

CLINICAL PRACTICE

Urinary Stress Incontinence in Women

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This Journal feature begins with a case vignette highlighting a common clinical problem. Evidence supporting various strategies is then presented, followed by a review of formal guidelines, when they exist. The article ends with the author's clinical recommendations.

A 45-year-old woman reports losing urine with coughing, laughing, or sneezing since the birth of her last baby. She has been unable to lose the 25 lb (11 kg) that she gained after her pregnancy 6 years ago. She voids every 3 hours and reports no urinary urgency or nocturia. Her incontinence keeps her from participating in her exercise class, and she leaks urine during sexual intercourse. Her body-mass index (BMI, the weight in kilograms divided by the square of the height in meters) is 28, and a routine pelvic examination is normal. How should she be evaluated and treated?

THE CLINICAL PROBLEM

Urinary incontinence is common and costly. Approximately 25% of premenopausal women and 40% of postmenopausal women report leakage of urine. Not all leakage is bothersome to patients; however, 10% of middle-aged women report daily incontinence, and one third report weekly incontinence.¹ Incontinence reduces the quality of life, including sexual health. Yet fewer than half of women who consider their incontinence a problem seek help, and many primary care providers feel unprepared to provide treatment.^{2,3}

Stress incontinence and urge incontinence are the two most common types of urinary incontinence. Stress incontinence — defined as involuntary urinary leakage on exertion, sneezing, or coughing — occurs when bladder pressure exceeds urethral resistance under conditions of increased abdominal pressure.⁴ The balance between urethral and bladder pressures is influenced both by intrinsic factors (e.g., urethral musculature, blood flow, and innervation) and extrinsic factors (e.g., degree of urethral support and the weight and physical activity of the patient). Urge incontinence — defined as involuntary urinary leakage accompanied by or immediately preceded by urgency — is a function of uncontrolled detrusor contractions that overcome urethral resistance.⁴ Patients may have a combination of the two types of incontinence; distinguishing between them is important, because therapies vary. Patients with mixed incontinence can indicate which symptoms are most bothersome to them in order to focus therapy. The present review focuses on stress incontinence.

The peak incidence of stress incontinence occurs between 45 and 49 years of age.³ Recognized risk factors for stress incontinence include white race, obesity, and pregnancy and childbirth, particularly vaginal, as compared with cesarean, delivery.⁵⁻⁸ Non-Hispanic white women have higher rates of stress incontinence than either Hispanic or black women.^{9,10} Obese women (BMI ≥ 30) have twice the risk of incontinence of lean women, independent of age and parity.¹¹ Symptoms of stress incontinence develop in up to one third of women during pregnancy, although incontinence frequently resolves after delivery. In one report of women with persistent

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stress incontinence 3 months post partum, 92% continued to have stress incontinence at 5 years post partum.^{12,13}

Urinary incontinence is associated with low libido, vaginal dryness, and dyspareunia.¹⁴ Many women with incontinence report loss of urine during vaginal intercourse, which can cause embarrassment and relationship problems.¹⁵

from urge incontinence (reported sensitivity and specificity, 75% and 77%, respectively).¹⁶ Assessing the degree to which the patient is bothered by the symptoms of incontinence can guide whether to initiate treatment. Patients should also be asked about fecal incontinence and pelvic-organ prolapse, which may accompany urinary incontinence.

