

Vaginal Approach to Postsurgical Bladder Outlet Obstruction

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Bladder outlet obstruction resulting in voiding dysfunction following anti-incontinence procedures can be a disappointing outcome for both patient and surgeon. When stress incontinence is replaced by lower urinary tract symptoms (LUTS) such as frequency, urgency or urge incontinence, difficulty voiding, or urinary retention, the patient may have more severe complaints than at initial presentation. It is a challenging task for the clinician to decide what if any action to take and when to take it and by what approach. Several considerations are the type of anti-incontinence procedure, postoperative physical findings, the patient's degree of bother, and any addition testing that may be performed. Recent work has focused on clarifying the etiology and incidence of this condition, as well as providing new definitions on bladder-outlet obstruction in women. In addition, effective, less invasive ways

of treating this condition have been described. The prevailing doctrine is not to make a bad situation worse and to find the simplest solution that produces the least anxiety for the patient. The vaginal approach to sling incision and urethrolisis is appealing for this reason. This chapter discusses the incidence and etiology of postsurgical obstruction, the diagnostic evaluation, and the current management and treatment for this condition, with specific emphasis on the vaginal approach.

Incidence

The true incidence of obstruction after incontinence surgery is not known. Older studies estimated it to occur in between 2.5% and 24% of patients (1–6). Obstruction may go undiagnosed if it is not severe enough to cause significant urinary retention. For example, an obstructed patient may experience detrusor overactivity with relatively normal emptying. Also, some patients seek second opinions regarding less-than-optimal surgical outcomes, and therefore most series on obstruction after incontinence surgery do not contain the critical denominator of the total number of patients undergoing surgery from which the obstructed patients were derived. In 1997 a meta-analysis of surgical procedures for the treatment of stress incontinence, undertaken by the American Urological Association Stress Urinary Incontinence Clinical Guideline Panel, showed that the reported incidence of urinary retention for more than 4

weeks postoperatively was 5% for retropubic and transvaginal suspensions and 8% for sling procedures (no statistical difference) (6). There were no accurate data available for a determination of the risk of permanent urinary retention, but the panel's opinion was that it "generally does not exceed 5%." Although recent changes in our understanding of how stress incontinence operations work (i.e., by support rather than tension) and the introduction of new techniques, like the tension-free vaginal tape (TVT) and similar TVT-like procedures, have undoubtedly reduced the incidence of postoperative obstruction, it still remains a problem nevertheless. Two large contemporary pubovaginal sling series found the need for surgical intervention for obstruction in 1% to 3% of patients (7,8). More recently the TVT procedure has been shown to have similar rates of postoperative intervention for obstruction, 1.7% to 4.5% (9–12).

Dunn et al (13) recently performed an extensive literature review to determine the incidence of "voiding dysfunction" after incontinence procedures. They searched the Medline database from 1966 to 2001 for various procedures. All available studies were retrospective collections, case reports, or case cohort series. Rates of voiding dysfunction varied from 4% to 22% following Burch colposuspension, 5% to 20% following Marshall-Marchetti-Krantz urethropexy, 4% to 10% following pubovaginal sling, 5% to 7% after needle suspension, and 2% to 4% following TVT. Although it cannot be said that all patients with voiding dysfunction in these series were obstructed, it can be inferred that a number were.

Etiology

Surgical procedures for the correction of stress urinary incontinence are designed to restore support to the urethrovesical junction or improve coaptation of the urethra in cases of intrinsic sphincter dysfunction. This can be accomplished in a variety of ways that include cystourethropexy and colposuspension and sling procedures. Although most believe that support rather than "obstruction" is the basis of incontinence procedures, some have proposed that surgery works, at least in part, by creating an obstruction, or relative obstruction, which is necessary for a successful outcome (14). Others have disputed this concept, reporting no change

in postoperative urodynamic parameters in successful slings at 3 to 6 months after surgery (15). Clinical obstruction after incontinence surgery is typically a result of technical factors usually related to excessive tension on sutures or the sling. Less commonly, improper placement of the same can cause obstruction. Clearly, the most important aspect in preventing urethral obstruction is to avoid placing tension on the suspension, whether it is done with sutures (i.e., colposuspension) or a sling. Excess tension can cause an obvious overcorrection or "hypersuspension" of the bladder neck or urethra. However, in most cases of obstruction, hypersuspension is not evident on physical exam. Periurethral scarring secondary to the surgical procedure itself can also result in obstruction, which may have somewhat delayed presentation.

The concept of placing the sling at the bladder neck has been challenged by the overwhelming popularity and success of the TVT placed at the midurethra. Although no tension is placed, TVT can still cause obstruction in 2% of patients. A more recent variation on the midurethral sling using a transobturator approach has shown similar obstructive symptoms as TVT at 1 year. Five of 32 patients followed for at least 1 year had voiding disorders suggestive of obstruction, and subsequently required surgical intervention for obstruction (16).

