

Incontinence

A Quarterly Newsletter on Incontinence Diagnosis, Treatment and Care

Laparoscopic Burch or TVT: Choosing between two minimally invasive techniques for stress incontinence

by Peter L. Rosenblatt, MD and Neeraj Kohli, MD

Today, surgeons are faced with a growing number of choices when treating patients with stress urinary incontinence. Over the past several years, there has been a trend towards developing safe, effective, and minimally invasive procedures that allow women to recover more quickly. These qualities might even encourage some women, who were previously reluctant, to undergo surgery for their incontinence.

Laparoscopic Burch procedure

Since the introduction of the laparoscopic bladder suspension in 1991 by Vancaillie,¹ this minimally invasive approach to stress incontinence has become popular with many pelvic surgeons. There are many advantages of the laparoscopic approach to the Burch procedure compared with the traditional

Continued on page 5

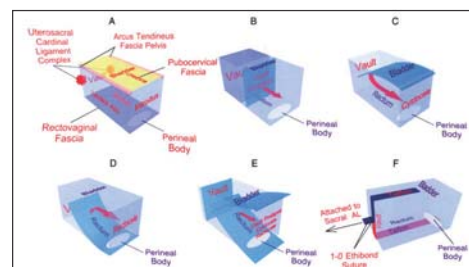
Sacrocolpopexy with anterior and posterior mesh extensions

by Serge Peter Marinkovic, MD and Stuart L. Stanton, FRCS, FRCOG

Hysterectomy has become the extensive operation most commonly performed in North America.

The incidence of post-hysterectomy vaginal vault prolapse is approximately 11.6 percent when performed for prolapse and 1.8 percent for other benign diseases.^{1,2} These facts, coupled with increased life expectancy, imply a considerable increase in the incidence of vault prolapse going into the 21st century.³

Vault prolapse is among the most demanding and technically challenging problems facing the practitioner of female reconstructive surgery. It is imperative for the surgeon to have a comprehensive understanding of the support anatomy of the anterior, middle, and posterior pelvic compartments. Vault prolapse results from the lack of suspensory support from the pelvic sidewalls, the uterosacral cardinal ligament complex (figure 1A). This support can be weakened by childbirth



Figures 1A-1F

neuropathy, direct childbirth trauma, or global pelvic connective tissue remodeling from increased elastase or collagenase activity.⁴

With straining, the weakened support can lead the vault to within 1 cm or less proximal or distal to the plane of the hymen for an International

Continued on page 8

INSIDE

Continued Follow-up Of The Cadaveric Prolapse Repair With Sling (Caps) _____ 2

What are the different requirements for office urodynamics? _____ 4

Continued Follow-up Of The Cadaveric Prolapse Repair With Sling (CAPS)

Gary E. Leach, MD; Kathleen C. Kobashi, MD; and Joanna Chon, MD

The study and treatment of female pelvic-floor dysfunction is undergoing tremendous growth. A myriad of surgical techniques has been introduced, many within the past five years alone, to repair the various components of pelvic prolapse.

Most previous techniques of cystocele repair relied on the patient's own "weak" tissues to close the anterior vaginal wall defect. We recently introduced the CAPS procedure (CAdaveric Prolapse repair with Sling) to provide urethral support. CAPS uses a sling of strong solvent-dehydrated cadaveric fascia lata fixed with transvaginal bone anchors in conjunction with repair of the grade 3–4 cystocele. We have continued to follow our patient outcomes closely to determine the long-term results of the CAPS procedure.

Preoperative evaluation

After a detailed history and physical examination (including pelvic examination with patient supine and standing), urinalysis is obtained and the amount of post-void residual urine is checked. Detailed multi-channel slow-fill water cystometry is performed to obtain the following information: 1) document the presence of genuine stress urinary incontinence with and without prolapse reduction; 2) evaluate bladder function

(ie document any detrusor instability during filling of the bladder), 3) evaluate the mechanism of voiding (e.g. is the patient obstructed?); and 4) evaluate the ability of the patient to empty the bladder.

With the patient in the standing position the bladder is filled with sterile water at 30cc/minute. At each 100 cc of filling, the patient is asked to cough and perform a Valsalva maneuver to document the presence of any genuine stress urinary incontinence and to determine the Valsalva leak-point pressure. This maneuver is repeated with reduction of the prolapse. Prolapse reduction is accomplished with either digital reduction or with the lower half of a Graves speculum. After filling is completed, a pressure/flow study is performed to determine the patient's mechanism of voiding and to exclude any outlet obstruction related to the prolapse. A preoperative renal ultrasound is routinely obtained to exclude the presence of any hydronephrosis related to distal ureteral kinking caused by the large cystocele.

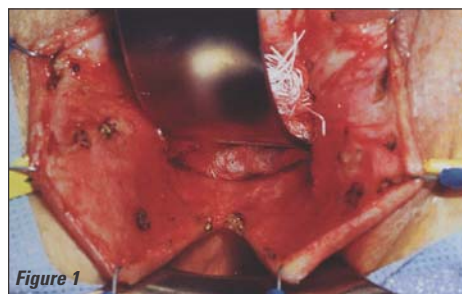


Figure 1

Surgical technique

The CAPS procedure involves the following steps:

- 1) an anterior vaginal wall midline incision;
- 2) dissection of the bladder and urethra off the anterior vaginal wall laterally to the pubic bone and medial aspect of the levator muscles; (figure 1)
- 3) perforation of the deep endopelvic fascia at the level of the bladder neck with entry into the retropubic space;