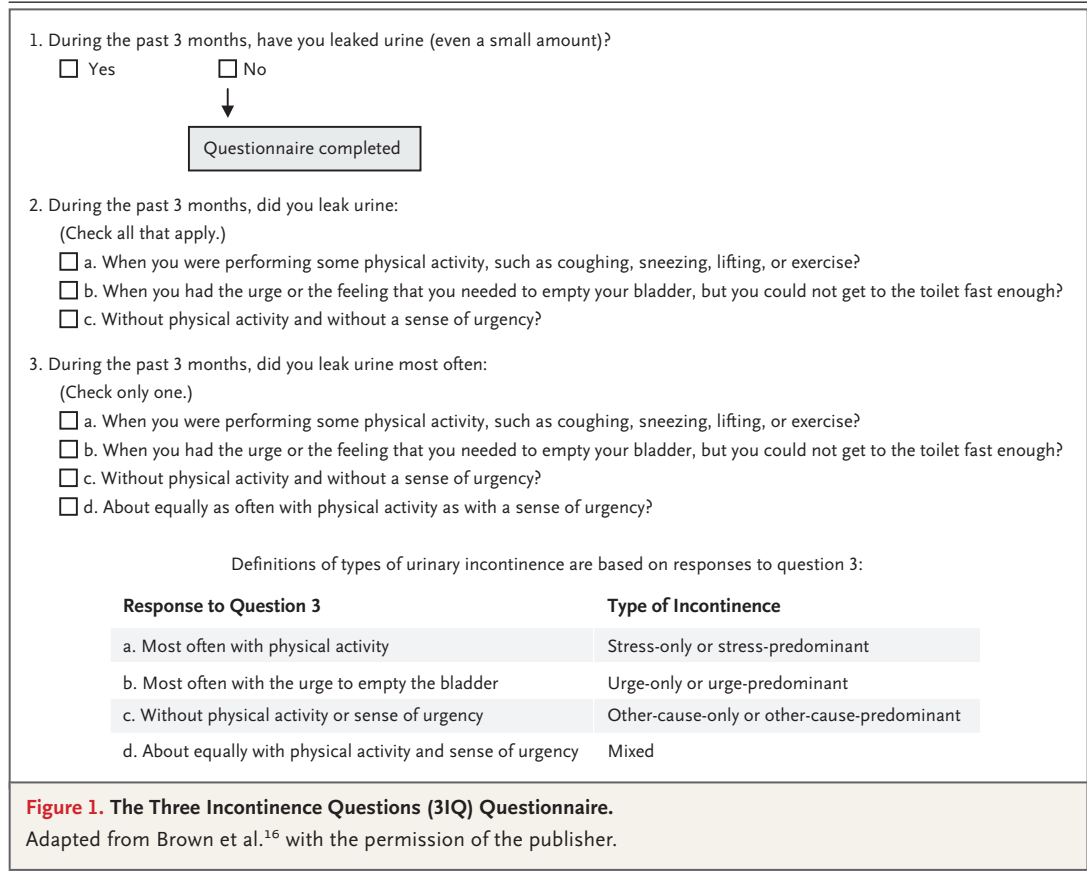
On pelvic examination, the musculature should be assessed by asking the patient to contract her pelvic muscles around the examiner's fingers; both the ability to voluntarily contract the pelvic floor muscles and the strength of the contraction should be noted. Attention to whether the pelvic organs prolapse beyond the hymen during the Valsalva maneuver is also warranted. A "cough stress test" should be performed; this involves asking a patient to cough with a full bladder and observing the urethra for leakage. Leakage supports the diagnosis of stress incontinence.

Women should be asked to complete a voiding diary in which they record the volumes and types of fluids consumed, the frequency of void-

STRATEGIES AND EVIDENCE

EVALUATION

Evaluation for stress incontinence includes history taking and physical examination, completion of a voiding diary by the patient, urine testing for infection, and simple tests conducted in the physician's office, including assessment of the post-void residual urine volume and a cough stress test. Since many women are reluctant to discuss incontinence, screening questionnaires may be helpful. A short, validated questionnaire consisting of three questions is used to screen for incontinence (Fig. 1) and distinguishes stress incontinence



ing, and the amount of urine voided (measured using a “toilet hat,” or a plastic receptacle with marked gradations that nests within the toilet seat), as well details about episodes of incontinence and associated triggers. Normal voided-urine volumes range from 200 to 400 ml per void, and normal voiding frequency ranges from 8 to 12 voids daily, with 1 void per night.¹⁷ Three-day diaries have been shown to be representative of longer diaries.¹⁸ A randomized trial showed that completion of a voiding diary led to reduced fluid intake, more frequent voids in women who wait excessive amounts of time between voids, and identification of problematic times of day or triggers for incontinence episodes.¹⁹