Additional factors that may affect a patient's ability to empty after anti-incontinence surgery include preoperative voiding dysfunction and a cystocele or other prolapse that was either uncorrected at the time of surgery or occurred postoperatively. Prolapse of sufficient size may kink the urethra. Impaired detrusor contractility, a condition that is present preoperatively, may contribute to a relative obstruction when urethral resistance is increased by an anti-incontinence procedure. Finally, preexisting or learned voiding dysfunction can affect emptying after surgery. The patient who habitually voids by abdominal straining may have difficulty emptying after incontinence surgery because of increased urethral resistance. Dysfunctional voiding or incomplete relaxation of the external urinary sphincter can also occur postoperatively, although it is rare.

Diagnostic Evaluation

Transient voiding dysfunction and urinary retention are frequent and expected after many

types of anti-incontinence surgery. This is the rationale behind concomitant placement of suprapubic tubes or teaching clean intermittent catheterization preoperatively. Tension-free vaginal tape and transobturator slings are an exception to this, as retention and obstruction should not persist beyond a few days. After traditional pubovaginal sling (and variants) or colposuspension, most women begin voiding sufficiently on their own within a few days to weeks, while others may take longer to resume normal voiding. Storage symptoms such as urgency, frequency, and urge incontinence are often more refractory than retention because they can be related to bladder changes. Sometimes such symptoms can take months to resolve. It has been common practice to delay evaluation of the patient with urinary retention or severe storage symptoms after pubovaginal sling, colposuspension, and needle suspension for approximately 3 months postoperatively. Although this time frame is arbitrary, most data found in the literature is based on a waiting period of at least 3 months to ensure adequate time for obstruction/retention to resolve and to minimize the risk of recurrent stress incontinence. After 3 months, there is a very low probability that any persistent retention will resolve without intervention. Recently, some surgeons, including ourselves, have advocated earlier intervention in cases of complete retention; however, less data on outcomes and recurrence of stress incontinence are available. Few studies have focused on outcomes with respect to waiting a longer period of time before intervention. Although it seems intuitive that longer standing symptoms (especially detrusor overactivity) will be less likely to respond to relief of obstruction the longer the patient is obstructed, this has not been proven conclusively. Leng et al (17) recently conducted a retrospective review of 15 women who underwent urethrolisis and found that patients with persistent postoperative symptoms ($n = 8$) had a significantly longer time from surgery to intervention than those who had no symptoms ($n = 7$). The mean time to urethrolisis was 31.25 ± 21.94 months versus 9 ± 10.1 months, respectively. The large overlap, small sample size, and the fact that more patients in the successful group had urinary retention (5/7 vs. 3/8) make it difficult to draw definitive conclusions. We have not excluded obstructed patients from intervention based on duration of obstruction.

The waiting period advocated for obstruction and retention for more traditional anti-incontinence procedures has been largely abandoned for TVT and TVT-like procedures. In these cases, quicker intervention is suggested when obstruction is suspected (9–12). Owing to the immobility of the polypropylene mesh and the tremendous ingrowth of fibroblastic tissue at 1 to 2 weeks, patients with severe symptoms or urinary retention are less likely to improve after this time period.

History and Physical Exam

The diagnostic evaluation of the patient with voiding dysfunction after incontinence surgery begins with a focused history and physical examination. Key points in the history are the patient's preoperative voiding status and symptoms and the temporal relationship of the lower urinary tract symptoms to the surgery. The type of procedure performed and the number and type of other procedures done are also important. Urodynamic data such as uroflow and pressure flow studies from before incontinence surgery are useful if available. If patients are straining to void (perhaps by habit), they should be instructed to stop this behavior, as incontinence procedures are designed to prevent the flow of urine with abdominal straining. Finally, it is important to determine if the symptom of stress incontinence persists.

The most obvious presenting symptom of obstruction after incontinence surgery is the inability to void or intermittent retention. Patients may also experience voiding (obstructive) symptoms including slow or interrupted stream and straining to void. Storage (irritative) symptoms of urinary frequency, urgency, and urge incontinence, which persist after surgery, may also be a sign of obstruction even if emptying is complete. Carr and Webster (18) reviewed the presenting symptoms of 51 women undergoing urethrolisis for voiding dysfunction and obstruction following incontinence surgery and found storage symptoms in 75%, obstructive symptoms in 61%, de novo urge incontinence in 55%, need for periodic intermittent catheterization in 40%, persistent retention in 24%, recurrent urinary tract infections in 8%, and painful voiding in 8%. Obviously storage and voiding symptoms and retention can coexist in any combination.

