the treatment of vaginal vault prolapse and the reestablishment of apical support—from abdominal sacral colpopexy and abdominal uterus sacral suspensions, to sacrospinous vaginal vault suspensions, sacrospinous hysteropexies, and iliococcygeal vaginal vault suspensions.

All options have been described in the literature as being effective operations with minimal complications and varying degrees of success, but the optimal approach for vaginal vault prolapse remains a subject of debate. Unfortunately, many surgeons are not comfortable with vaginal surgery, despite the safety, speed, and effectiveness that sacrospinous vaginal vault suspension and its modifications can provide in experienced hands.

Sacrospinous vaginal vault suspension was originally described by Dr. Paul Zweifel in Germany in 1892. It was "rediscovered" in 1951 by Dr. I.A. Amreich in Austria, modified by Dr. J. Sederl, and then studied and described extensively in 1968 by fellow Austrian Dr. K. Richter.

The operation received more attention when Dr. C.L. Randall and Dr. D.H. Nichols reported on it (Obstet. Gynecol. 1971;38:327-32). Since then, the posterior approach to sacrospinous vaginal vault suspension that was described by Dr. Nichols has been modified, and an alternative approach through the anterior compartment of the vagina has been developed and described. Several newer devices, in the meantime, have offered improved safety and simplicity.

The Original Posterior Approach

The posterior approach to sacrospinous

vaginal vault suspension involves a posterior vaginal incision, perforation of the rectal pillars, and blunt dissection of the pararectal space anterior to the ligament.

In the original posterior approach described by Dr. Nichols, two Allis clamps are placed at the level of the hymenal ring, approximately 1 cm from the midline, and a dilute vasopressin solution can be used to infiltrate underneath the posterior vaginal wall to within 1 cm of the apex of the vagina. The scalpel is used to make a transverse incision between the Allis clamps, and then the Metzenbaum scissors are used to dissect underneath the vaginal epithelium in the midline, vertically to within 1 cm of the apex of the vagina.

The Metzenbaum scissors can be used to spread beneath the vaginal epithelium and smooth muscle to free the underlying endopelvic connective tissue from its attachments on the undersurface of the vaginal epithelium and smooth muscle. (See photo.) The scissors can then be used to make a vertical incision in the posterior vaginal wall to about 1-2 cm away from the vaginal apex.

Placement of Allis clamps—or self-restraining retractor hooks—on the incised edges of the vaginal epithelium and smooth muscle can allow for exposure and resection of the endopelvic connective tissue from the undersurface of the vaginal epithelium and smooth muscle laterally to the level of the rectal pillars. This may be facilitated by countertraction from your assistant, using tissue forceps on the endopelvic connective tissue.

Once this dissection is complete, the ischial spine on the patient's right side may be palpated, and—with either sharp dissection with the tips of the Metzenbaum scissors or blunt dissection with the operator's right index finger—the endopelvic connective tissue can be swept from anterior-lateral to medial of the ischial spine across the coccygeus muscle to remove the fatty tissue that overlies the ischial spine and the sacrospinous ligament.

The entire coccygeus muscle with its anterior sacrospinous ligament should be palpated, and the rectum and pararectal attachments mobilized bluntly with the index finger from lateral to medial. This is a relatively blood-free plane, and such a maneuver is possible with minimal bleeding so long as the affecting finger remains anterior to the ischial spine and

sacrospinous ligament.

A short Breisky-Navratil retractor can then be placed at the 10 o'clock position, resting on the ischial spine. By maintaining your right index finger against the ischial spine, you can then insert a long Breisky-Navratil retractor directly opposing the short retractor over the ventral surface of your finger, against the ischial spine with its posterior edge just anterior to the coccygeus muscle.

Sweeping this long retractor counterclockwise immediately across the coccygeus muscle, keeping its posterior blade in contact with the muscle throughout, will mobilize the rectal and pararectal fat medially and expose the coccygeus muscle and sacrospinous ligament. This retractor should be held at approximately the 2 o'clock position, creating a 60- to 90-degree angle with the other Breisky-Navratil retractor. (The exact angle will depend on the angle of the pubic arch.)

