Using slings for the surgical management of urinary incontinence: A safe, effective, evidence-based approach

Sling procedures are a mainstay of surgical treatment for SUI. Here, 2 experts offer case vignettes to illustrate the considerations involved in selecting the appropriate sling and counseling the patient.

Nancy Ringel, MD, and Lee A. Richter, MD

IN THIS ARTICLE

Urinary incontinence affects approximately 50% of women, with up to 80% of these women experiencing stress urinary incontinence (SUI) at some point in their lives.[1-3] While conservative measures can offer some improvement in symptoms, the mainstay of treatment for SUI is surgical intervention.[4,5] The lifetime risk of undergoing surgery for SUI is 13.6%, and surgery leads to a major improvement in quality of life and productivity.[1,6]

Dr. Ringel is Clinical Fellow, Section of Female Pelvic Medicine and Reconstructive Surgery, MedStar Georgetown/Washington Hospital Center, Washington, DC.

Dr. Richter is Assistant Professor of Urology and Obstetrics and Gynecology, Georgetown University School of Medicine, Section of Female Pelvic Medicine and Reconstructive Surgery, MedStar Washington Hospital Center, Washington, DC.

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Types of slings used for SUI

Sling procedures are the most commonly used surgical approach for the treatment of SUI. Two types of urethral slings are used: the midurethral sling and the autologous fascial (pubovaginal) sling. The midurethral sling, which is the most frequently used sling today, can be further characterized as the retropubic sling, the transobturator sling, and the mini sling (**FIGURE 1**, page 44).

Retropubic sling

A retropubic sling is a midurethral mesh sling that is placed beneath the urethra at the midpoint between the urethral meatus and the bladder neck. The arms of the sling extend behind the pubic symphysis, providing a hammock-like support that helps prevent leakage with increased abdominal pressures. The retropubic sling is the most commonly used type of sling. For women presenting with uncomplicated SUI who desire surgical correction, it often is the best choice for providing long-term treatment success.[7]

Transobturator sling

A transobturator sling is a midurethral mesh

sling that is placed beneath the urethra as described above, but the arms of the sling extend outward through the obturator foramen and into the groin. This enables support of the midurethra, but this sling is less likely to result in such complications as bladder perforation or postoperative urinary retention. Transobturator slings also are associated with lower rates of voiding dysfunction and urinary urgency than retropubic slings.[7-9] However, transobturator slings have higher rates of groin pain, and they are less effective in maintaining long-term cure of SUI.[7]

First introduced in 1996, the midurethral sling quickly grew in popularity for the treatment of SUI because of its high success rates and its minimally invasive approach.[10] Both retropubic and transobturator slings are safe, extensively researched surgical approaches for the management of SUI.[3] Midurethral slings have a very high rate of incontinence cure (80%–90%) and extremely high patient satisfaction rates (85%–90%), as even patients without complete cure report meaningful symptomatic improvement.[7,8,11]

Single-incision (mini) sling

A single-incision sling is a midurethral mesh sling that is designed to be shorter in length than standard midurethral slings. The placed sling lies under the midurethra and extends toward the superior edge of the obturator foramen but does not penetrate it. The sling is held in place by small pledgets on either side of the mesh hammock that anchor it in place to the obturator internus muscular fascia. Because this "mini" sling was introduced in 2006, fewer long-term data are available for this sling than for standard midurethral slings.

Autologous (fascial) sling

An autologous sling is a retropubic sling made from the patient's own fascia; it is harvested from either the fascia lata of the lateral thigh or the rectus fascia of the abdomen. The sling is placed beneath the urethra in the bladder neck region, and sutures affixed to the sling edges pass behind the pubic symphysis and through the abdominal fascia to anchor it in place.