The evaluation should also include urinalysis and culture. Urinary tract infection may cause incontinence, though it causes urge incontinence more often than stress incontinence. Bladder emptying should be assessed by measuring post-void residual urine, either by means of ultrasonography or catheterization, although catheterization is considered the gold standard.¹ Exact cutoff points for abnormal residual volumes are debated; however, those greater than 150 ml on two occasions are suggestive of urinary retention (which may result in “overflow” incontinence) and should prompt further evaluation for voiding dysfunction.

Urodynamic testing to evaluate urethral function, bladder capacity and stability, and voiding function is not routinely indicated before the initiation of most treatments for stress incontinence. However, it is often recommended before surgical intervention to support the diagnosis of stress leakage without bladder contraction and to document voiding function.

MANAGEMENT

ABSORPTIVE DEVICES

Absorptive products such as pads play an important role in the care of women with stress incontinence. Because of their lower cost and lesser stigma, many women use sanitary napkins or minipads in lieu of incontinence pads; however, the latter are more effective for patients with incontinence. In a randomized trial comparing a variety of incontinence products, patients preferred incontinence pads to menstrual pads, although the cost of incontinence pads was greater.²⁰ For women with large urine losses, disposable

products may be associated with fewer skin problems than nondisposable products.²⁰ Cleaning the urogenital area with premoistened wipes made for adults helps to control odor; adult wipes are larger, and more brands contain odor-reducing and skin-care ingredients.

BEHAVIORAL AND PHYSICAL THERAPY

First-line treatment for stress incontinence includes pelvic floor exercises (contractions of the pelvic floor musculature) and various behavioral modifications. Perception of a cure is more common in women who perform pelvic floor exercises than in those who do not.²¹ Although recommendations regarding the number of repetitions necessary for treatment vary widely, efficacy has been shown with 30 to 50 daily contractions.^{22,23} In a small, randomized trial, women who were trained to perform a pelvic floor contraction in anticipation of a cough, sneeze, or laugh had less urine loss than women who did not perform a contraction.²⁴ Not all women are able to perform pelvic floor exercises correctly with oral instructions. Women can be coached on how to perform exercises during an annual pelvic bimanual examination. Women unable to identify their pelvic floor musculature may benefit from seeing a physical therapist trained in pelvic floor therapy. Performance of pelvic floor exercises is not recommended during voiding, because frequent interruptions of voiding may cause voiding dysfunction, and the ability to stop the flow of urine intermittently does not confirm that exercises are performed correctly.

For obese or overweight women, weight loss is likely to result in improvement in incontinence. In a small trial, obese women who were randomly assigned to a liquid weight-loss diet had a significantly greater reduction in incontinence frequency than did controls whose treatment was delayed. A reduction of 5 to 10% in the baseline weight resulted in an approximately 50% reduction in the frequency of incontinence.¹¹ Other modifications to diet and habits, including the cessation of smoking and reduction of caffeine intake, have no proven efficacy in reducing incontinence but are commonly recommended.