At this point, the right-angle Haney retractor can be placed at approximately the 7 o'clock position over the coccygeus muscle and then, with posterior traction, withdrawn distally until it pops down in front of the coccygeus muscle, exposing this muscle and sacrospinous ligament.

A Deschamps ligature carrier then can be inserted through the middle of the coccygeus muscle and rotated clockwise to expose its tip around the sacrospinous ligament. The initial bite should be placed 1 cm medial to the ischial spine to avoid the pudendal complex. A second suture can then be placed 1-2 cm medial to the first, again with care taken to place it through the middle of the coccygeus muscle and not posterior to this muscle, where it could injure the vessel and nerve of the pudendal complex.

When the Deschamps ligature carrier is brought through the muscle, a colpotomy or nerve hook can be used to mobilize one end of the suture and withdraw it back out into the operative field. Once this is mo-



Metzenbaum scissors are used to free the endopelvic connective tissue from the vaginal epithelium.

COURTESY DR. PETER SAND

bilized, the Deschamps ligature carrier can be rotated counterclockwise—in an arc exactly opposite to that in which it was placed—to withdraw the posterior end of the suture.

Care should be taken to identify the posterior end of the suture and differentiate it from the anterior end. This may be accomplished through the use of a straight hemostat on one end and the placement of a curved hemostat across both ends of the suture.

(When we perform the surgery, we use a straight hemostat to identify the posterior end of suture on the patient's right side, or the lateral suture, and a straight Kocher clamp to identify the posterior end on the patient's left side.)

The Breisky-Navratil retractors can then be slowly withdrawn one at a time to allow for observation of the entire paravaginal space and assessment for any bleeders, which can be easily grasped and electrocoagulated or sutured.

The suture can then be placed on the undersurface of the apex of the vagina by use of a free Mayo needle. The anterior arm of the lateral suture can be placed approximately 1-2 cm away from the right apex of the vagina in a figure-eight fashion, and this one arm of the suture can be tied to itself with a loose surgeon's knot.

The same process can be followed with the left or medial anterior arm of the second sacrospinous suture, 1-2 cm away from the left apex of the vagina, and tied down in the same fashion. Care needs to be taken on the patient's left side to place

Continued on following page

Continued from previous page

the suture approximately 0.5 cm further away from the apical edge of the vagina, as this suture will traverse a longer distance to reach the sacrospinous ligament.

Now the sutures can be retracted anteriorly, and a rectocele repair and/or enterocele repair can be performed as needed.

After successful completion of such repairs, excess vaginal epithelium and smooth muscle can be resected as indicated and the posterior vaginal wall closed with either interrupted sutures or a running, locking suture approximately halfway down the posterior vaginal wall.

At this point, the sacrospinous sutures should be tied down, with the suture on the patient's right lateral side tied down first. The posterior arm of the sacrospinous suture should be taken in the nondominant hand, and slow traction should be applied while the apex of the vagina is guided back into position in the pelvis, toward the right sacrospinous ligament.

Once the excess slack is taken up by mobilization of this suture, the suture may be tied down, with care taken to leave no gap between the vaginal apex and the sacrospinous ligament. This suture is then held while the second suture is mobilized in the same fashion and then tied down similarly.

Retraction of the undersurface of the closed posterior vaginal wall will allow for visualization of the sacrospinous sutures, which can be cut approximately 1 cm above the knot. The posterior vaginal wall may be closed, and perineorrhaphy performed as indicated.

The choice of sutures is up to the individual operator. Although Dr. Nichols originally described using delayed-absorbable sutures, later in his career he changed to using one Gore-Tex suture and one polyglycolic acid suture. He informed me that his reason for this was that the permanent suture would offer longer-lasting strength, whereas the delayed-absorbable suture would create more inflammatory response and possibly elicit more scarring.

