

Pelvic floor disorders in women: an overview

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Resumen

La incontinencia urinaria afecta a un 10-58% de las mujeres y hasta un 50% de las institucionalizadas. Su prevalencia aumenta con la edad, alcanzando un pico en edades medias de la vida para seguir un constante incremento en ancianas. Se ha demostrado que afecta al bienestar clínico, psicológico y social de las pacientes. La mayoría de las mujeres con incontinencia no demandan tratamiento. Se calculan en 12,6 billones de dólares americanos los costes anuales directos de la incontinencia urinaria.

En los Estados Unidos la población de personas mayores de 75 años era del 22% en 1999 y se espera que aumente considerablemente en las próximas décadas. Los trastornos del suelo pelviano como la incontinencia urinaria, la incontinencia fecal y el prolapso de órganos pélvicos afecta sobre todo a mujeres mayores. Debido a esta relación se estima que el crecimiento en la demanda de tratamiento por patología del suelo pelviano sea el doble que la tasa de crecimiento poblacional en los próximos 30 años.

Alrededor de 10% de las mujeres serán operadas a lo largo de su vida por un prolapso y cerca de un 30% de las veces la cirugía será por trastornos recurrentes. Estos datos sugieren que las tasas de fallos son altas a pesar de la introducción de nuevas técnicas diagnósticas y quirúrgicas.

Se han desarrollado numerosas técnicas para valorar el tipo y extensión de la incontinencia urinaria, fecal y del prolapso. Existen también numerosas opciones de tratamiento, que varían desde las modificaciones de conductas hasta tratamientos médicos o quirúrgicos. En este artículo se discutirán algunas de ideas generales relacionadas con los trastornos del suelo pelviano así como se sugerirán áreas de nuevo desarrollo en este campo.

Palabras clave: Trastornos del suelo pelviano. Prolapso de órganos pélvicos. Incontinencia urinaria.

Introduction

Urinary incontinence affects 10% to 58% of community-dwelling women and up to 50% of nursing home residents. Prevalence of incontinence appears to gradually increase during young adult life, has a broad peak around middle age, and then a steady increase in the elderly¹. It has been shown to affect a person's social, clinical, and psychological well-being. The majority of women with incontinence do not seek medical

Summary

Urinary incontinence affects 10% to 58% of community-dwelling women and up to 50% of nursing home residents. Prevalence of incontinence appears gradually to increase during young adult life, has a broad peak around middle age, and then a steady increase in the elderly¹. It has been shown to affect a person's social, clinical, and psychological well-being. The majority of women with incontinence do not seek medical help.¹ The estimated annual direct cost of urinary incontinence alone in women in the United States (in U.S. dollars) is \$12.4 billion².

The proportion of the United States population over age 75 was 22% in the year 1999 and is expected to grow substantially during the coming decades³. Pelvic floor disorders such as urinary incontinence, fecal incontinence, and pelvic organ prolapse affect older women disproportionately⁴. Because of this relationship, it is estimated that the growth in demand for services to care for female pelvic floor disorders will increase at twice the rate of growth of the population over the next 30 years⁴.

Approximately 10% of women have surgery for pelvic organ prolapse or urinary incontinence in their lifetime and nearly 30% of these operations are for recurrent disease⁵. This fact suggests that failure rates after surgery for pelvic floor disorders are high, in spite of the introduction of many new surgical diagnostic techniques, tools and operations.

Numerous techniques have been developed to evaluate the type and extent of urinary and fecal incontinence and prolapse. A number of treatment options exist, ranging from behavioral to medical and surgical approaches. This document will discuss some of the general issues related to pelvic floor disorders and suggest areas for future research.

Key words: Pelvic floor disorders. Pelvic organ prolapse. Urinary incontinence.