MEDICATIONS

Duloxetine hydrochloride, a serotonin-reuptake inhibitor approved for the treatment of depression, has some efficacy in the treatment of stress

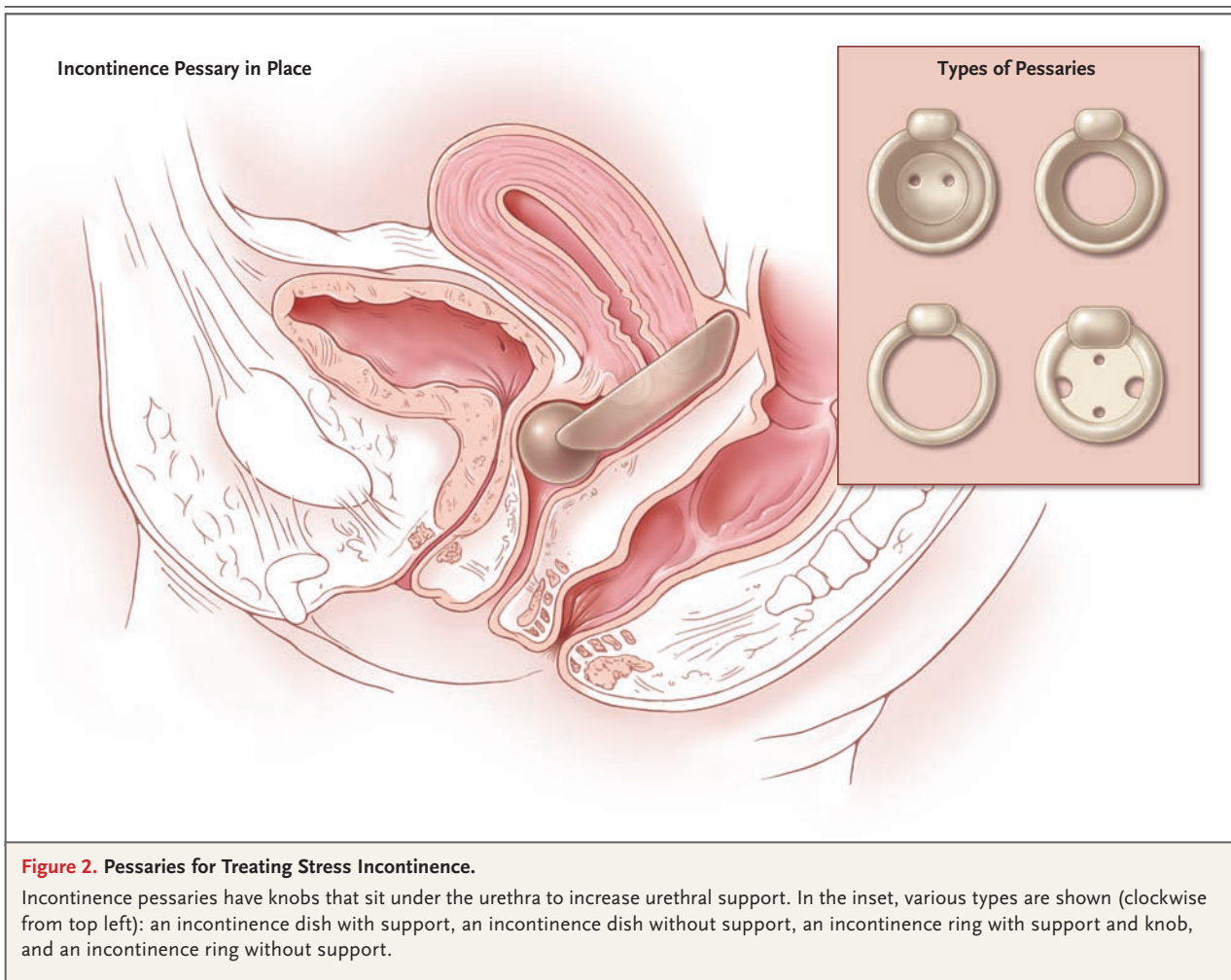
incontinence, although it has not been approved for this indication in the United States.²⁵ A recent meta-analysis of randomized trials concluded that duloxetine significantly decreased the frequency of episodes of stress incontinence and improved the quality of life; adverse events, primarily nausea, were common but generally minor.²⁶ Alpha agonists, such as clonidine, have been used empirically for the treatment of stress incontinence, but this use is not supported by rigorous studies, and efficacy in clinical practice is limited.