Variations of the Original Approach

Some surgeons have suggested that a bilateral attachment of the vaginal apex—or attachment of the cervix, when the uterus is preserved—may offer a superior

anatomical reconstruction of the vaginal vault, and may avoid deviation of the vagina to the right or the left side.

Instead of placing two sutures on one sacrospinous ligament, a single suture can be placed on the right sacrospinous ligament at its midportion and on the left sacrospinous ligament at its midportion. These sutures are attached to the right and left apex of the vagina, respectively.

This approach, the thinking goes, allows for a wider width of the vaginal apex in the posthysterectomy patient, as well as good lateral support.

Often, a bilateral sacrospinous ligament suspension may be augmented by bilateral paravaginal defect repairs performed through the vagina, with or without the use of an adjuvant graft. The dissection for placement of these sutures is identical to the ipsilateral dissection for sacrospinous vaginal vault suspension, just described, on the patient's right side; it also can be performed on the patient's left side, with care taken to mobilize the rectum medially (which is often a more challenging task on the patient's left side).

Bilateral suspension to the sacrospinous ligament has not, however, been compared directly to unilateral sacrospinous vaginal vault suspension. Sometimes, when scarring exists in the midline from prior vaginal hysterectomy, or when an enterocele repair has been performed, there may be indentation in the midline of the vaginal vault, creating a somewhat Y-shaped vagina.

In a report published in 1997, Dr. J.F. Pohl and Dr. J.L. Frattarelli concluded that bilateral suspension is feasible in many patients, but that it requires significant intraoperative judgment both as to its feasibility and as to the width of the vaginal cuff that will allow a bilateral suspension without tension (*Am. J. Obstet. Gynecol.* 1997;177:1356-61).

In our practice, we tend to prefer right-sided vaginal vault suspensions in which we utilize either an anterior approach or a posterior approach, with a left-sided iliococcygeus vaginal vault suspension. This requires less dissection and less risk of bleeding, as the sutures are placed lateral to the ischial spine.

It also creates a vagina with further cephalad elevation of the right vaginal apex than the left vaginal apex, as well as an ample apical width.

Anterior sacrospinous suspension is an approach that we have pursued and described in order to address possible shortcomings or limitations of the conventional posterior approach—chiefly, recurrence of anterior vaginal wall prolapse and a deep posterior angle and narrowing of the upper one-third of the vaginal vault.

Whereas posterior suspension uses a posterior vaginal incision and pararectal dissection, anterior suspension uses an anterior vaginal incision, perforation into the right retropubic space, and dissection of the ipsilateral paravaginal space from the level of the bladder neck to the ischial spine, to create a wide space to accommodate the vaginal vault.

In our experience—Dr. Harvey A. Winkler, Dr. Janet E. Tomeszko, and I first reported on the technique in 2000—the anterior approach appears to reduce postoperative proximal vaginal narrowing and lateral deviation of the upper vagina by avoiding passage through the rectal pillars (*Obstet. Gynecol.* 2000;95:612-5).

The technique involves opening the anterior vaginal wall and separating the endopelvic connective tissue on the patient's right from the pubic ramus at the level of the bladder neck to the ischial spine, exposing the paravesical and pararectal space. The sacrospinous ligament is identified and isolated through this space.

Two permanent sutures are placed approximately 2 cm apart through the ligament, anchored with pulley stitches underneath the vaginal epithelium and smooth muscle, and tied down to the ligament.

An Evolution in Instrumentation

The Deschamps ligature carrier is the device originally used for applying sutures through the coccygeus muscle and sacrospinous ligament. However, because the ligature carrier is delivered posteriorly to anterior-medially, there always has been concern about potential damage to the pudendal artery, vein, and nerve.

With the advent of newer devices that deliver the suture in a limited arc from the anterior to posterior direction, the risk of damage to the pudendal complex has been significantly minimized and the need for extensive dissection is often unnecessary. The newer devices have thus improved not only the safety of the procedure but also its simplicity, and they have reduced the operative time required.