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Table 1. Differential diagnosis of urinary incontinence in women**Genitourinary Etiology**

- **Filling/storage disorders**
 - Urodynamic stress incontinence
 - Overactive bladder (idiopathic)
 - Overactive bladder (neurogenic)
 - Mixed types
 - Overflow incontinence
- **Fistula**
 - Vesical
 - Ureteral
 - Urethral
- **Congenital**
 - Ectopic ureter
 - Epispadias
- **Nongenitourinary Etiology**
 - Functional
 - Neurologic
 - Cognitive
 - Environmental
 - Pharmacologic
 - Metabolic

From: Walters MD. Description and Classification of Lower Urinary Tract Dysfunction and Pelvic Organ Prolapse. En: Walters MD, Karram MM: Urogynecology and Reconstructive Pelvic Surgery (2nd ed.) Mosby, St. Louis, 1999.

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Etiologies of urinary incontinence

Among women complaining of urinary incontinence, the differential diagnosis includes genitourinary and nongenitourinary conditions (Table 1). Genitourinary disorders include problems of bladder filling and storage, as well as extraurethral disorders such as fistula and congenital abnormalities. Nongenitourinary conditions that cause urinary incontinence generally are functional conditions that occur simultaneously with normal or abnormal urethral and bladder function. These conditions are most common in elderly women.

The most common urine storage disorder in women is urodynamic stress urinary incontinence (SUI). Bladder filling disorders caused by overactive detrusor function are the second most common cause of urinary incontinence. Underactive or acontractile detrusor function may result in voiding dysfunction

or urinary incontinence. Involuntary loss of urine associated with overdistention of the bladder is called overflow incontinence. This condition is less prevalent in women and is usually associated with diabetes, neurologic diseases, severe genital prolapse, or postsurgical obstruction.

Functional incontinence is associated with cognitive, psychologic, or physical impairments that make it difficult to reach the toilet or interfere with appropriate toileting. With these conditions, continent women may not have enough time to avoid an accident. Functional causes also may act synergistically with other urinary problems. For example, women with manageable detrusor overactivity may become incontinent if another disease or physical problem keeps them from reaching the toilet. Physical conditions that may cause functional incontinence include joint abnormalities, arthritic pain, or muscular weakness. An unfamiliar setting, lack of convenient toilet facilities, or other environmental factors can aggravate this condition. Psychologic difficulties and repressed or hostile behavior may be related to incontinence, especially in the institutionalized elderly. Finally, iatrogenic factors, such as drugs, can cause or aggravate incontinence.

The relative likelihood of each condition causing incontinence varies with the age and health of the individual. Among ambulatory incontinent women, the most common condition is urodynamic SUI, which represents 29% to 75% of cases. Urge incontinence account for 7% to 33% of incontinence cases with the remainder being mixed forms¹. Among elderly, noninstitutionalized incontinent women evaluated in referral centers, stress incontinence is found less often, and detrusor abnormalities and mixed disorders are more common than in younger ambulatory women. More severe and troublesome incontinence probably occurs with increasing age, especially over 70 years¹.

Diagnosis

Urinary incontinence can be a symptom of which patients complain, a sign demonstrated on examination, or a condition (i.e., diagnosis) that can be confirmed by definitive studies. When a woman complains of urinary incontinence, appropriate evaluation includes exploring the nature of her symptoms and looking for physical findings. The history and physical examination are the first and most important steps in the evaluation. A clear understanding of the severity of the problem or disability and its effect on quality of life should be sought. Assessment of mobility and living environment is especially important in certain patients. A preliminary diagnosis can be made with simple office and laboratory tests, with initial therapy based on these findings. If complex conditions are present, if the patient does not improve after initial therapy, or if surgery is being considered, definitive, specialized studies are necessary.

The amount or severity of prolapse in each vaginal segment should be measured and recorded according to the Pelvic Organ Prolapse Quantification System (POPQ)⁶. I believe that taking the time to learn and use the POPQ grading system will help physicians worldwide improve their understanding of disease severity and perhaps lead to better patient care and research.