Postmenopausal estrogen treatment was previously believed to decrease the symptoms of stress incontinence. However, data from the Heart and Estrogen/Progestin Replacement Study showed a significantly higher risk of stress and urge incontinence among women randomly assigned to

receive estrogen alone or estrogen and progesterone than among those assigned to receive placebo.²⁷ Given these results, the initiation of hormone therapy for treatment of stress incontinence is not indicated.

DEVICES

Devices that treat stress incontinence include tampons and pessaries. Pessaries are intravaginal devices that support the pelvic organs (Fig. 2). Incontinence pessaries have knobs that sit under the urethra to increase urethral support. Pessaries require upkeep and need to be removed and cleaned regularly; the risks associated with use are minimal but include erosion of vaginal tissue and vaginal discharge. Because pessaries come in a variety of shapes and sizes, they must be fitted for comfort and to optimize the relief of symp-

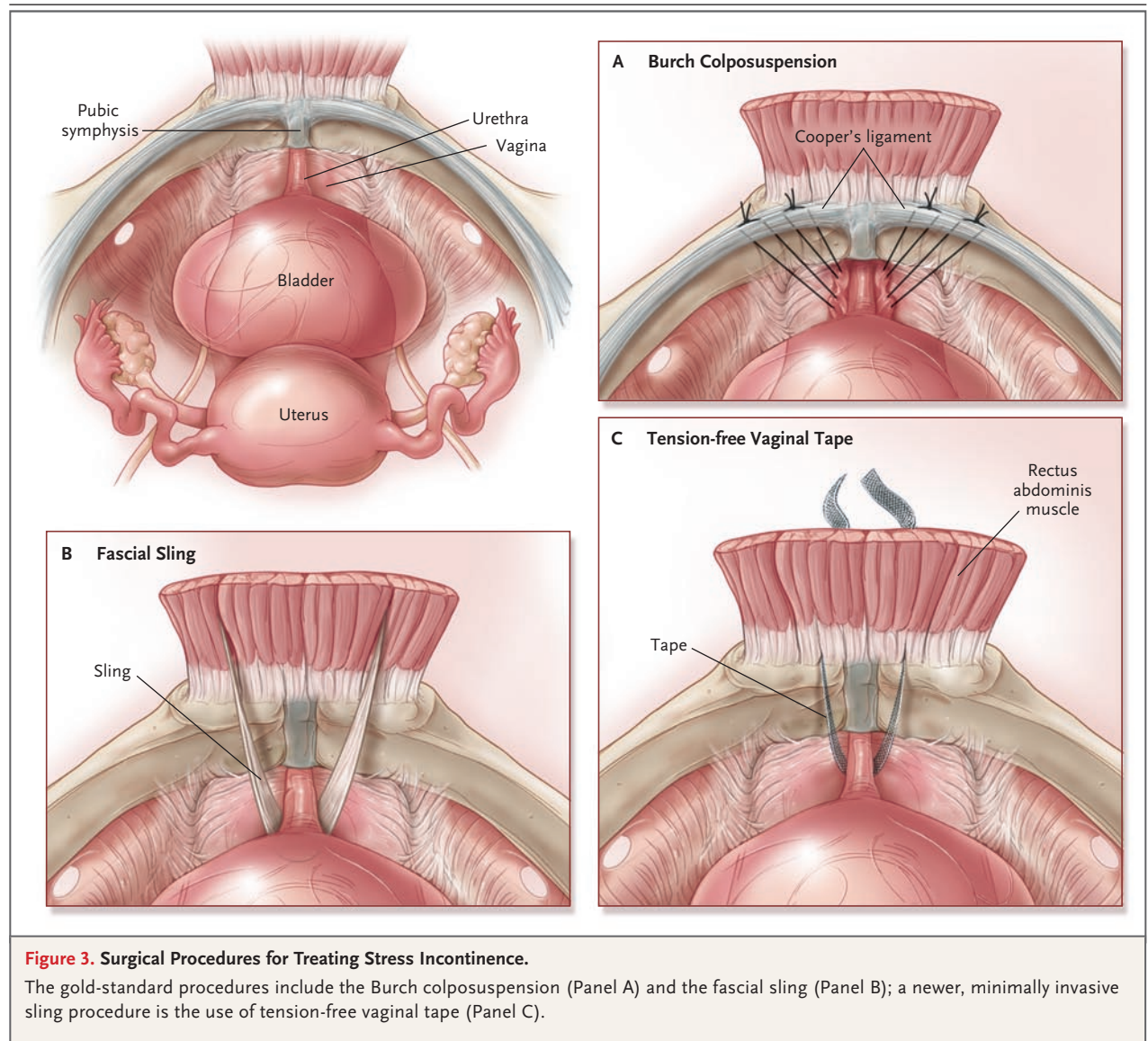


toms. Approximately half the women who are successfully fitted with a pessary use it for the next 1 to 2 years.^{28,29} A randomized, controlled trial comparing the use of super tampons and the use of pessaries to the use of no device in women who were incontinent while exercising found that the tampons and pessaries were similarly effective in reducing the frequency of stress incontinence.³⁰

SURGERY

The rates of surgical procedures for stress incontinence in women in the United States increased

from 0.32 per 1000 in 1979 to 0.60 per 1000 in 1997.^{31,32} Although more than 100 surgical procedures have been described for the treatment of stress incontinence, gold-standard procedures include the Burch colposuspension and the fascial sling (Fig. 3). Both of these methods are designed to increase urethral support. A recent randomized trial of 655 women found better cure rates (as assessed by combined objective and subjective measures of continence) for the fascial sling than for the Burch colposuspension at 2 years (47% vs. 38%, $P=0.01$); however, the sling resulted in higher rates of adverse events, including urinary tract infec-



tions, voiding dysfunction, and symptoms of overactive bladder.³³