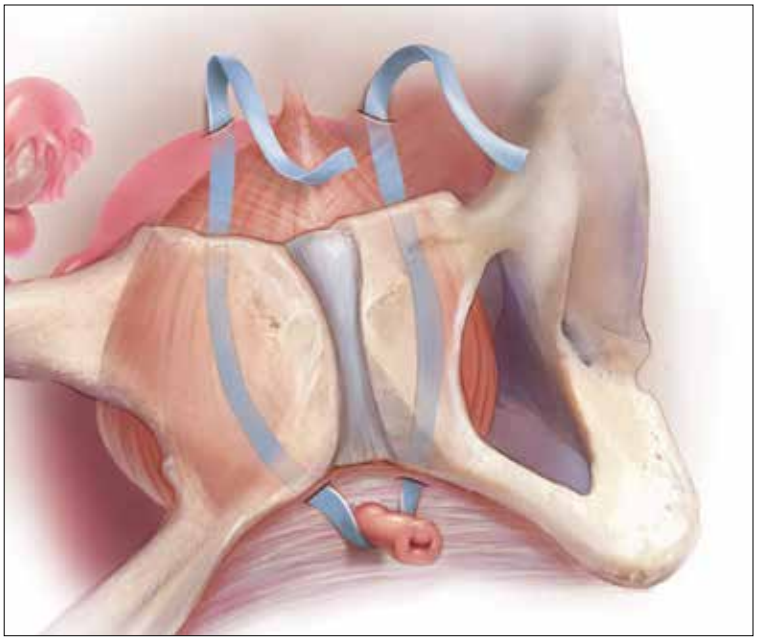


ILLUSTRATION: KIMBERLY MARTENS FOR OBG MANAGEMENT

Choose a sling based on the clinical situation and patient goals

Consider the unique features of each sling when selecting the proper sling; this should be a shared decision with the patient after thorough counseling. Below, we present 4 clinical cases to exemplify scenarios in which different slings are appropriate, and we review the rationale for each selection.

CASE 1 SUI that interferes with exercise routine