The office evaluation of incontinence should involve some assessment of voiding, detrusor function during filling, and competency of the urethral sphincteric mechanism. During the

assessment, one should try to determine the specific circumstances leading to the involuntary loss of urine. If possible, such circumstances should be reproduced and directly observed during clinical evaluation. The examination is most easily initiated with the patient's bladder comfortably full. The patient is allowed to void as normally as possible in private. The time to void and the amount of urine voided are recorded. The patient then returns to the examination room and the volume of residual urine is noted by transurethral catheterization. If a sterile urine sample has not yet been obtained for analysis, it can be obtained at this time. A 50-ml syringe without its piston or bulb is attached to the catheter and held above the bladder. The patient is then asked to sit or stand and the bladder is filled by gravity by pouring 50-ml aliquots of sterile water into the syringe. The patient's first bladder sensation and maximum bladder capacity are noted. The water level in the syringe should be closely observed during filling, as any rise in the column of water can be secondary to a detrusor contraction. Unintended increases in intraabdominal pressure by the patient should be avoided. The catheter is then removed and the patient is asked to cough in a standing position (cough stress test).

Based on the clinical evaluation, the physician can formulate a presumptive diagnosis and initiate treatment. Algorithms for evaluation of incontinence have been proposed⁷ and have been used with success in elderly patients^{8,9}. The initial goal should be to diligently seek out and treat all transient reversible causes of urinary incontinence and voiding difficulty (Table 2). Complex causes of incontinence are triaged for urodynamic testing or for consultation (Table 3).

After the evaluation, patients can be categorized as having probable urodynamic SUI, probable overactive bladder (with or without coexistent stress incontinence), or other causes. For either diagnosis, appropriate behavioral or medical therapy can be given and a substantial percentage of patients expected to respond. Even patients with mixed disorders (coexistent stress and urge incontinence) respond to various forms of conservative therapy in about 60% of cases.

The physician must recognize that even under the most typical clinical situations, the diagnosis of incontinence based only on clinical evaluation may be uncertain. This diagnostic uncertainty may be acceptable if medical or behavioral treatment (as opposed to surgery) is planned because of the low morbidity and cost of these treatments and because the ramifications of noncure (continued incontinence) are not severe. When surgical treatment of stress incontinence is planned, urodynamic testing is recommended to confirm the diagnosis unless the patient has an uncomplicated history and simple symptoms of stress incontinence.

Guidelines of the Agency for Health Care Policy and Research defined a subset of women complaining of urinary incontinence who did not need urodynamic testing before surgery⁷. Such a patient would lose urine only with physical exertion; have normal voiding habits (< 8 voiding episodes/day, < 2/night); have no neurologic history or physical findings suggestive of such; have no history of antiincontinence or radical pelvic surgery; possess a hypermobile urethra, pliable vaginal wall, and adequate vaginal capacity on physical examination; have a normal postvoid residual volume; and not be pregnant.

Complex cases such as noted in Table 3 may require urodynamic or other testing before initiating treatment¹⁰.

Table 2. Common Causes of Transient Urinary Incontinence

- Delirium
- Urinary tract infection or urethritis
- Atrophic urethritis or vaginitis
- Drug side effects
- Increased urine production
 - Metabolic (hyperglycemia, hypercalcemia)
 - Excess fluid intake
 - Volume overload
- Restricted mobility
- Stool impaction
- Psychologic

Modified from Urinary Incontinence Guideline Panel, 1992;7

Table 3. Situations That Warrant Further Testing for Diagnosis and Treatment of Lower Urinary Tract Dysfunction

- Uncertain diagnosis and inability to develop a reasonable treatment plan based on the basic diagnostic evaluation. Uncertainty in diagnosis may occur when there is lack of correlation between symptoms and clinical findings.
- Failure to respond to the patient's satisfaction to an adequate therapeutic trial, and the patient is interested in pursuing further therapy.
- Consideration of surgical intervention, particularly if previous surgery failed or the patient has a high surgical risk.
- The presence of other comorbid conditions:
 - Incontinence associated with recurrent symptomatic urinary tract infection
 - Persistent symptoms of difficult bladder emptying
 - History of previous antiincontinence surgery, radical pelvic surgery, or pelvic radiation therapy
 - Symptomatic pelvic prolapse, especially if beyond hymen
 - Abnormal postvoid residual urine volume
 - Neurologic condition such as multiple sclerosis or spinal cord lesions or injury
- Fistula or suburethral diverticulum.
- Hematuria without infection.