Minimally invasive sling procedures have more recently been introduced; these can be performed under local anesthesia, with reduced recovery time and reduced duration of catheter dependence. Tension-free vaginal tape (Fig. 3), now used widely, was the first minimally invasive midurethral sling procedure to undergo rigorous evaluation in a randomized trial.³⁴ Success rates at 2 years were similar for the use of tension-free vaginal tape and the use of Burch colposuspension. Patients undergoing the procedure with the tension-free vaginal tape had shorter operating times and a lower rate of postoperative complications such as abdominal hernia (0%, vs. 2% of those undergoing Burch colposuspension) but a higher rate of intraoperative complications such as bladder injury (9% vs. 2%).³⁵ A newer technique (the use of transobturator tape) involves the placement of polypropylene mesh through the obturator foramen rather than through the retropubic space, but large, randomized trials with adequate follow-up comparing these newer anti-incontinence procedures are limited. A single trial comparing the use of transobturator tape and Burch colposuspension found similar success rates for the two procedures.³⁶ All surgical procedures for stress incontinence carry certain risks — including the development of overactive-bladder symptoms, voiding dysfunction (which may be permanent), increased risk of urinary tract infection, and failure to adequately treat stress-incontinence symptoms. The majority of women who undergo surgery for stress incontinence report satisfaction with surgery as well as improved quality of life, including improved sexual function.³⁷

AREAS OF UNCERTAINTY

DEFINITION OF CURE

Reported cure rates associated with surgical treatment of stress incontinence by means of Burch colposuspension, suburethral sling, tension-free vaginal tape, or transobturator tape range widely, from 30% to 100%.³⁴ This wide variation relates in part to the use of varying definitions of cure. Traditionally, cure for stress incontinence was defined as no loss of urine on either urodynamic or pad testing and was determined by the treat-

ing clinician. Such objective measures, however, are not always indicative of a patient's perception of cure, and the importance of subjective outcomes has been increasingly recognized. Although validated questionnaires that measure subjective outcomes have been developed, their use is limited in clinical settings. A frank discussion regarding the degree to which the patient is bothered by her symptoms, as well as expectations and goals after surgery, can help guide treatment choices. Relatively few women have absolutely no loss of urine after treatment for stress incontinence, although most report satisfaction with the treatment and the improved quality of life.^{33,34} This has important implications for surgical counseling, since realistic descriptions of expected outcomes are central to obtaining informed consent for surgery.