Physical exam may show overcorrection or hypersuspension where the urethra and urethral meatus appear to be pulled up toward the pubic bone and “fixed.” The angle of the urethra becomes more vertical than is normal. When severe, this is usually quite obvious, but can be confirmed by a Q-tip test. However, not all obstructed patients appear to be overcorrected. It is important to assess for cystocele and other forms of prolapse that may cause obstruction (owing to a kinking of the urethra). The patient should also be examined for persistent urethral hypermobility and stress incontinence.

Urodynamics

Recent interest in female bladder outlet obstruction (BOO) has resulted in the publication of several unique proposals of urodynamic criteria for the diagnosis of female BOO. Chassagne et al (19) used the cutoff values of detrusor pressure at maximum flow rate ($P_{\text{det}} Q_{\text{max}}$) of more than 20 cmH₂O and maximum flow rate (Q_{max}) of less than 15 mL/s to define obstruction. In 2000, Lemack and Zimmern (20) revised these values to a cutoff of Q_{max} of 11 mL/s or less and $P_{\text{det}} Q_{\text{max}}$ of 21 cmH₂O or more. Nitti et al (21) used video-urodynamic criteria, with less emphasis on pressure-flow dynamics, to diagnose BOO. In this study, obstruction was defined as radiographic evidence of an obstruction between the bladder neck and distal urethra in the presence of a sustained detrusor contraction of any magnitude during voiding. Blaivas and Groutz (22), realizing the possibility of test-induced catheter obstruction, designed a nomogram based on the maximum noninvasive flow rate (free Q_{max}) and the maximum detrusor pressure during voiding (P_{detmax}). Although each urodynamic definition for obstruction has merit, further investigation should provide a better understanding of when to use which criteria.

The diagnosis of obstruction in women after incontinence surgery can be particularly difficult to make urodynamically. In cases of urinary retention and incomplete emptying, urodynamic studies may not be necessary before intervention, particularly if preoperative contractility and emptying are known to be normal. However, in cases of de novo or worsened storage symptoms, including urge incontinence without a

significantly elevated postvoiding residual (PVR), a formal urodynamic evaluation is preferred. Classic high-pressure, low-flow voiding dynamics (or obstruction by any of the above criteria) confirm the diagnosis of obstruction, but their absence do not always rule out obstruction. Many women with suspected obstruction after incontinence surgery do not generate a significant contraction on urodynamic studies but are obstructed nevertheless. Outcomes of surgical intervention in such cases are identical to those in women with classic high-pressure low flow dynamics.

There appear to be no consistent preoperative parameters, urodynamic or otherwise, that predict success or failure of urethrolisis. For example, Foster and McGuire (23) found that patients with detrusor instability had a higher rate of failure, but a later study as well as others found this not to be the case. Nitti and Raz (24) found that as the PVR increased, so did the rate of failure, but others have not confirmed this correlation. Carr and Webster (18) found that the only parameter predictive of success was no prior urethrolisis. It is well established that urodynamics may fail to diagnose obstruction in a significant number of women obstructed from anti-incontinence procedures. Additionally, patients with nondiagnostic urodynamic studies or who failed to produce a detrusor contraction have the same outcomes as those with urodynamic findings classic for obstruction, namely high-pressure, low-flow voiding. In the study by Nitti and Raz, four women who failed to generate a contraction during urodynamic testing had a successful urethrolisis. They also reported that the urodynamic findings in patients considered failures after transvaginal urethrolisis failed to elucidate the reason for their continued voiding dysfunction. Owing to the limitations of urodynamics in these patients, the temporal relationship of the surgery to the onset of voiding and storage symptoms is relied upon as an indicator of obstruction. Likewise, if the patient fails to resume preoperative voiding or improve significantly, then continued obstruction is suspected.

Classic high-pressure, low-flow voiding dynamics do confirm the diagnosis of obstruction, but are far from a consistent finding. Urodynamics can also yield important information regarding instability, impaired compliance, bladder capacity, and voiding

characteristics. Based on our experience, video-urodynamics offers an advantage over simple urodynamics in this patient population, because of the ability to simultaneously image the bladder outlet.

The utility of urodynamics may be considered as follows:

1. For the patient in retention, urodynamics can provide valuable information (e.g., detrusor overactivity or significantly impaired compliance, the latter being an absolute indication for intervention) and can confirm a diagnosis of obstruction but should not exclude the patient from urethrolisis, even if there is no contraction or impaired contractility. Urodynamics may also identify learned voiding dysfunction.
2. For the patient with storage symptoms with normal emptying, urodynamics can diagnose obstruction and, equally as important, rule out obstruction. It can help to provide a specific diagnosis that is useful in directing therapy, especially if obstruction can be ruled out.