Modified from Fantl *et al.* 1996;10

Whenever objective clinical findings do not correlate with or reproduce the patient's symptoms, urodynamic testing is indicated for diagnosis. When trials of therapy are used, patients must be followed up periodically to evaluate response. If the patient fails to improve to her satisfaction, appropriate further urodynamic or other testing is indicated^{7,10}.

Treatments

Behavior modification

Several management strategies used to treat urinary incontinence can be incorporated under the category "behavior modifications". These include lifestyle interventions, scheduled

and/or prompted voiding, bladder training and pelvic muscle rehabilitation. Lifestyle alterations are frequently recommended by healthcare professionals to help modify incontinence, but published literature supporting this is sparse. Likewise, the effects of adding or removing lifestyle interventions (such as weight loss) on incontinence severity has generally not been studied.

Bladder training is widely used for the treatment of urinary incontinence, both in the community and in institutional settings; this intervention decreases the frequency of incontinence in most individuals. It is best provided by knowledgeable and motivated health care providers. There are no reported side effects and it does not limit future treatment options. Bladder retraining, also known as bladder drill or timed voiding, is generally used for the treatment of people with urge incontinence, but may also improve symptoms in women with mixed and stress incontinence. Bladder training aims to increase the time interval between voiding, either by mandatory or self-adjusted schedule, so that incontinence is ultimately avoided and continence regained. It is recommended and most effective for people who are physically and cognitively able and who are motivated. Bladder training is generally comprised of three components: patient education, scheduled voiding, and positive reinforcement¹⁰.

Burgio *et al.*¹¹ showed that combining drug and behavioral therapy in a stepped program can produce added benefit for patients with urge incontinence. In general, however, there is not enough evidence to show whether drug therapy is better than bladder training or useful as a supplement to it¹².

Pelvic muscle exercises, also called Kegel and pelvic floor exercises, are performed to strengthened the voluntary periurethral and perivaginal muscles (voluntary urethral sphincter and levator ani) that contribute to the closing force of the urethra and the support of the pelvic organs. They appear to be an effective treatment for adult women with stress and mixed incontinence¹³ and are better than no treatment or placebo. Pelvic muscle exercises may be used alone or augmented with bladder training, biofeedback, electrical stimulation or vaginal weight training. Health care providers must teach patients the correct method of distinguishing and contracting the pelvic muscles through vaginal examination, verbal feedback, biofeedback or educational programs.

Pessaries are recommended for women who have symptomatic pelvic organ prolapse. Pessaries and other mechanical devices modified to selectively support the bladder neck may be effective for treating some cases of urinary incontinence but objective evidence regarding their effectiveness has not been reported¹⁰. Other devices designed to compress the urethra or to insert within the urethra have been or are being developed but supportive data on their effectiveness are unavailable.

Pharmacologic therapy

The urethra and bladder contain a rich supply of estrogen receptors, and it is therefore biologically feasible that estrogen replacement affects postmenopausal urogenital symptoms. Estrogen does promote vaginal cellular maturation and beneficial vaginal flora; clinically estrogen improves symptoms of atrophy such as vaginal dryness, irritation and burning¹⁴. Estrogen also provides relief for various urogenital symptoms, including urinary

frequency, nocturia, urgency and dysuria¹⁴ although its effect on urinary incontinence and pelvic organ prolapse remains unresolved.

Pharmacologic therapy remains a popular mode of treatment for overactive bladder possibly because of convenience and compliance issues. A number of pharmacologic agents appear to be effective for frequency, urgency, and urge incontinence. However, the response to treatment is often unpredictable, and side effects are common with effective doses. In general, drugs improve overactive bladder by inhibiting the contractile activity of the bladder. These agents can be broadly classified into anticholinergic agents, tricyclic antidepressants, muscolotropic drugs, and a variety of less commonly used drugs. Several meta-analyses addressing drug therapy for overactive bladder have been published^{15,16}. The anticholinergic drugs oxybutynin chloride and tolterodine have five or more randomized controlled trials each; these trials support anticholinergic drug treatment as efficacious therapy for urge incontinence, with predictable side effects¹⁵. There does not seem to be a significant difference in response between these two drugs. The most typical side effect of anticholinergic therapy is dry mouth; the other side effects most frequently reported were blurred vision, constipation, nausea, dizziness and headache¹⁵. Although the treatment effects between anticholinergic drugs and placebo on overactive bladder symptoms were statistically significant, they tended to be small with frequent side effects. No data are available regarding long-term efficacy and compliance. For many of the outcomes studied, the observed differences between anticholinergic medications and placebo may be of questionable clinical significance¹⁶.