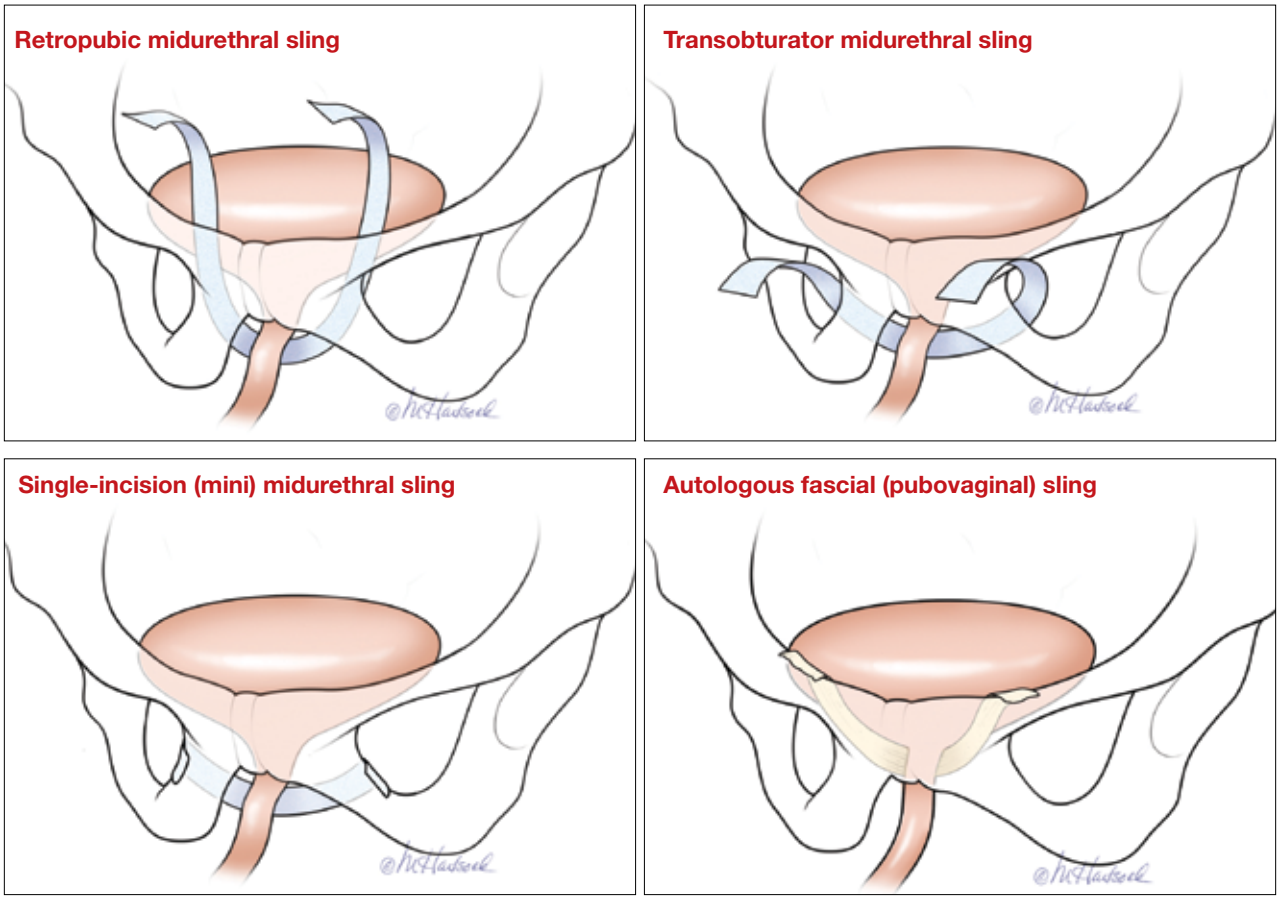
Ms. P. is a 46-year-old (G3P3) active mother. She loves to exercise, but she has been working out less frequently because of embarrassing urinary leakage that occurs with activity. She has tried pelvic floor exercises and changing her fluid intake habits, but improvements have been minimal with these interventions. On evaluation, she has a positive cough stress test with a recently emptied bladder and a normal postvoid residual volume.