Endoscopy and Imaging

Endoscopic evaluation of the urethra may show scarring, narrowing, occlusion, kinking, or deviation of the urethra. These findings are especially helpful in cases where urodynamics are equivocal. The urethra and bladder should be carefully inspected for eroded sutures or sling material and the presence of a fistula. This is facilitated by the use of a rigid scope with a 0- to 30-degree lens and little or no beak to allow for complete distention of the urethra. In cases where intervention is anticipated, endoscopy should be done routinely, either before surgery or at the time of surgery prior to incision. Radiographic imaging may be done independent of video-urodynamics. A standing cystogram in the anterior-posterior, oblique, and lateral positions, with and without straining, assesses the degree of bladder and urethral prolapse and displacement or distortion of the bladder. A voiding cystourethrogram can assess the bladder, bladder neck, and urethra during voiding to determine the presence of narrowing, kinking, or deviation. While not mandatory, imaging can be extremely useful in equivocal cases.

Management of Iatrogenic Obstruction

Conservative Treatment

Treatment of obstruction and its timing are usually dictated by the degree of bother of symptoms. In some cases an obstructed patient opts for conservative management including clean intermittent catheterization (CIC) if necessary. In the woman who is not very bothered by catheterization and prefers this option to repeat surgery and a risk of recurrent stress urinary incontinence, CIC is a reasonable treatment plan. Most women ultimately choose definitive treatment; however, chronic CIC is an option in select cases. Patients who are emptying well but have significant storage symptoms secondary to iatrogenic obstruction may be treated initially with pharmacotherapy (anticholinergics) or pelvic floor physiotherapy. In our experience these measures are not all that successful when obstruction exists, but can be considered before surgery. The role for urethral dilation in cases of iatrogenic obstruction secondary to pubovaginal sling and colposuspension is not clear. Although many practitioners report anecdotal success, no peer reviewed literature exists. It is our opinion that urethral dilatation is of limited utility in these cases. Karram et al (11) did report an 82% cure or improved rate with urethral dilatation for with varying amounts of voiding dysfunction in 28 women after TVT. The cutting of suspension or sling sutures above the rectus has been described anecdotally with variable success.

When conservative measures in a symptomatic patient fail, definitive surgical therapy by either formal urethrolisis or sling incision may be required. The two most common transvaginal procedures for obstruction are transvaginal urethrolisis, which can be done for any incontinence procedure, and sling incision, which can be done for any type of sling procedure. In addition, there is limited experience with manipulation of TVT and TVT-like slings.

Transvaginal Urethrolisis

Urethrolisis may be accomplished through a retropubic or a transvaginal approach. Both methods have shown equivalent success rates

and rates of recurrent stress urinary incontinence, although most of these series include patients who are obstructed from a number of different anti-incontinence surgeries. The type of urethrolisis chosen depends on several factors including patient presentation, type of incontinence procedure performed, failed prior urethrolisis, and surgeon preference. It has been our practice to perform transvaginal urethrolisis as a primary operation, and a retropubic urethrolisis as a secondary operation, for example after failed transvaginal urethrolisis. We prefer the transvaginal technique because of its ease and the reduced morbidity and recovery time afforded by avoiding an abdominal procedure. However, there are times when a retropubic approach may be the best primary procedure, for example, when vaginal anatomy precludes a transvaginal approach; in cases where original incontinence surgery was associated with bladder perforation, fistula, or other operative complication; when there is a synthetic sling that must be removed; or in cases where the patient wishes to avoid a vaginal incision.

All urethrolisis procedures begin with a thorough endoscopic examination of the urethra, bladder neck, and bladder. Urethroscopy may show scarring, narrowing, occlusion, kinking, or

deviation of the urethra. Eroded sutures or sling material or evidence of a fistula should be excluded. A rigid scope with a 0- to 30-degree lens and little or no beak to allow for complete distention of the urethra is ideal for female urethroscopy. Also it is common to find that the urethra or urethrovessical function is fixed and there is lack of mobility when moving the cystoscope up and down. After urethrolisis, mobility should be restored.

The most commonly used transvaginal technique was originally described by Leach and Raz (25). A midline or inverted-U incision approximately 3 cm long is made in the anterior vaginal wall. A midline incision should extend from the midurethra to 1 to 2 cm proximal to the bladder neck. In the case of an inverted U, the apex should be located halfway between the bladder neck and urethral meatus, and the lateral wing should extend proximal to the bladder neck. With either incision, lateral dissection is performed along the glistening surface of the periurethral fascia to the pubic bone. The retropubic space is entered sharply by perforating the attachment of the endopelvic fascia to the obturator fascia (Figure 16.1A). The urethra is dissected bluntly and sharply off of the undersurface of the pubic bone and completely freed proximally to the bladder