Alternative drugs, new drugs and new formulations of existing drugs are all available but limited data exist on which to base recommendations. These drugs may have larger (or smaller) effects or have fewer side effects than is currently the case, but such possible benefits cannot be judged from the existing information¹⁶. Innovative non-pharmacologic treatments for refractory overactive bladder, such as neuromodulation and Botox intravesical injections, appear effective at least in the short term and are subjects of intense ongoing research.

Periurethral bulking

A number of bulking agents have been used for the treatment of urodynamic stress incontinence in women. The bulking agents (collagen, carbon-coated beads, and fat) are injected trans- or peri-urethrally in the periurethral tissue around the bladder neck and proximal urethra. Bulking agents provide a "washer" effect around the proximal urethra and the bladder neck. Most of the reported studies have utilized glutaraldehyde cross-linked collagen as the bulking agent. Dmochowski and Appell¹⁷ summarized the literature on cross-linked bovine collagen for the treatment of stress incontinence and intrinsic sphincter deficiency. Most patients in the studies had failed other incontinence surgeries and had a supported non-mobile bladder neck. Seventeen studies were cited with cure rates ranging from 7% to 83%. The cure rate, defined in 15 articles as completely dry, averaged 48%. An overall average of 76% of subjects (range 68% to 90%) were listed as "dry" or "improved"¹⁷. The limitations of existing bulking agents are their durability and long-term results. For women with extensive co-morbidity precluding anesthesia,

injection of bulking agents may provide a useful option for relief of symptoms for a 12-month period although 2 or 3 injections are likely to be required to achieve a satisfactory result¹⁸.

Surgery

Surgery is indicated for treatment of SUI when all conservative treatments have failed to satisfactorily relieve the symptoms, and the patient wishes further treatment in an effort to achieve continence. Many operations have been developed for SUI but only a few -retropubic colposuspension and sling procedures- have survived and evolved with enough supporting evidence to make recommendations. Contemporary, less invasive modifications of these operations are being done and studies assessing their efficacy are ongoing.

Retropubic procedures

The basic goal of retropubic colposuspension procedures is to suspend and to stabilize the anterior vaginal wall, and thus the bladder neck and proximal urethra, in a retropubic position. This prevents their descent and allows for urethral compression against a stable suburethral layer. The Burch colposuspension is indicated for women with the diagnosis of urodynamic SUI and a hypermobile proximal urethra and bladder neck. Selection of a retropubic approach (versus a sling) depends on many factors, such as the need for laparotomy for other pelvic disease, the amount of pelvic organ prolapse and whether a vaginal or abdominal procedure will be used to suspend the vagina, the age and health status of the patient, and the preferences of the patient and surgeon. Although the Burch procedure can be used for intrinsic sphincter deficiency (ISD) with urethral hypermobility, sling operations probably yield better long-term results.

In a prospective multicenter randomized trial of Burch colposuspension and TVT procedure for urodynamic SUI, no difference was found between the surgeries for objective cure rates: 66% in the TVT group and 57% in the colposuspension group¹⁹. Bladder injury was more common during the TVT procedure; delayed voiding, operating time, and return to normal activity were all longer after colposuspension¹⁹.

Alcalay *et al.*²⁰ followed a cohort of 109 women (out of a group of 366 eligible women) who underwent Burch colposuspension between 1974 and 1983. The mean follow-up interval was 13.8 years. Both subjective and objective outcome measures were collected during the follow-up period. The cure of SUI was found to be time-dependent, with a decline for 10 to 12 years and then a plateau at 69%. Cure rates were significantly lower in woman who had had previous bladder neck surgery. Approximately 10% of patients required at least one additional surgery to cure her stress incontinence²⁰.