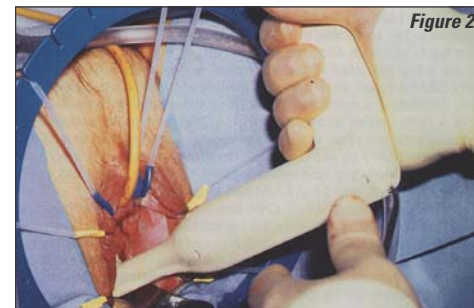


Figure 2

- 4) placement of a transvaginal bone anchor into the underside of the pubic bone at the level of the bladder neck (figure 2);
- 5) placement of 0-panacryl sutures (Ethicon) into the medial aspect of the levator muscles with two sutures on each side to fix the fascial patch used to repair the cystocele;
- 6) use of a 6x8 cm Suspend Tutoplast fascial patch (Mentor Corp.) cut

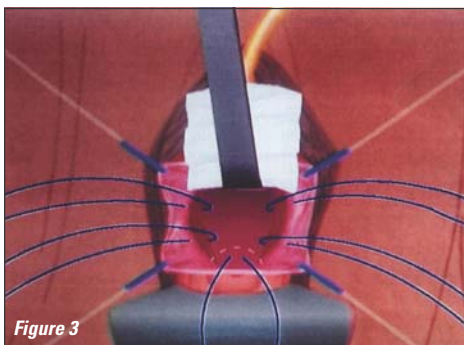


Figure 3

into a T-shaped configuration, with the upper portion of the T being 2 cm wide, for the sling portion of the repair;

- 7) passage of the suture attached to the bone anchors through the end of the sling portion of the fascial patch, tying the sling in place;
- 8) passage of the levator panacryl sutures through the cystocele portion of the patch with reduction of the cystocele after tying these sutures (figure 3);
- 9) minimal trimming and closure of the anterior vaginal wall (figure 4).

Postoperative care

The Foley catheter and vaginal packing are removed the morning after surgery, and post-void residual urine volumes are checked. Approximately 80% of patients empty well immediately. When required, patients perform self-catheterization postoperatively, with resumption of complete bladder

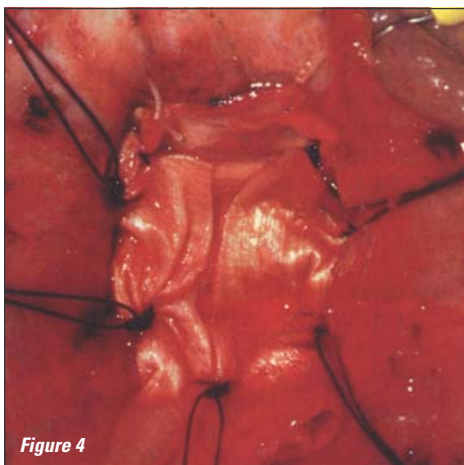


Figure 4

emptying usually in less than one week. Postoperative pain is usually minimal, requiring only mild oral pain medication. Oral antibiotics are continued for one week. Most patients resume normal activities three to four weeks after the CAPS procedure.

Results

Patients are followed closely to obtain accurate long-term outcomes data as it becomes available. The CAPS procedure has been done on 144 women aged 35–90 years (mean 66 years) with a mean follow-up of 13.2 months (range 6–34 months). Of the 144 patients, 107 (74%) have completed follow-up. Patients have been evaluated by physical examination (degree of pelvic prolapse), SEAPI scores, and complications, as well as patient-reported continence, perceived improvement, and satisfaction. Patient improvement and satisfaction were obtained using a validated questionnaire.

Total resolution of cystocele occurred in 95.3% of patients. Five out of 107 patients (4.7%) have had recurrence of a grade-1 cystocele requiring no further treatment. Ten (9.3%) have had recurrent or de novo apical vaginal prolapse. Preoperative and postoperative SEAPI scores were 6.3 and 2.2, respectively ($p < 0.0001$). Six women (7%) have stress incontinence, 18 (16.8%) have de novo urinary urgency, and 12 (11.2%) have persistent urgency. There has been one case of osteitis pubis at the bone anchor site. No patient has experienced osteomyelitis or long-term urinary retention.

With regard to patient's subjective evaluation of postoperative status, 78 (72.8%) reported >80% improvement in their preoperative symptoms, 77

(71.9%) were >80% satisfied, and 82 (76.6%) would recommend the surgery to a friend.

Conclusion

We have been pleased with the CAPS technique with regard to the preliminary results with the prolapse repair. The use of the strong fascia lata patch in conjunction with the transvaginal sling facilitates both prolapse repair and correction of stress incontinence in a combination procedure that avoids dependence on the patient's own weak tissues, maintains vaginal capacity, and thus far provides satisfactory results with few complications.

Suggested Reading

1. Haab F, Trockman B, Zimmern P, Leach G. Results of pubovaginal sling for the treatment of intrinsic sphincteric deficiency determined by questionnaire analysis. *J Urol* 1997;158:1738–1741.
2. Kobashi KC, Mee SL, Leach GE. A new technique for cystocele repair and transvaginal sling: The cadaveric prolapse repair and sling (CaPS). *Urology* 2000;56(Suppl 6A):9–14.
3. Kobashi KC, Leach GE. Pelvic prolapse. *J Urol* 2000;164(6):1879–1890.
4. Kobashi KC, Gormley EA, Govier F, et al. Development of quality of life assessment instrument for patients with pelvic prolapse: a validated instrument. *J Urol* 2000;76:abstract #334.
5. Raz S, Erickson DB. SEAPI QMM incontinence classification system. *Neurourol Urodynam* 1992;11:187–200.
6. Zimmern PE, Leach GE, Ganabathi. The urological aspects of vaginal wall prolapse: Part 1. Diagnosis and surgical indications. *AUA Update Series*, vol XII, Lesson 25;1993:193.

Laborie News

What are the different requirements for office urodynamics?

by Ing Han Goping

When patients with lower urinary tract disorders present to the physician, a vast array of assessment and diagnostic techniques is available to identify or confirm a suspected pathology. These techniques or instruments vary from having the patient answer a questionnaire (covering bladder symptoms, previous surgeries, medical history, age, occupation, etc.) or keep a voiding diary to pad-weight testing, Q-tip testing, and urodynamics (UDS). In the office setting, use of urodynamics as part of the testing regimen is inconsistent as compared with the other instruments. Use of urodynamics in tertiary-care centers is commonplace, but in the office practice, urodynamics is either left to referral centers or performed with less-than-optimal instrumentation.