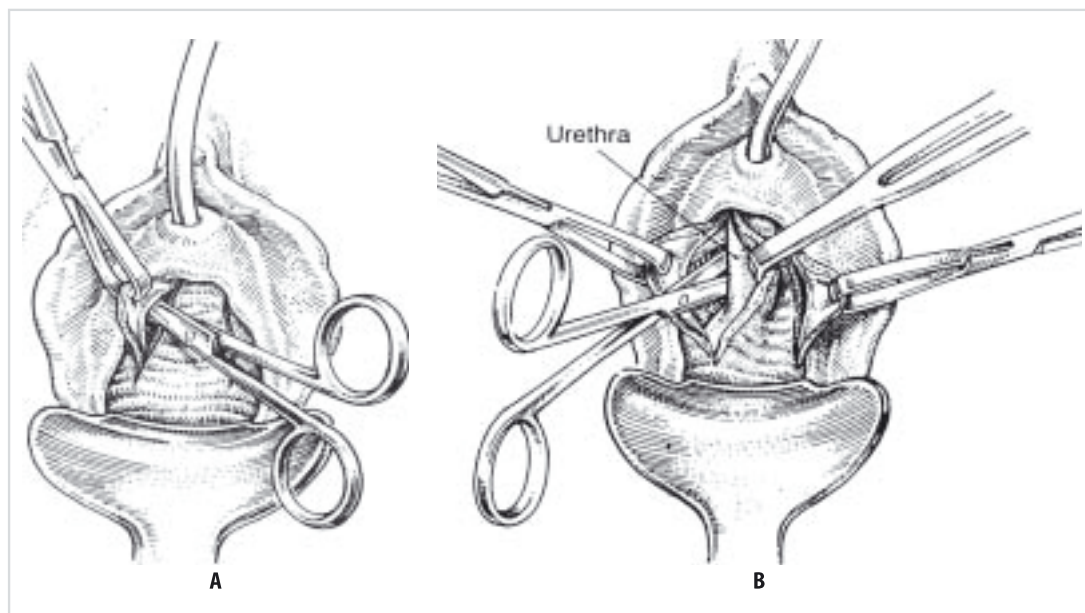


Figure 16.1. A: Transvaginal urethrolisis. An inverted-U incision in the anterior vaginal wall and entrance into the retropubic space. B: Transvaginal urethrolisis. The urethra is sharply dissected off of the undersurface

of the pubic bone. The endopelvic fascia, periurethral fascia, and vaginal wall are retracted medially to expose the urethra in the retropubic space. (From Nitti and Raz [24]. © 2002, with permission from Elsevier.)

neck. Sharp dissection is usually required here (Figure 16.1B). The urethra should be completely freed proximally to the bladder neck so that the index finger can be placed between the urethra and the symphysis pubis (Figure 16.2). If previously placed sutures are identified, they should be cut; however, if none is identified, it is important to make sure that full urethral mobility is achieved.

Some authors routinely use a Martius labial fat pad graft with all transvaginal urethrolisis (26), whereas most reserve it for select cases (e.g., repeat urethrolisis, extensive fibrosis). Arguments in favor of the routine use of a Martius flap include (1) decreased risk of recurrent fibrosis, (2) decrease risk of urethral injury should future pubovaginal sling be required, and (3) the fact that it may provide some degree of urethral support (26). Arguments against routine use are increased morbidity and operative time, and the fact that series that use a Martius flap routinely do not show significantly better outcomes or lower stress urinary incontinence (SUI) rates than those that don't. We reserve the Martius flap for special circumstances.

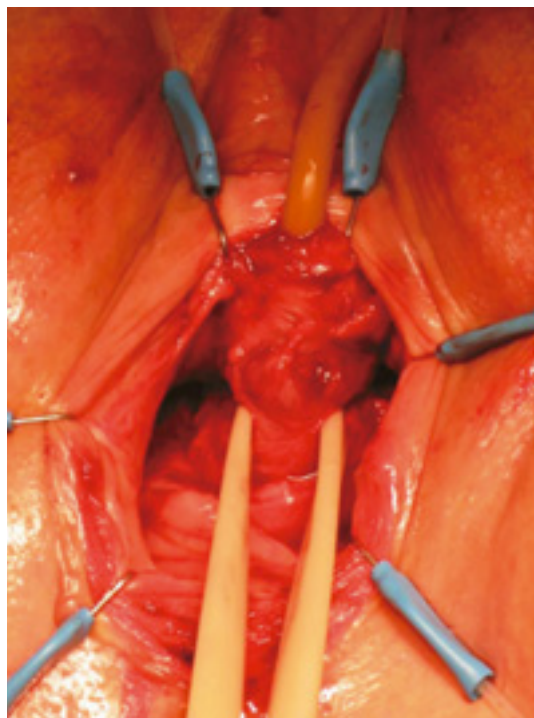


Figure 16.2. Intraoperative photo after completed urethrolisis. A Penrose drain has been placed around the urethra, isolating it from the pubic bone.