The first of these devices described for applying sutures in a defined arc from anterior to posterior was the Miya hook, described by Dr. F. Miyazaki.

Another new device, the Capio device, is a push-and-catch suture delivery system that allows the suture to be delivered over a defined arc into a catch device. The Capio device has enabled placement of sacrospinous sutures through palpation and without direct visualization of the ligament. This further limits the need for dissection of the perirectal space, potentially improving safety and reducing blood loss.

Other authors have described using the Schutt device, which also delivers a suture from anterior to posterior in a defined arc to improve the safety and speed of the procedure.

Evolving Research

At this time, there are relatively few stud-

ies that have compared vaginal sacrospinous colpopexy with abdominal sacral colpopexy for the treatment of upper vaginal prolapse.

The two prospective, randomized trials that appear to be most often cited and referred to—a study by Dr. Christopher F. Maher published in 2004 and a study by Dr. J. Thomas Benson published in 1996—were quite different in their scope and methodology (*Am. J. Obstet. Gynecol.* 2004;190:20-6; 1996;175:1418-21).

Dr. Benson's group reported data for 80 women with uterovaginal or vault prolapse and concluded that the abdominal approach was more effective, but this study involved the use of multiple concomitant procedures that may have confounded the outcomes.

Needle suspensions of the bladder neck were used in the vaginal surgery group, compared with retropubic urethropexies in the abdominal surgery group. Needle suspensions have been associated with a significant increased risk of subsequent recurrent cystocele and have affected the high recurrent prolapse rate for the vaginal surgery group.

The outcomes for both groups in the Benson study were very poor and markedly different from other results in the literature, which makes it difficult to generalize these outcomes to other populations.

Dr. Maher's study was better designed and has been more reflective of my experience and the experience of many other surgeons. His group reported on 95 women with posthysterectomy vaginal vault prolapse, and concluded that both surgeries are highly effective and significantly improve the patient's quality of life.

Similarly, in the same year of Dr. Benson's publication, Dr. P.J. Hardiman and Dr. H.P. Drutz reported that in a case series of 130 sacrospinous vaginal vault suspensions and 80 abdominal sacral colpopexies, the failure rate in terms of the recurrent vault prolapse was 2.4% with the vaginal approach and 1.3% with the abdominal approach (*Am. J. Obstet. Gynecol.* 1996;175[3, pt. 1]:612-6).

They concluded that both approaches were associated with a low incidence of complications and recurrent vault prolapse.

Although it was not a randomized trial, the Hardiman-Drutz study is noteworthy and the outcomes are more comparable with real-life experience. I believe that surgeons who are expert at performing both surgeries find them to be equally successful, with the vaginal approach having less morbidity.

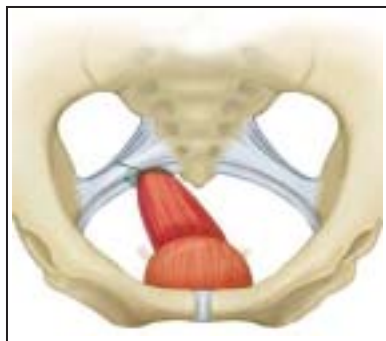
Success, in most cases, has been defined through rates of recurrent apical or anterior vaginal prolapse, and few studies have addressed anatomical outcomes more directly relevant to vaginal function, such as length, axis, and sexual satisfaction.

We are challenged by the lack of universally accepted standards for quantifying such outcomes, but nevertheless, such outcomes should be pursued.

In a study reported in 2001 (with Dr. R. Goldberg as lead author), we found that sexual function was well preserved regardless of the sacrospinous suspension technique, with equally low rates of postoperative dyspareunia in both groups (*Obstet. Gynecol.* 2001;98:199-204). ■



The dissection finger is placed adjacent to the suture site.



The upper vaginal vault is sutured to the sacrospinous ligament.



Vaginal wall suturing is done at the upper portion of the vaginal apex.

IMAGES COURTESY DR. PETER SAND