Continuing improvements

Much has changed over the past 16 years since Laborie introduced the first computerized urodynamics analyzer. In the days before digital technology, physicians were performing “eyeball” urodynamics (using a single-pressure hydrostatic line). Eventually, the need for recording pressure values numerically, including trend information, was met with the use of analog strip-chart devices. Additional advances in simplicity were devised such as the use of CO₂ as a filling medium to minimize patient connections and water in the office. CO₂ is considered a compromising medium and, with the popularity of ALPP (cough/stress tests) measurements, CO₂ is losing favor over standard saline infusion.

Urodynamics became a serious procedure when university centers employed multi-channel parameters to monitor voiding functions. Leaders in fields of incontinence and hydrodynamics worked together to establish standard terminology and to encourage the employment of good urodynamic techniques. Good techniques and advances in consumable materials have

greatly reduced the time it takes to set up a urodynamics test.

Urodynamics continues to be the gold standard for quantitative assessment in voiding dysfunction, and in busy centers it is an integral part of the clinic. However, not all clinics that offer treatment (surgical, pharmacological, behavioral, etc.) include urodynamics. To fill the gap, the office urodynamics system was developed. Urodynamics devices (originally multi-channel equipment for advanced UDS users) were repackaged for the office market.

There was a problem with the early-generation equipment: Its rudimentary nature forced the user to become a serious technician to operate it properly. Office-based analog devices were merely single-channel versions of multi-channel devices, the idea being that the complicated operations of a six-channel device can be made six times easier by using only one channel. The problem was that five-sixths of the information was lost, so simple urodynamics became essentially useless.

Computer technology offered a major improvement in data-collection consistency. Multi-channel recording, synchronizing fluoroscopic bladder images, and displaying multiple arrays of event calculations and nomogram comparisons are but some of the operations made easier to perform using the computer. Even the non-urodynamic procedure—questionnaires—is now available in computer form.

Feasible for everyone

While some have debated the usefulness of office urodynamics, the fact is that many reference centers for incontinence and pelvic-floor problems continue to use (and expand on) this sole objective component of the incontinence assessment process.

It can be shown on a case-by-case basis that urodynamics is a feasible activity for even the smallest clinics. However, clinics that have insufficient patient volume might be forced to acquire lower-cost UDS systems to offset the capital cost within a reasonable time-frame of three to five years. Manufacturers of

computerized systems attempt to satisfy tight budgets by reducing many important features such as accuracy, resolution, flexibility, and software capabilities. Some of these low-cost systems are still analog in nature! Other manufacturers attempt to make investing into urodynamics attractive by simply lowering the price of a high-volume UDS system when such a system is not appropriately designed for the office environment.

In addition to straight data-recording functions, office urodynamics equipment should be capable of data retention and integrated reporting. Unlike users in the large medical universities, office users find data mining (statistical querying) not as important as fulfilling insurance auditing requirements. Personalized report generation can be useful when expedience is necessary as the patient considers potential treatment options at the conclusion of a urodynamic evaluation.

In order to make office urodynamics feasible, equipment must retain the important quality functions of instrumentation with the additional constraint of cost and simplicity. If these requirements could be met, urodynamics would find itself in a better position to serve the office market.



Ing Goping is CEO and chief engineer at Laborie Medical Technologies. He received his formal training in electronic engineering from the University of Waterloo, Waterloo, Ont. Mr. Goping has been actively involved in the field of incontinence and urodynamics for over 14

years and is attributed with having created the first commercial computerized urodynamics system. Much of Mr. Goping's time is now spent in the field with incontinence specialists, researching and developing newer and better technology.

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Laparoscopic Burch or TVT:

— Continued from page 1

procedure performed through a laparotomy. Visualization of the structures in the space of Retzius is clearly superior, allowing accurate placement of suspensory sutures and precise control of hemorrhage. The pneumoperitoneum created during laparoscopy seems to aid not only in expanding the retropubic space but also in keeping the prominent veins in the space collapsed, thereby reducing bleeding, which further improves visualization for the surgeon. Studies have demonstrated other advantages to the laparoscopic Burch, including decreased postoperative pain, shorter hospital stay, and shorter recovery period. Morbidity from wound infection, blood loss, de novo detrusor instability and postoperative voiding dysfunction are also reduced with the laparoscopic method.²

The laparoscopic Burch procedure seems to be an effective treatment for genuine stress incontinence. In a recent multicenter study by Summitt et al,³ women with genuine stress incontinence were randomized to either laparoscopic or open Burch procedure. At 12 months follow-up, the objective cure rates were similar (93% vs. 88%, respectively). While the operating time was considerably longer for the laparoscopic method, the length of stay was significantly shorter (1.4 vs. 2.1 days). There were no differences between the two groups in terms of complications, postoperative fever, time to normal voiding, or postoperative urodynamic parameters.

It is felt that the Burch procedure works by stabilizing the proximal urethra and bladder neck, as evidenced by the usual correction of urethral hypermobility seen following successful surgery. This might also explain the

failure of the procedure to cure many cases of intrinsic sphincter deficiency, a situation where partial obstruction (e.g., suburethral sling or periurethral injection) is usually required for effective treatment. Sand et al⁴ reported a 54% failure rate after Burch colposuspension when the preoperative maximum urethral closure pressure (MUCP) was less than 20 cm H₂O, which is considered to be evidence of intrinsic sphincter deficiency. When the MUCP was greater than 20 cm H₂O, the failure rate was reduced to 18%.