What type of sling would be best?

Because this patient is young, active, and has significant leakage with an empty bladder, a sling with good long-term treatment success is likely to provide her with the best results (Figure 1). We therefore offered her a retropubic midurethral sling. The retropubic

Using slings for the surgical management of urinary incontinence

FIGURE 1 Types of slings used in surgical management of SUI

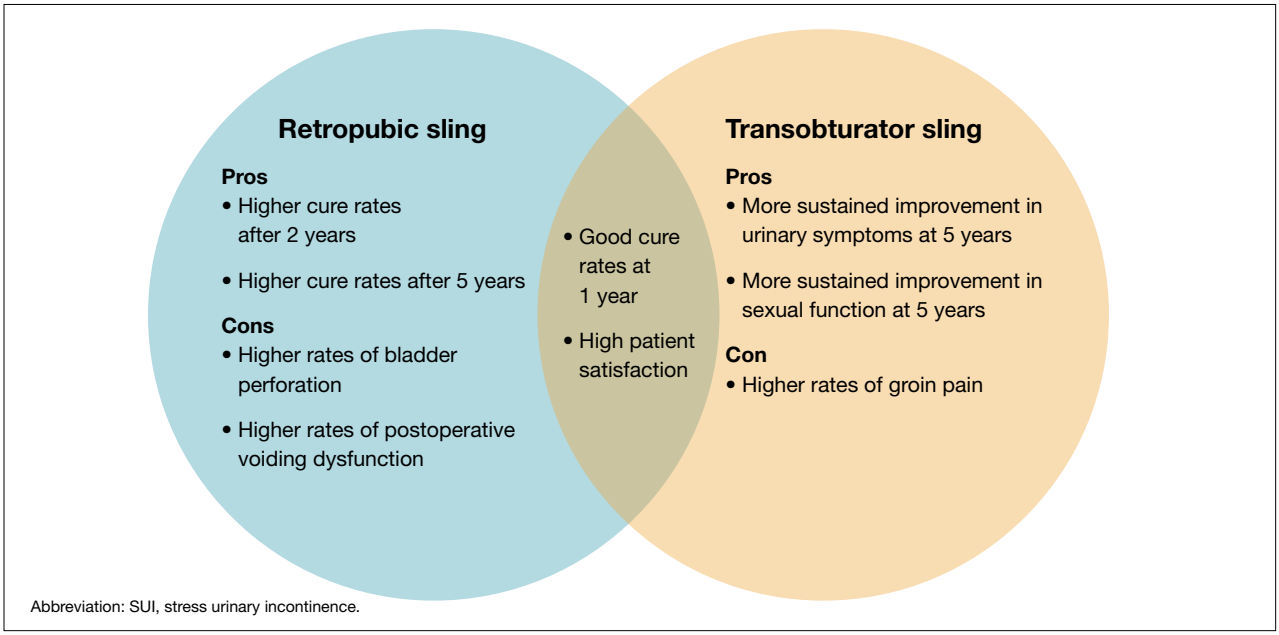


Type	Retropubic midurethral sling	Transobturator midurethral sling	Single-incision (mini) midurethral sling	Autologous fascial (pubovaginal) sling
Description	Mesh sling placed beneath the midurethra with arms extending behind the pubic bone	Mesh sling placed beneath the midurethra with arms through the obturator foramen	Mesh sling placed beneath the midurethra with arms to the obturator foramen	Fascial sling placed beneath the urethra at the level of the bladder neck with arms or suture passing behind the pubic bone
Incisions	Anterior vaginal wall Suprapubic	Anterior vaginal wall Groin	Anterior vaginal wall	Anterior vaginal wall Pfannenstiel Lateral thigh (if using fascia lata)
Conditions in which to consider use	Uncomplicated SUI Occult SUI Recurrent SUI after prior sling Intrinsic sphincter deficiency	Uncomplicated SUI Occult SUI A need to avoid the retropubic space (eg, patients with renal transplants)	Occult SUI A need to avoid the retropubic space (eg, patients with renal transplants) Desire to minimize incisions	A need to avoid mesh A preference to avoid mesh

Abbreviation: SUI, stress urinary incontinence.

ILLUSTRATIONS: MARCIA HARTSOCK FOR OBG MANAGEMENT

FIGURE 2 Pros and cons of the retropubic sling versus the transobturator sling for SUI[7-9]



Abbreviation: SUI, stress urinary incontinence.

approach is preferred here as it is less likely than the transobturator sling to cause groin/thigh pain, which is an important consideration in this young, active patient.

Further testing is not needed

For women with uncomplicated SUI who demonstrate leakage with stress (coughing, Valsalva stress test) and who have a normal postvoid residual volume, additional testing, such as urodynamic evaluation, is not necessary.[12] These patients can be counseled on the range of conservative management options and as well as surgical inventions.

CASE 2 Return of SUI symptoms after transobturator sling placement

Ms. E. is a 70-year-old woman who had a transobturator sling placed 5 years ago. Initially, her SUI symptoms improved after surgery. Recently, however, she noticed a return of her SUI, which she finds bothersome and limiting to her quality of life.

How would you manage this patient?

While midurethral slings are highly effective, there are instances in which patients will have symptom recurrence. For women who already have a midurethral sling, consider the following important questions.

Is this truly recurrent SUI, or is it a new process?

Like any reconstructive procedure, midurethral sling success rates decline over time and recurrent SUI can develop.[7] However, it also is possible for urge urinary incontinence to develop as a new process, and it is important to distinguish which type of urinary incontinence your patient has prior to counseling about treatment options.

To further evaluate patients with recurrent incontinence and a prior sling, we recommend urodynamic studies with cystoscopy (in addition to a detailed history and physical exam). This not only helps rule out other forms of incontinence, such as overactive bladder, but also evaluates for possible mesh erosion into the urethra or bladder, which can cause irritative voiding symptoms and incontinence.

What type of sling did the patient have initially, and how does this impact a repeat procedure?