Laparoscopic access can be used to perform a Burch colposuspension and this technique has become popular with some physicians and patients. However, it remains to be proved whether laparoscopic colposuspension gives cure rates equal to open Burch colposuspension for SUI in women. Although it is possible that no difference exists between laparoscopic and open colposuspension, there appears to be a trend towards higher cure rates with the open Burch procedure²¹. Further well-designed and adequately powered randomized trials are required.

Langer *et al.*²² reported that 13.6% of patients who had undergone Burch procedures, but no hysterectomy or cul-de-sac obliteration, developed an enterocele 1 to 2 years postoperatively. Alcalay *et al.*²⁰ noted that 26% of patients during a 10 to 20 year follow-up period after Burch colposuspension underwent a rectocele repair and 5% underwent an enterocele repair. Whenever possible, a cul-de-sac obliteration in the form of uterosacral suspension plication or McCall culdeplasty should be considered at the time of colposuspension to prevent enterocele formation, although the true efficacy of this prophylactic maneuver is unknown. Rectocele repair should be done as indicated for symptomatic or large rectoceles. The study by Langer *et al.*²² clearly showed that hysterectomy adds little to the efficacy of Burch colposuspension in curing SUI. In general, hysterectomies should be done only for specific uterine pathology or for the treatment of uterovaginal prolapse.

Slings

In the majority of reported cases in the literature, the suburethral sling procedure has been used predominantly as a treatment for patients with recurrent SUI after previous bladder neck surgeries. Used for such an indication, the objective cure rates recorded in the literature range between 61% and 100% with a mean cure rate of 85%.^{23,24} The studies relating to the use of a suburethral sling (other than the tension-free vaginal tape [TVT] procedure) as a first procedure are few, but a mean continence rate of 94% is quoted²³.

Numerous materials are available for use in a suburethral sling. Current materials can be categorized as autologous fascia, allograft fascia, xenografts, and synthetic slings. Synthetic materials are readily available, allow the patient to avoid a harvesting procedure, and appear effective, but have the disadvantage of potentially generating a foreign body inflammatory reaction. Autologous rectus fascia and fascia lata are probably the most common materials in use and are the gold standard to which the outcome of other new materials should be compared. Application of newer technologies of harvesting tissue has made multiple human and animal-based materials available. The theoretical rationale for using allo- and xenografts for suburethral slings is reinforcement of inherently weak endopelvic fascia. Allogenic grafts harvested from cadaveric donors are widely used, and do not seem to carry a significant risk of erosion or infection. The long term durability of allograft fascia continues to be studied; there seems to be wide variability in the quality of tissue depending on its source and processing. The type of sling material probably does not significantly affect cure rates, provided that the characteristics of the chosen material are considered carefully²⁴.

The intermediate and longer-term results for suburethral slings suggest that the 10-year continence rate is similar to the 1-year continence rate²⁴. In fact, it appears that if sling procedures are successful after six months, then they are likely to remain successful for many years²⁴.

Tension-free mid-urethral slings

The TVT procedure is based on a theory of pathophysiology of SUI presented by Petros and Ulmsten²⁵. In their "integral

theory”, impairment of the pubourethral ligaments is one of the primary causes of SUI. Following this view, a narrow strip of polypropylene mesh is placed at the mid-urethra to compensate for the inefficiency of the pubourethral ligaments.

Long-term objective results of TVT procedure for primary SUI were shown in a Nordic multicenter trial by Nilsson *et al.*²⁶; at a median follow-up of 56 months, 85% of patients were objectively and subjectively cured, 10.6% were improved and 4.7% were regarded as failures²⁶. There were no cases of mesh erosion or permanent retention. Two randomized trials comparing the results of TVT vs. Burch colposuspension showed similar objective and subjective cure rates from both procedures^{19,27}. In the study by Ward and Hilton¹⁹, where TVT and colposuspension were employed as primary procedures, the reporting of complete dryness in both groups was 38% and 40%, respectively. Dryness with stress was reported in 66% and 68% of women. Strict definitions of cure and the fact that non-attendees and patients with missing data were recorded as treatment failures explain the lower cure rates compared to other studies¹⁹.