There are, however, several drawbacks with the laparoscopic Burch procedure that have limited its widespread acceptance among surgeons. Compared with traditional surgery, laparoscopic suturing has a long learning curve and is difficult to master. Practicing suturing and knot-tying with pelvic trainers, animals, and fresh cadavers is essential for developing competency and safety in this procedure, and the availability of these training tools is somewhat limited, especially in community hospitals. In addition, the cost of the procedure can be prohibitive. Kohli et al⁵ have shown that total hospital charges associated with the laparoscopic Burch are significantly higher than with the open procedure, and that this difference can be attributed to prolonged operating times. One can assume that, with greater surgical experience, operative times can be reduced and associated costs decreased.

In order to simplify the laparoscopic procedure and reduce the costs associated with longer operating times, some surgeons have used polypropylene mesh strips stapled to both the paraurethral endopelvic fascia and Cooper's ligaments as an alternative to classic suturing techniques. Ou and

Rowbotham⁵ reported their experience with this technique on 40 women with genuine stress incontinence. At a minimum follow-up of five years, 88% of patients were subjectively cured. A recent review of surgical outcomes following laparoscopic Burch procedures reports cure rates ranging from 69–100% on variable follow-up of 3–36 months. Surgical outcomes with laparoscopic modifications including mesh and stapling yielded similar results.⁶

Tension-free vaginal tape procedure

Although there have been scores of innovative minimally invasive procedures for stress incontinence described in the last few years, none has become more widely used than the tension-free vaginal tape (TVT) sling procedure. As of May 1, 2001, approximately 150,000 procedures have been performed worldwide, with 40,000 performed in the United States.⁷

The TVT procedure involves placement of a polypropylene mesh tape transvaginally around the mid-urethra, with the use of special needles to transfer the arms of the tape to the suprapubic area. The procedure is most often performed under local anesthesia and intravenous sedation. Out of 75 patients with primary stress incontinence, Ulmsten et al⁸ reported an 84% cure rate at two years with significant improvement in another 8%. A recent study by Nilsson et al⁹ reported an objective and subjective cure rate of 84.7% with an additional 10.6% improvement rate after a median follow-up of 56 months after the TVT procedure in women with primary stress incontinence.

The mechanism of cure with TVT appears to be different from that of

retropubic urethropexies. Klutke et al¹⁰ observed that of 12 patients who demonstrated evidence of persistent urethral hypermobility following TVT, 11 (92%) were subjectively cured. This implies that stabilization of the bladder neck (as confirmed by the cotton swab test) is not the mechanism of action; the improvement might be due to compression of the mid-urethra against the tape sling during increases in abdominal pressure. Further research investigating the exact mechanism of action is required.

We are fortunate that serious complications are rare with TVT, but there must be a high index of suspicion among surgeons to deal with problems as soon as they arise. The most common complication—bladder perforation during passage of the needles—has been reported to occur in up to 4% of patients and is easily managed with a short course of postoperative bladder drainage.¹¹ Rare complications of the procedure, including vascular injuries to the external iliac vessels and intestinal perforation, have been reported.¹² As with other synthetic slings, vaginal or urethral mesh erosions have been reported but are very rare.

Choosing between procedures

With excellent cure rates for these two minimally invasive procedures, how then does the pelvic surgeon decide which procedure to perform in which patient? The decision will be guided by surgical experience, coexisting pelvic support defects, presence of intrinsic sphincter deficiency, choice of anesthesia, and patient preference.

Surgeons might find the laparoscopic Burch to be associated with a longer learning curve and more variance in operative time due to differences in patient anatomy, technical

difficulties, and surgical assistance. Physician preference will vary with the surgeon's previous experience in laparoscopy and anti-incontinence surgery, including retropubic urethropexies and suburethral slings. It is also important that the surgeon be comfortable with the diagnosis and treatment of complications of each procedure.

Physical exam findings can also play a role in determining which procedure best suits the individual patient. Many women with stress incontinence have a coincident cystocele, not to mention associated types of pelvic relaxation. When paravaginal defects are diagnosed on pelvic exam, one should consider paravaginal repair, which may be performed laparoscopically at the time of the Burch procedure.¹³ True central defects, which many authors feel are less commonly present, may lead the surgeon to perform an anterior repair at the time of a TVT procedure. Similar decisionmaking regarding the type of concurrent vault suspension (e.g., laparoscopic vault suspension versus sacrospinous ligament suspension) may determine the optimal minimally invasive anti-incontinence procedure. The route of approach to coexisting prolapse will depend on surgical experience, clinical outcomes, and the patient's preferences for anesthesia, incision, and hospitalization or recovery.

The presence of intrinsic sphincter deficiency might require a suburethral sling operation. Preoperative urodynamic testing is an important element in the decision-making process for stress incontinence. As mentioned earlier, there is evidence that the urodynamic finding of a MUCP <20 cm H₂O (suggesting intrinsic sphincter

deficiency) is a risk factor for failure of retropubic urethropexy.^{4,14} Some authors have advocated using the Valsalva leak-point pressure (VLPP) to diagnose intrinsic sphincter deficiency, and in many centers this test has replaced urethral-pressure profilometry for the purpose. Caution should be exercised in using VLPP alone to guide therapy, as Hsieh and colleagues have shown that women with low VLPP in the presence of a normal MUCP have an excellent success rate (92%) after retropubic urethropexy.¹⁵

Since the early European studies on TVT involved only patients with primary stress incontinence, it was assumed by many that TVT might not be an effective treatment option for women with recurrent stress incontinence or those diagnosed with intrinsic sphincter deficiency on urodynamic testing. In a recent prospective study by Rezapour et al,¹⁶ 49 women with stress incontinence due to ISD (defined as MUCP <20 cm H₂O) were followed for a mean of four years after TVT. Seventy-four percent of the women were cured, and 12% were significantly improved. Risk factors for failure in the study were age >70 years, very low MUCP (<10 cm H₂O), and the presence of a fixed urethra.

In another study by Rezapour and Ulmsten,¹⁷ 34 women with recurrent stress incontinence (after previous failed anti-incontinence surgery) underwent a standard TVT procedure. Patients with urodynamic evidence of ISD were excluded from this study. After a mean of four years, 82% of the patients were cured and another 9% were significantly improved. Only one bladder perforation occurred and was successfully treated conservatively with two days of bladder drainage.