Regardless of the initial sling type used, repeat midurethral sling procedures have a

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Like any reconstructive procedure, midurethral sling success rates decline over time and recurrent SUI can develop

significantly lower cure rate than primary midurethral sling procedures.[13] Retropubic slings are more effective than transobturator slings for patients with recurrent SUI who have failed a prior sling. When a patient presents with recurrent SUI after a prior transobturator sling, the best option for a repeat procedure is usually a retropubic sling, as it achieves higher objective and subjective cure rates.[13,14] (See **FIGURE 2,** page 45, for a comparison of retropubic and transobturator slings.)

Should I remove the old sling prior to placing a new one?

While it is recommended to remove the vaginal portion of the sling if the patient has a mesh exposure or is experiencing other symptoms, such as pain or bleeding, removal of the old sling is not necessarily indicated prior to (or during) a repeat incontinence procedure.[15,16] Removing the sling, removing a portion of the sling, or leaving the sling in situ are all reasonable options.

CASE 3 Treated SUI has mesh exposure

Ms. R. is a 60-year-old woman with a history of SUI that was previously managed with a retropubic midurethral sling placed at an outside hospital. She is a smoker and has developed a vaginal mesh exposure. Although she would like the mesh removed, she does not want her incontinence to come back. She tells you that she does not think she would be able to quit smoking.

What would be a reasonable next option for Ms. R.?

While complications from a midurethral sling are rare, mesh exposures occur in approximately 2% of patients, and urinary retention requiring release of the sling occurs in about 1% of patients.[3,6] It often helps to clarify for patients that the US Food and Drug Administration public health

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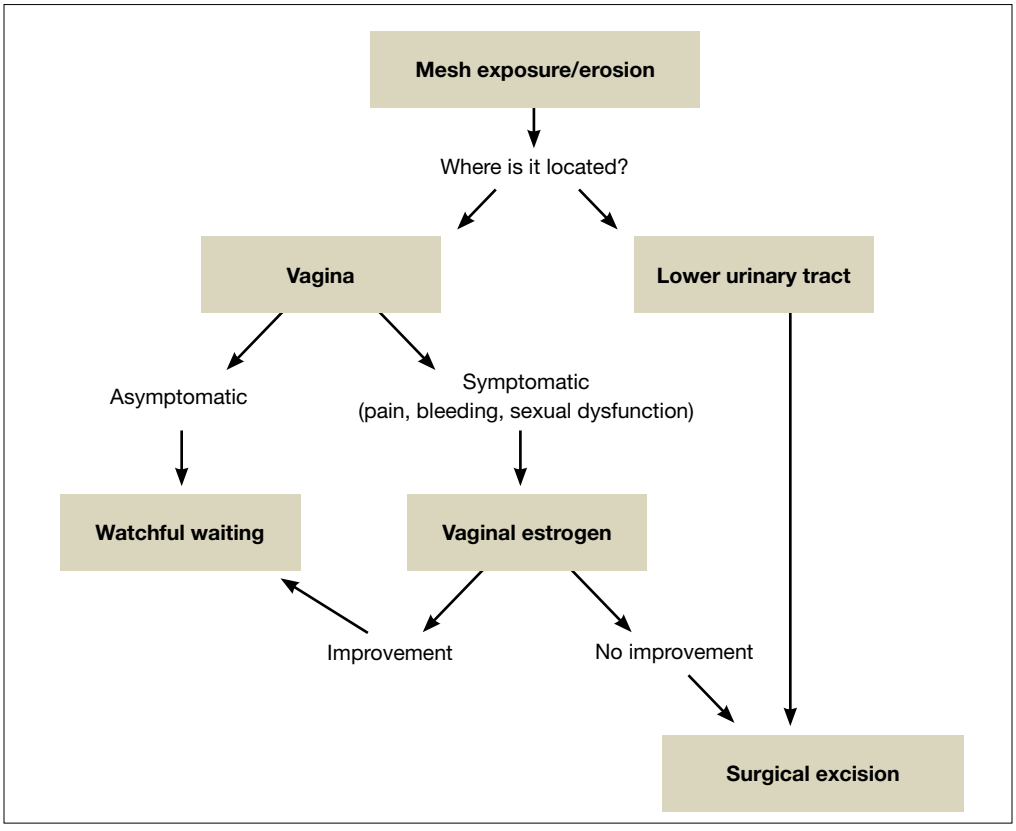
FIGURE 3 Mesh complications decision tree



advisories on the use of transvaginal mesh have been directed specifically toward the use of transvaginal mesh for the treatment of pelvic organ prolapse (POP), *not* the use of mesh for midurethral slings for SUI or transabdominal mesh for POP.[10,17]