In select cases (e.g., extensive mobilization or stress incontinence coexisting with obstruction) it may be desirable to resuspend the urethra at the time of urethrolisis. Resuspension or pubovaginal sling may be done. Currently our practice is to consider a resuspension or sling only if the patient has stress incontinence prior to urethrolisis or if support structures are severely compromised during urethrolisis. Resuspension does increase the risk of persistent obstruction, and since most patients are distraught about obstruction, we feel it is best to take care of that problem and deal with recurrent SUI at a later time should it occur. Rates of recurrent SUI after resuspension vary between 0% and 19% when resuspension is not performed (18,23,26–28). Many of these patients may be salvaged with transurethral collagen injections should stress incontinence recur. Goldman et al (27) reported a 66% response rate to collagen in women with recurrent stress incontinence after transvaginal urethrolisis. In addition, the option for repeat surgery for SUI at a later date exists. It is important to discuss with patients preoperatively the pros and cons of resuspension and the treatment of recurrent stress incontinence, as this could effect the decision to resuspend or not.

Success rates for transvaginal urethrolisis vary from 65% to 93% (Table 16.1). Most of these series include patients who are obstructed from a number of different anti-incontinence surgeries.

Suprameatal Urethrolisis

An alternative transvaginal approach to urethrolisis, via a suprameatal approach, has been described by Petrou et al (29). An inverted-U incision is made around the top of urethral meatus (approximately 1 cm away) between the 3 and 9 o'clock positions. Using sharp dissection, a plane is developed above the urethra. Then, with a combination of sharp and blunt dissection, the urethra, vesical neck, and bladder are freed from the pubic and pelvic attachments anteriorly and laterally. The index finger may then be passed into the retropubic space, and with a sweeping motion from medial to lateral, further freeing may be performed. If obstruction is caused by a pubovaginal sling, the lateral wings of the sling may be cut. Likewise, if the obstruction is caused by suspension sutures, these may be cut. As with transvaginal

Table 16.1. Summary of series on urethrolisis and sling incision/loosening for the treatment of obstruction after incontinence surgery

Reference	No.	Type of urethrolisis	Success ^a	Recurrent SUI ^b
Zimmern et al (36)	13	Transvaginal	92%	N/A
Foster and McGuire (23)	48	Transvaginal	65%	0
Nitti and Raz (24)	42	Transvaginal	71%	0
Cross et al (28)	39	Transvaginal	72%	3%
Goldman et al (27)	32	Transvaginal	84%	19%
Carey et al (26)	23	Transvaginal with Martius flap	87%	16%
Petrou et al (29)	32	Suprameatal	67%	3%
Webster and Kreder (37)	15	Retropubic	93%	13%
Petrou and Young (38)	12	Retropubic	83%	25%
Carr and Webster (11)	54	Mixed	78%	14%
Amundsen et al (32)	32	Transvaginal and sling incision	94%—retention 67%—urge sx	9%
Nitti et al (33)	19	Sling incision	84%	17%
Goldman (34)	14	Sling incision	93%	21%
Klutke et al (9)	17	TVT incision or loosening	100%	6%
Rardin et al (10)	23	TVT incision	100%—retention 30%—urge sx cured 70%—urge sx improved	39% (2/3 less SUI than pre-TVT)

SUI, stress urinary incontinence; sx, symptoms; TVT, tension-free vaginal tape.

^aSuccess is usually defined as cure or significant improvement in presenting symptoms (resumption of normal bladder emptying for patients in retention, and resolution of symptoms for patients with obstructive symptoms or frequency, urgency, or urge incontinence). In some series success for specific symptoms is noted.

^bRecurrent SUI is defined as percentage of patients without SUI before urethrolisis who experienced SUI after urethrolisis.

urethrolisis, a Martius flap may be placed. Petrou et al reported a 65% success rate for retention and a 67% success for urgency symptoms, with a 3% recurrent stress incontinence rate. This approach may be beneficial if dissection between the urethra and pubic bone is excessively difficult. It may be particularly applicable for cases of repeat transvaginal urethrolisis (after a failed prior urethrolisis) or when scarring is particularly dense.

Transvaginal Sling Incision

When obstruction results from a sling procedure (whether autologous, allograft, xenograft, or synthetic) transvaginal sling incision may be performed. This procedure is simpler and less morbid than formal transvaginal urethrolisis and has similar results. The technique of midline sling incision was originally described by Ghoneim and Elgmasy (30) using a free vaginal interposition graft and later modified as a simple midline incision without interposition (31–33).