These two studies suggest that TVT

can be used safely and effectively to treat patients with recurrent incontinence or with urodynamically proven ISD, two conditions for which slings have traditionally been used. These studies' findings are logical given the fact that TVT is essentially a sling procedure. The only difference between TVT and traditional sling procedures is the midurethral placement of the TVT, in contrast to the usual bladder-neck placement.

Type of anesthesia can also determine the choice between laparoscopic Burch and TVT. While the laparoscopic approach requires general anesthesia, the TVT procedure may be performed under local or regional anesthesia in patients who are at increased anesthetic risk due to age or coexisting medical problems, or in those who prefer to avoid general anesthesia.

Some patients might prefer either the laparoscopic or the vaginal approach based on previous experience, type of anesthesia, or associated incisions, pain, and recovery. This can be determined only after comprehensive counseling of each patient regarding risks and individual assessment.

Conclusion

With more attention being directed towards the diagnosis and management of urinary incontinence, physicians will have more options for providing safe and effective treatment to their patients. When a patient desires surgical intervention for her documented stress incontinence, surgeons can now offer several effective, minimally invasive procedures. The choice among procedures should be individualized, based on the medical condition, physical findings, urodynamic parameters, and personal preferences of the woman. In order to offer patients adequate choices,

the pelvic surgeon must feel comfortable with each procedure in terms of technique, skills, and management of complications. Over all, both the laparoscopic Burch and TVT are safe and effective minimally invasive procedures associated with excellent cure rates, minimal complications, and high patient satisfaction.

References

1. Vancaillie TG, Schuessler W. Laparoscopic bladder neck suspension. *J Laparoendosc Surg* 1991;1(3):169-73.
2. Paraiso MFR, Falcone T, Walters MD. Laparoscopic surgery for genuine stress incontinence. *Int Urogynecol J* 1999;10:237-247.
3. Summitt RL, Lucente V, Karram MM, Shull BL, Bent AE. Randomized comparison of laparoscopic and transabdominal Burch urethropexy for the treatment of genuine stress incontinence. *Obstet Gynecol* 2000;95:4(Suppl):2S.
4. Sand PK, Bowen LW, Panganiban R, Ostergard DR. The low pressure urethra as a factor in failed retropubic urethropexy. *Obstet Gynecol* 1987;69:399-402.
5. Kohli N, Jacobs PA, Sze EH, Roat TW, Karram MM. Open compared with laparoscopic approach to Burch colposuspension: a cost analysis. *Obstet Gynecol* 1997;Sept;90(3):411-415.
6. Ou CS, Rowbotham R. Five-year follow-up of laparoscopic bladder neck suspension using synthetic mesh and surgical staples. *J Laparoendosc Adv Surg Tech A* 1999;9(3):249-252.
7. Gynecare statistics, personal communication.
8. Ulmsten U, Henriksson L, Johnson P, et al. An ambulatory surgical procedure under local anesthesia for treatment of female urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct* 1996;7:81-86.
9. Nilsson CG, Kuuva N, Falconer C, Rezapour M, Ulmsten U. Long-term results of the tension-free vaginal tape (TVT) procedure for surgical treatment of female stress urinary incontinence. *Int Urogynecol J* 2001(suppl 2):S5-8.
10. Klutke JJ, Carlin BI, Klutke CG. The tension-free vaginal tape procedure: correction of stress incontinence with minimal alteration in proximal urethral mobility. *Urology* 2000 Apr;55(4):512-4.
11. Kohli N, Miklos JR. Laparoscopic Burch colposuspension: A modern approach. *Contemporary Ob/Gyn* 1997;42(1):36.
12. Peyrat L, Boutin JM, Bruyere F, Haillot O, Fakfak H, Lanson Y. Intestinal perforation as a complication of tension-free vaginal tape procedure for urinary incontinence. *Eur Urol* 2001 Jul;39(5):603-605.
13. Miklos JR, Kohli N. Laparoscopic paravaginal repair plus Burch colposuspension: review and descriptive technique. *Urology* 2000;56(suppl 6A):64-69.
14. Francis LN, Sand PK, Hamrang K, Ostergard DR. A urodynamic appraisal of success and failure after retropubic urethropexy. *J Repro Med* 1987;32(10):693-696.
15. Hsieh GC, Klutke JJ, Kobak WH. Low Valsalva leak-point pressure and success of retropubic urethropexy. *Int Urogynecol J* 2001;12:46-50.
16. Rezapour M, Falconer C, Ulmsten U. Tension-free vaginal tape (TVT) in stress incontinent women with intrinsic sphincter deficiency (ISD): a long-term follow-up. *Int Urogynecol J* 2001(suppl 2):S12-S14.
17. Urology 2000 Apr;55(4):512-4. Rezapour M, Ulmsten U. Tension-free vaginal tape (TVT) in women with recurrent stress urinary incontinence — a long-term follow up. *Int Urogynecol J* 2001(suppl 2):S9-S11.

Sacrocolpopexy with anterior and posterior mesh extensions.

— Continued from page 1

Continence Society Grade 2 Vault prolapse (middle compartment pelvic prolapse; figure 1B).⁵

Vault prolapse is often not an isolated change. Sixty-seven percent of patients have concomitant cystocele (figure 1A), rectocele (figure 1D), or both (figure 1E) component.⁶ The cystocele central defect is primarily a result of weakened pubocervical fascia; a lateral defect results from an injury to the arcus tendineus fascia pelvis. A rectocele may result from diminished rectovaginal fascial support. An enterocele results from both pubocervical and rectovaginal fascial defects.⁷

If all three pelvic compartments are prolapsed, they can be reinforced with synthetic mesh⁸ or autologous⁹ or allogenic fascia¹⁰ (figure 1F). Cundiff and associates¹¹ in 1997 described sacrocolpopexy with a posterior polyester-fiber mesh extension for simultaneous correction of vault prolapse and rectocele or perineal body defect. Their experience led us to evaluate the use of the sacrocolpopexy with anterior and posterior Teflon,¹² Prolene,⁸ or Vipro mesh extensions for the treatment of triple-compartment prolapse.