When considering use of a mesh sling, a thorough discussion of the potential risks, as well as the benefits and alternatives, is imperative. Patients must personally balance the probability of benefit with the potential risk of complications, and while physicians can help outline the benefits and risks through shared decision-making, ultimately it is the patient who should make this decision.

Certain patient populations may be at higher risk for mesh complications[18] (see box at right). These complications are managed in various ways (**FIGURE 3**). Patients who have experienced mesh complications previously are typically not good candidates for a repeat mesh sling, particularly when the risk factor for complications cannot be modified.

A mesh sling alternative

The most effective way to manage SUI in patients who are not good candidates for a mesh sling is to consider employing a sling that uses the patient's own tissue.[19-21] Common approaches include harvesting a graft of rectus fascia through a Pfannenstiel skin incision or using fascia lata from the patient's iliotibial band in the lateral thigh. Autologous slings are safe and effective, and even after a mesh sling has failed, autologous slings have an almost 70% cure rate for SUI.[20,21]

Timing of mesh removal and placement of an autologous fascial sling

Either concomitant or delayed placement of a pubovaginal sling is acceptable when removing mesh, though this should be a joint decision with the patient after counseling. If the risk for surgical complications is modifiable (for example, poorly controlled diabetes that could be improved with blood glucose control), it may be advisable to delay the fascial sling until the risk factors have been addressed. Similarly, if the reason for mesh removal is pain, it may be advisable to remove the mesh prior to placing a new sling to ensure that the pain resolves completely. Otherwise, if pain persists, it can be unclear whether the new sling is contributing to the pain, and this may lead to difficulties treating pain or incontinence in the future.

In this patient, who was an active smoker, we excised the exposed mesh and concomitantly placed an autologous fascial sling utilizing rectus fascia. This maintained continence without introducing mesh in a high-risk patient.

Risk factors for mesh-related complications

- Smoking
- Poorly controlled diabetes
- Decreased estrogen status
- Chronic steroid use
- Prior urethral surgery (urethral diverticulum, urethroplasty)

CASE 4 POP and occult SUI

Ms. B. is a 79-year-old woman with stage 3 POP planned for surgical repair. While she does not report urinary leakage, preoperative urodynamic testing revealed occult SUI with reduction of her prolapse. Her priorities are to avoid needing another surgery and to limit the chances of postoperative leakage, but she is nervous about her postoperative recovery and wants to avoid pain.

What approach would be appropriate?

Consider a mini sling for this patient

The single-incision (mini) sling is an option to consider for patients with mild incontinence or for those without evidence of intrinsic sphincter deficiency. It is also a good option for those who want to avoid the additional incisions required for full-length slings.

While currently there is not sufficient evidence to clearly state if single-incision slings are equivalent to other slings, recent studies show that single-incision slings appear to be

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Common approaches for autologous slings include harvesting a graft of the patient's rectus fascia through a Pfannenstiel incision or using fascia lata from the iliotibial band in the lateral thigh

safe and effective in the short term, with possibly fewer complications than traditional transobturator slings.[22-24] As patients are often concerned about the potential for groin pain with a transobturator sling, a single-incision sling is an acceptable alternative that avoids groin incisions and also avoids the retropubic space.

Patient counseling is crucial

Regardless of the route, sling procedures are highly effective and safe for treating women with SUI.[3] Understanding the characteristics of each type of sling and the distinct surgical approaches enables informed counseling for patients who are navigating the treatment options for SUI. ●

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