Our technique starts with an inverted-U or midline incision to expose the area of the bladder neck and proximal urethra (33). As the

vaginal flap is dissected off, the sling should be identified above the periurethral fascia. The sling may be encased in scar tissue and thus require careful dissection of the scar to identify the sling. If the sling has significant tension on it, it may be especially difficult to identify. Insertion of a cystoscope or sound into the urethra, with upward retraction, may help to exposing the bladder neck to better isolate the sling. Once the sling is isolated, it should be separated from the underlying periurethral fascia with sharp or blunt dissection. The dissection may be facilitated by grasping the sling with an Allis clamp on either side of the midline and exerting downward pressure. Care should be taken to avoid injury to the bladder and urethra by beginning the dissection distally, identifying normal urethra, and then proceeding more proximally until the plane between the sling and urethra is identified. A right-angle clamp can be placed between the urethra and periurethral fascia and the sling, lifting the sling. The sling is then cut in the midline (Figure 16.3A). Alternatively, if scarring is dense and the plane between the sling and periurethral fascia cannot easily developed, the sling can be isolated lateral to the midline, off of the urethra. The edges of the sling are mobi-

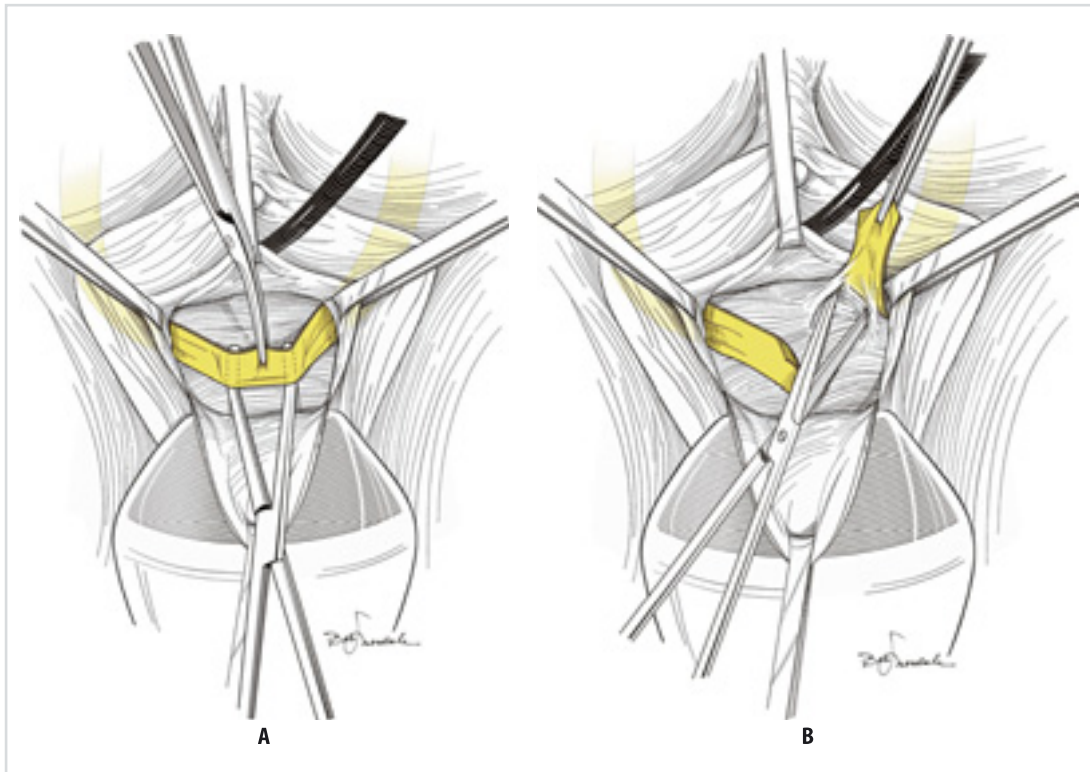


Figure 16.3. A: After an inverted-U or midline incision, the sling is isolated in the midline and incised. A right-angle clamp may be placed between the sling and the periurethral fascia to avoid injury to the

urethra. B: The sling is freed from the undersurface of the urethra toward the endopelvic fascia. Ends may be excised or left in situ. (From Nitti et al. [33]. © 2002, with permission from Elsevier.)

lized off of the periurethral fascia to, but not through, the endopelvic fascia (Figure 16.3B). In cases of extreme tension the ends of the sling may retract back into the retropubic space after incision, but more often the sling stays secure to allow this mobilization. Lateral support is preserved because the retropubic space is not entered, and the urethra is not freed from the undersurface of the pubic bone. The ends of the sling can be left in situ or excised. We typically excise synthetic material and leave autografts and allografts in place. If the sling cannot be clearly identified, then formal transvaginal urethrolisis should be done.