Mesh extensions

Synthetic materials have been used in a plethora of surgical procedures

including inguinal and incisional herniorrhaphies.^{13,14} Synthetic materials can be segregated into three categories: Type 1, polypropylene (Prolene) macroporous mesh⁸ that allows bacteria and macrophages to infiltrate the mesh, making infection more unlikely. When a mesh infection arises it can be treated

intestinal adhesions. Type 3, polyester fiber (Mersilene) macroporous mesh¹⁶ or knitted polyester (Dacron)¹⁷ with multifilamentous components. One component is microporous or multifilamentous; it admits bacteria but does not allow infiltration of macrophages, which can contribute to a mesh

infection or abscess. Each type of available synthetic material has been utilized in female reconstructive surgery.

With the small risk of mesh infection, an alternative is autologous fascia (rectus fascia or fascia lata)⁹ or allogenic fascia (cadaveric fascia lata).¹⁰ But autologous tissues can undergo increased collagenase or elastase activity, and they can compromise long-term tensile strength secondary to constant pelvic-floor remodeling.⁴ Allogenic fascia has been less extensively studied, but it can be remodeled by collagenase and elastase, and long-term results are still lacking.

Evolution of the sacrocolpopexy

Vault prolapse is a common post-hysterectomy phenomenon that can cause dull vaginal aching, a dragging sensation, and—if the vault becomes

excoriated—vaginal discharge and bleeding. Because pelvic prolapse is a global phenomenon related to child-birth, all pelvic-floor compartments can be affected. With vault prolapse there often is concomitant anterior compartment prolapse (cystourethrocele,

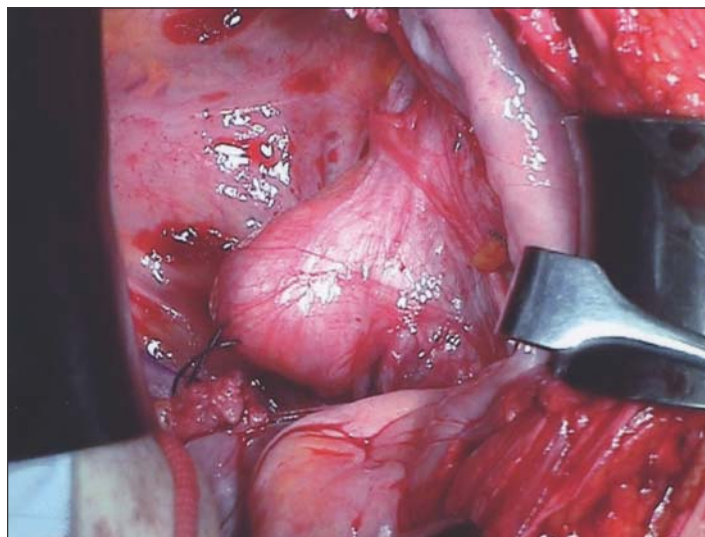


Figure 2. Vaginal vault

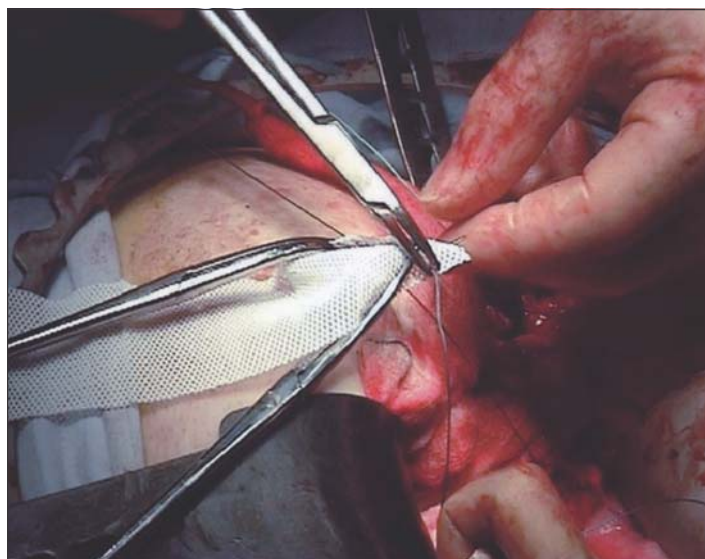


Figure 3. Preparation of posterior mesh extension.

with an extended course of antibiotics and close observation. Type 2, polytetrafluoroethylene (Gore-Tex) microporous mesh,¹⁵ which deters the penetration of macrophages and has the advantage of minimizing fibroplasia and/or angiogenesis, thus reducing

cystocele) and posterior compartment prolapse (rectocele, enterocele, perineal descent). A totality of vision is necessary for the surgical correction of this problem.

Falk in 1961¹⁸ developed the sacrocolpopexy by directly attaching the vault to the sacrum. Later, several different materials were interposed between the vagina and sacrum with various technical modifications. In 1973, Birnbaum¹⁹ used Gore-Tex mesh, attaching it to the sacral promontory and thereby ensuring a normal vaginal axis and maximal vaginal depth. The latter is particularly important for those patients who have undergone prior vaginal shortening procedures and for all patients who want to remain sexually active.

Compared with the three vaginal approaches to vault prolapse (iliococcygeal hitch, uterosacral ligament plication, or sacrospinous fixation), sacrocolpopexy may better preserve maximum vaginal length and sexual function. It is our preferred method of treating triple-compartment prolapse when patients want to preserve sexual function. Use of a synthetic mesh enables the anterior longitudinal ligament to support the vault without undue tension.