PREVENTION

Given the observational data indicating increased rates of stress incontinence among women who have undergone vaginal delivery as compared with cesarean delivery,^{38,39} cesarean delivery has been proposed as a strategy to prevent stress incontinence.^{40,41} This highly controversial proposal is supported by a single trial of planned cesarean delivery versus planned vaginal delivery in cases of breech presentation,⁴² which showed a decrease in the rate of stress incontinence in the cesarean-delivery group at 3 months post partum (relative risk, 0.62; 95% confidence interval, 0.41 to 0.93) but no significant difference between the two groups at 2 years post partum.⁴³ In epidemiologic studies, the incidence of stress incontinence is higher among women who have undergone cesarean delivery than among nulliparous women, implying that some of the increased risk of incontinence after delivery may be due to the delivery itself or to other factors unrelated to the mode of delivery.⁴⁴

NEW SURGICAL PROCEDURES

Many midurethral slings and related devices have been approved for use by the Food and Drug Administration (FDA). However, these approvals have involved the FDA's 510(k), or premarket-notification, process that does not require proof of safety and efficacy of the new device but simply requires evidence that it is similar to one that has

already been approved. The potential risks associated with this process are evidenced by the experience with the ProteGen sling, which was widely implanted in women before clinical trials were conducted. Subsequent reports showed erosion of the sling into vaginal tissue in up to 30% of women after 5 months of use, and it was ultimately removed from the market.⁴⁴ An additional concern related to the 510(k) device-approval process is that the reporting of adverse events and complications is voluntary and probably underrepresents the true incidence. Until peer-reviewed comparative data are available, caution is warranted in the adoption of new devices, and patients should be informed that the data available to guide the use of many new techniques are limited.

GUIDELINES

The International Continence Society, the American Urogynecologic Society, and the Society of Gynecological Surgeons issued a statement standardizing terminology related to pelvic floor disorders, including urinary incontinence, and outlined the recommended assessment; the current review is generally consistent with these recommendations.¹⁸ The American College of Obstetricians and Gynecologists has published practice guidelines for the care of women with urinary incontinence, although not stress incontinence specifically.⁴⁵ In 1997, the American Urological Association published recommendations for surgical management of stress incontinence,⁴⁶ but these antedate recent randomized trials of surgical interventions.

CONCLUSIONS AND RECOMMENDATIONS

The loss of urine while coughing, sneezing, or engaging in physical activity, as reported by the patient in the vignette, is characteristic of stress incontinence. I would perform a physical examination, including a cough stress test, and urinalysis and assessment of post-void residual volume of urine. Assuming the urinalysis results and the residual volumes are normal, I would instruct the patient in behavioral changes and pelvic-floor exercises. Specifically, I would ask the patient to complete a voiding diary, which I would review with her to assess whether she is drinking excessive amounts of fluids and to evaluate her voiding habits. During the physical examination, I would make sure that she knows how to perform pelvic floor exercises and instruct her to work toward performing 30 to 50 such exercises daily. Weight loss may reduce her incontinence symptoms and should be encouraged. For times when she is physically active, an incontinence pessary may be helpful. I would also discuss surgical treatment as an alternative to behavioral or device therapies. I would explain that surgical treatment would probably result in improved quality of life and sexual function and would be expected to decrease considerably, but not completely eliminate, all symptoms of incontinence.

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