Our experience with sling incision has shown results equivalent to those of formal urethrolisis. With a mean surgical follow-up of 12 months (range 1–55), sling incision was successful in 16 patients (84%) (33), similar to other reported series (32,34). Two of the failures had a successful retropubic urethrolisis. Three of 18 women (17%) without stress incontinence before sling

lysis developed it postoperatively at 1 and 22 months.

Midurethral Synthetic Sling Takedown

Tension-free vaginal tape and other midurethral synthetic slings can be incised in a similar manner as described above. In the early postoperative period, the sling can be simply incised without further dissection (9). Others have reported segmental resection of the suburethral portion of the sling (10). Sometimes the sling can twist on itself and become very narrow (Figure 16.4). Unlike autologous and biologic slings, it is imperative to identify the sling and cut it. Urethrolisis, without incision of an obstructing TVT, may not relieve obstruction.

In cases of early intervention (1–2 weeks) it may be possible to loosen the TVT. Using local anesthesia the suture used to close the vagina can be cut, thus opening the incision. The sling is

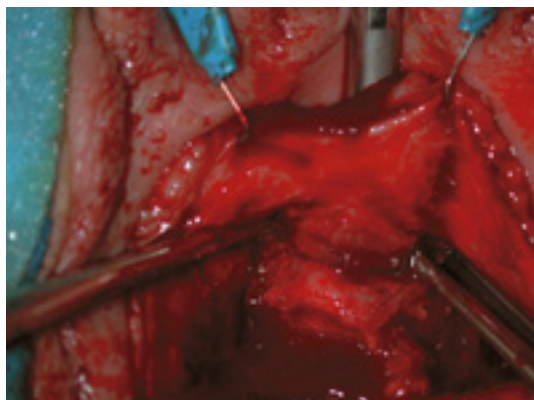


Figure 16.4. Obstructing tension-free vaginal tape (TVT), which has twisted into a 2-mm band. A right-angle clamp can be placed between the TVT and the periurethral fascia, and the TVT can be isolated and cut.

identified and hooked with a right-angle clamp. Spreading of the right-angle clamp (9) or downward traction on the tape will usually loosen it (1–2 cm). If the tape is fixed, it can simply be cut. The vaginal wall is then reapproximated.

Loosening or cutting of TVT has excellent results (9–12). In the two largest series of 17 and 23 patients, restoration of normal voiding and emptying occurred in all patients (9,29), whereas storage symptoms were partially relieved in 70% and completely relieved in 30% (29). Significant stress incontinence recurred in 6% to 13% of patients (9,10). In one study an additional 26% of patients had a recurrence of SUI, but it was significantly improved over baseline before TVT (10).

Failed Urethrolisis

Failure of urethrolisis may be due to persistent or recurrent obstruction, detrusor instability, impaired detrusor contractility, or learned voiding dysfunction. Recurrent obstruction may result from periurethral fibrosis and scarring or intrinsic damage to the urethra, which has occurred as a result of the urethrolisis surgery. When obstruction persists it is reasonable to attempt a repeat urethrolisis. We have found this to be effective in relieving urinary retention, but not as effective in treating persistent storage symptoms. We reported on the efficacy of repeat urethrolisis in 24 women who failed initial urethrolisis and remained in

urinary retention (35). Both transvaginal and retropubic approaches were chosen depending on the clinical situation. Obstruction was cured in 96%, but storage symptoms completely resolved in only 12.5% and were improved in 75%; SUI recurred in 18%. These data clearly support aggressive repeat urethrolisis in the face of initial failure. At least for retention and incomplete emptying. In general, if an aggressive transvaginal urethrolisis fails, then a retropubic approach may be considered. In cases where it is unknown how aggressive the initial transvaginal procedure was or if only a sling incision was done, then a repeat transvaginal approach may be appropriate.

Conclusion

Although urethral obstruction after incontinence surgery occurs at a relatively low incidence, it is still frequently seen because of the large number of incontinence procedures performed. The diagnosis is primarily a clinical one, though recent urodynamic definitions of bladder outlet obstruction in women may be helpful. Ultimately, the decision to intervene is made based on the clinician's suspicion of obstruction and the degree to which the symptoms are bothersome. With the popularity of TVT and other midurethral slings, intervention is being advocated at an earlier time than with more traditional pubovaginal slings and retropubic suspensions. Definitive treatment of post-operative obstruction is predominantly surgical. Classically, complete urethrolisis is performed, but in cases of obstruction after sling procedures, simply cutting the sling via a vaginal approach appears to be just as effective, with similar rates of recurrent stress urinary incontinence.

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Vaginal Surgery for Incontinence and Prolapse

Zimmern, P.E.; Haab, F.; Chapple, C.R. (Eds.)

2006, XV, 303 p., Hardcover

ISBN: 978-1-85233-912-8