In 1993, Addison and Timmons²⁰ published on this technique, following patients for as long as 20 years. They found the sacrocolpopexy to provide the best long-term outcome for vault prolapse. Cundiff and associates¹¹ reviewed their experience with

sacrocolpopexy with perineal descent in 19 patients with a mean follow-up of 11 weeks. Eight of twelve women had complete resolution of their symptoms of incomplete rectal emptying, while no subjects had greater than a recurrent stage-2 prolapse. No patient incurred mesh erosion.

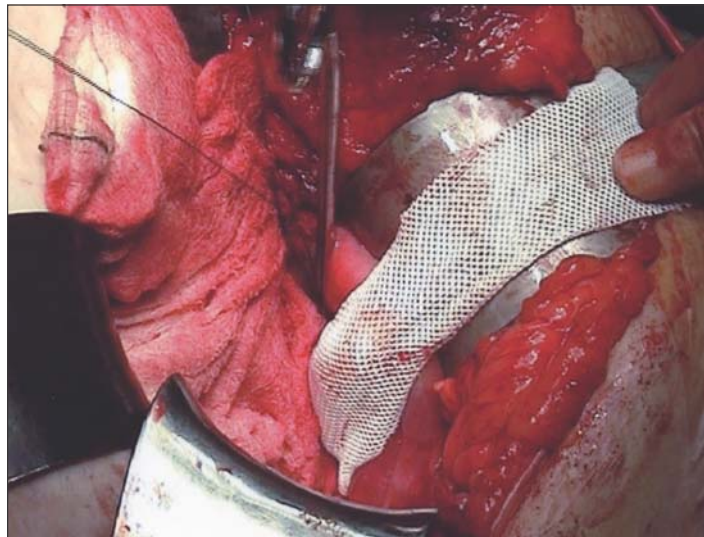


Figure 4. The posterior mesh extension secured to the perineal body and posterior vaginal wall.

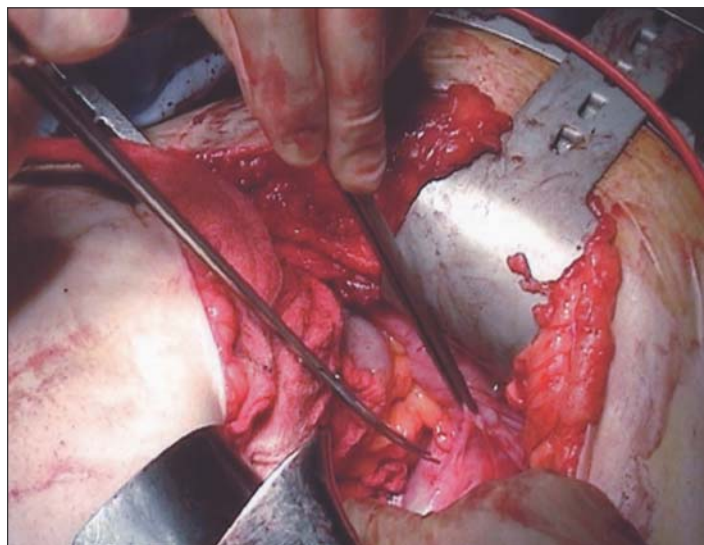


Figure 5. Mobilization of bladder off the anterior vaginal wall.

Our experience

We are the first female reconstructive surgery associates to use both anterior and posterior mesh extensions to treat vault prolapse for concomitant cystocele and rectocele/enterocele. (figures 2-7) In comparison with other studies, our original study group of 20

is larger and has a longer follow-up (minimum of 12 months) and demonstrates equally impressive results. With a median follow-up of 38 months, we had no recurrent vault prolapse and only one instance each of a grade-1 cystocele and rectocele. All patients had a preoperative grade-2 International Conti-

nence Society prolapse (prolapsed organ within 1 cm of the hymen) for each compartment. The median visual analog score (0–10; i.e., poor–excellent) for operative satisfaction was 8 of 10. Eighty percent of our patients who had needed to splint or digitate to empty their bowels had complete resolution of this problem, and the other patient had a 75-percent reduction in the need to digitate. In both studies bowel symptoms resolved in better than 66 percent of the women.

The small number of sexually active patients hindered sexual-function assessment. However, some insight can be appreciated. Three patients with preoperative dyspareunia had complete resolution of this symptom. There were no cases of postoperative dyspareunia. Four patients reported improved vaginal lubrication, and there was no

impairment in the ability to achieve orgasm. It appears that sexual activity is not adversely affected by sacrocolpopexy with anterior and posterior mesh extensions.

In our five-year experience, mesh erosion is a serious complication of sacrocolpopexy with anterior and

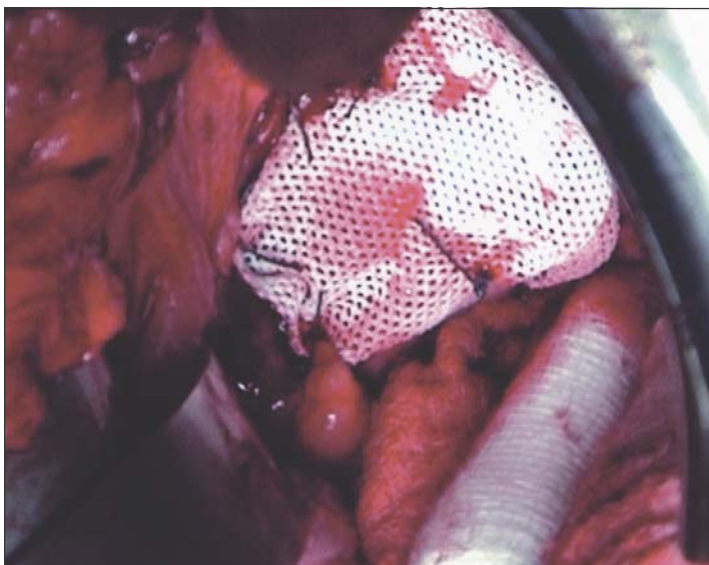


Figure 6. The anterior mesh extension secured to the anterior vaginal wall.