The operating time of TVT is relatively short and the majority of patients can undergo TVT without general anesthesia as an outpatient or overnight stay. Complications appear to be less severe and possibly less common than with pubovaginal fascial slings. In a multi-center study, intra-operative bladder perforation was recognized in 9% of procedures but no long-term sequelae resulted¹⁹. Nilsson *et al.*²⁶ reported that 56% of patients with mixed incontinence had resolution of their urge symptoms after TVT and 6% developed new symptoms of urge incontinence, findings that are similar to other sling procedures. Short-term voiding disorder is described in 4% to 11% of women, and retention requiring transection of the tape occurs in 1% to 2.8%^{19,28,29}. Mesh erosion into the vagina or urinary tract, pelvic hemorrhage or hematoma, and bowel perforation can occur but are very rare²⁸.

The success of TVT has led to the introduction of similar products with modified methods of midurethral sling placement (retropubic “top-down” and trans-obturator). Trans-obturator midurethral slings appear to be a particularly promising alternatives to TVT; these operations may be slightly safer since a needle passage through the retropubic space is avoided. A recent randomized trial with short follow-up showed similar cure rates between trans-obturator sling and TVT³⁰.

Surgical treatment of pelvic organ prolapse with and without SUI

The most effective surgical treatment for pelvic organ prolapse remains controversial and many opinions, but few quality studies, exist. Traditional vaginal repair procedures have relatively high failure rates and repeat operations are common. The addition of mesh with the abdominal sacral colpopexy has improved outcomes. One randomized surgical trial showed that abdominal sacral colpopexy with polypropylene mesh and vaginal sacrospinous colpopexy were both highly effective (anatomically and functionally) in the treatment of vaginal apex prolapse³¹. Interestingly, anterior vaginal wall failures were more common after vaginal sacrospinous colpopexy and posterior wall failures were more common after the abdominal approach³¹. Many new

Table 4. Important Topics of Current and Future Research in Pelvic Floor Disorders

- The actual role of urodynamic testing in predicting response to various treatments.
- Quality of life assessments of pelvic floor disorders, especially defecation disorders.
- The understanding and prevention of childbirth injury to the pelvic floor.
- Minimally invasive surgical techniques for SUI and pelvic organ prolapse.
- The use of graft materials in reconstructive pelvic surgery.
- Neuromodulation and related therapies for refractory voiding and pain disorders.

trans-vaginal operations utilizing grafts are being developed for prolapse, but outcomes are still preliminary.

Patients with stage II or III vaginal prolapse with coexistent symptomatic SUI have a number of treatment options. If the prolapse is to be repaired abdominally, as with a sacral colpopexy, then a Burch colposuspension, with a paravaginal defect repair if needed, is appropriate. Patients who are having their prolapse repaired transvaginally generally should have a sling placed at the time of their prolapse repair to treat the SUI. A TVT or trans-obturator mid-urethral sling is probably the most effective option if the patient has SUI without ISD. If she has ISD coexistent with her prolapse, then a pubovaginal fascial sling is appropriate although alternative materials, including a mid-urethral polypropylene sling, may be equally effective. Although anterior colporrhaphy with suburethral plication is not as effective as colposuspension or sling for symptomatic SUI, it may be appropriate for selected elderly patients with mild SUI in whom the surgical morbidity is best kept to a minimum.

Women who have severe pelvic organ prolapse but potential or occult SUI present a unique challenge to the surgeon. Data supporting a specific recommendation in these patients are scarce and several opposing opinions are common. In fact, even the correct method for making the diagnosis of occult SUI is controversial. However, a recent randomized trial showed that continence rates were higher after TVT compared to endopelvic fascia plication in women with prolapse and occult SUI^{31,32}.

Suggested areas of future research

The specialty of Urogynecology and Reconstructive Pelvic Surgery has expanded greatly in recent years and the quality of research has especially improved. There are many areas of exciting research that will lead to a better understanding of disease processes and treatments and ultimately to better care of patients. Table 4 lists some important topics are being intensively studied and will result in dramatic improvements in care to our patients.

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