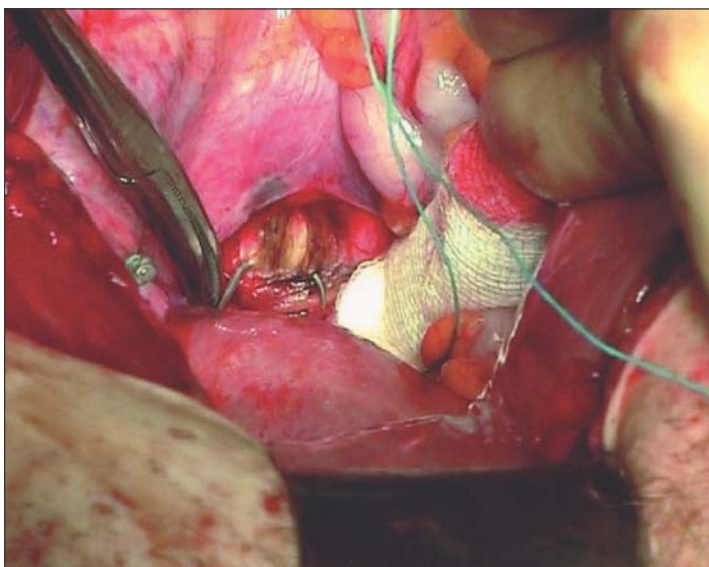


Figure 7. A stitch of 1-0 Ethibond through the sacral anterior longitudinal ligaments.

posterior mesh extensions. We encountered two patients with posterior vaginal wall mesh erosions, with one patient having two episodes. Both patients were among the first five patients to undergo this new procedure and had had multiple prior vaginal surgeries, which can reduce vaginal epithelial blood flow and regenerative capacity. Other than these two patients, we have not had a case of mesh erosion in three years. Despite the problems, these patients were pleased with their

operative results, with visual analog scores of 8/10. occur if the patient has had multiple vaginal surgeries.

operative results, with visual analog scores of 8/10.

Sacrocolpopexy with anterior and posterior mesh extensions provides excellent resolution of high-grade triple-compartment prolapse and bowel symptoms with a high standard of patient satisfaction. De novo urgency or stress incontinence are not common complaints, and patients with preoperative urgency rarely have this symptom exacerbated. Sexual function is not adversely affected. However, mesh erosion into the posterior vaginal wall can

References

1. Marchionni M, Bracco GL, Checucci V et al. True incidence of vaginal vault prolapse. Thirteen year experience. *J Reprod Med* 1999;44:679.
2. Barrington JW, Edwards G. Posthysterectomy vault prolapse. *Int Urogynecol J Pelvic Floor Dysfunct* 2000;11:241.
3. Maher CF, Murray CJ, Carey MP et al. Iliococcygeus or sacrospinous fixation for vaginal vault prolapse. *Obstet Gynecol* 2001;98:40.
4. Mathrubutham M, Maytal A, Rao SK, et al. Elastolytic and collagenolytic activity is elevated in conditioned media from the skin and endopelvic fascia explants of women with pelvic floor weakening. *J Urol* 2000;163:95.
5. Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. *Am J Obstet Gynecol* 1996;175:10-17.
6. DeLancey JL. Anatomic aspects of vaginal eversion after hysterectomy. *Am J Obstet Gynecol* 1992;166:1717.
7. Barber MD, Visco AG, Weidner AC, et al. Bilateral uterosacral ligament vaginal vault suspension with site-specific endopelvic fascia defect repair for treatment of pelvic organ prolapse. *Am J Obstet Gynecol* 2000;183:1402.
8. Diana M, Zoppe C, Mastrangeli B. Treatment of vaginal vault prolapse with abdominal sacral colpopexy using Prolene mesh. *Am J Surg* 2000;179:126.
9. Fitzgerald MP, Mollenhauer J, Brubaker L. The fate of rectus fascia suburethral slings. *Am J Obstet Gynecol* 2000;183:964.
10. Groutz A, Chaikin DC, Theusen E, Blaivas JG. Use of cadaveric solvent dehydrated fascia lata for cystocele repair preliminary results. *Urology* 2000;58: 179.
11. Cundiff GW, Harris R, Coates K, et al. Abdominal sacral colpoperineopexy: a new approach for correction of posterior compartment defects and perineal descent associated with vaginal vault prolapse. *Am J Obstet Gynecol* 1997;177:1345.
12. Fox SD, Stanton SL. Vault prolapse and rectocele: assessment of repair using sacrocolpopexy with mesh interposition. *Brit J Gynecol* 2000;107:1371.

Continued on page 11

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13. Luijendijk RW, Hop WC, van den Tol MP, et al. A comparison of suture repair with mesh repair for incisional hernia. *N Engl J Med* 2000;343:392.
14. Amid PK. Intraperitoneal polypropylene mesh repair of incisional hernia is not associated with enterocutaneous fistula. *Brit J Surg* 2000;87:1436.
15. Baessler K, Schuessler B. Abdominal sacrocolpopexy and anatomy and function of the posterior compartment. *Obstet Gynecol* 2001;97:678.
16. Brieger GM, Korda AR, Houghton CR. Abdominoperineal repair of pulsion enterocele. *J Obstet Gynaecol Res* 1996;22:151.
17. Kapoor R, Dubey D, Kumar A, Zaman W. Modified bulbar urethral sling procedure for the treatment of male sphincteric incontinence. *J Endourol* 2001;15:545.
18. Falk HC. Uterine prolapse and prolapse of the vaginal vault treated by sacropexy. *Obstet Gynecol* 1961;18:113.
19. Birnbaum SJ. Rational therapy for the prolapsed vagina. *Am J Obstet Gynecol* 1973;115:411.
20. Addison WA, Timmons MC. Abdominal approach to vaginal eversion. *Clin Obstet Gynecol* 1993;36:995.

Suggested Reading on Incontinence

- Nitti, Victor MD
Practical Urodynamics
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