Female Pelvic Health and Reconstructive Surgery

edited by
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Preface

In the year 2000, the American Board of Urology and the American Board of Obstetrics and Gynecology established a combined subspecialty entitled Female Pelvic Health and Reconstructive Surgery. The motivation for this decision was to emphasize and promote collaborative efforts between the specialties to further our understanding of pelvic floor disorders. As such, we embarked on this effort to establish this volume as a representation of those collaborative efforts.

This volume provides comprehensive, authoritative coverage of female pelvic health and reconstructive surgery. It is a compilation of contributions from many experts who specialize in the treatment of pelvic floor disorders. It will serve as an invaluable resource for investigators in the field and practitioners who treat pelvic floor disorders. Likewise, it will be an effective educational tool for both residents and medical students.

We have enjoyed this effort greatly. As the two fields develop this area of interest further, we hope that this type of collaboration and cooperation continues.

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Contents

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The Epidemiology and Etiology of Incontinence and Voiding Dysfunction

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I. INTRODUCTION

Urinary incontinence among women is a prevalent condition with a significant influence on well-being. Approximately one third of all women have involuntary leakage of urine; 10% have incontinence at least weekly, and 5% have incontinence daily [1–3]. Incontinence is so common in elderly patients that it is often mistakenly viewed as a consequence of aging and an inevitable problem with which women must contend. Incontinence, however, is also a problem among younger women in the community and in those younger women with particular medical problems [4,5]. Many factors, such as age, childbirth, parity, bowel dysfunction, obstetric complications, obesity, pelvic surgery, medications, functional impairment, chronic diseases, menstrual cycle, race, and family history, are associated with urinary incontinence [2,6–11]. It has been suggested that the prevalence of urinary incontinence increases at the time of menopause [12]. However, it remains uncertain whether this is due to the hormonal changes associated with menopause or is just part of the aging process [13]. This chapter focuses on the epidemiology and etiology of urinary incontinence and includes associated risk factors for incontinence.

II. PREVALENCE AND INCIDENCE

The prevalence of urinary incontinence in women varies widely. This is probably due to differences in populations studied, in data collection methods, and in defi-

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nitions of incontinence. The tendency for patients to underreport incontinence due to embarrassment further exacerbates this problem. Therefore, estimates from the literature should be accepted with some caution.

Urinary incontinence is estimated to affect 30% to 40% of older American women [14–17]. It has long been felt that the prevalence of any urinary incontinence increases with age, but contrary to popular belief, the few studies that have assessed incontinence across an age spectrum have shown only minimal increases in prevalence with age [2] or a higher prevalence in younger age groups [14]. The severity and type of urinary incontinence, however, may increase with aging.

The way in which incontinence is defined is particularly important. Estimates of the prevalence of urinary incontinence in women vary widely depending on the epidemiological methods used and the population studied. Hampel et al. observed that the epidemiological data are difficult to compare because of differences in definitions of incontinence, populations sampled, and study designs [18]. Using the definition of Diokno et al. of "any incontinence in the prior year" [17], the average prevalence estimate was 40.5%; using the definition of Thomas et al. of "more than two incontinent episodes per month" [2], the prevalence estimate was 14%; using the International Continence Society (ICS) definition of "social or hygienic problem and objectively demonstrable" [19], the prevalence estimate was 23.5%. Further, the overall average prevalence using a variety of miscellaneous definitions was 28.3% [14]. Studies that evaluated incontinence objectively had lower prevalence estimates (23.5%) [19] than those that depended only on the results of an interview (29.5%) [18]. Epidemiological studies conducted in the United States rarely confirm urinary incontinence objectively and have higher estimates of prevalence (37%) than do European (26%) and British (29%) series [18].

The prevalence of urinary incontinence has been shown to range from 26% to 57% depending on the definition used [20]. The tremendous range of prevalence data reported for incontinence in most studies is probably related to the differences in study populations and sampling procedures, the differences in methodologies used, and the differences in the definition of incontinence used by each investigator [21]. Another problem that affects the accuracy of prevalence studies of urinary incontinence is underreporting by patients. The incontinent woman is often embarrassed to report the condition to a health care professional and sometimes even attributes the incontinence to normal aging. As a result, incontinent patients often choose to manage their incontinence on their own by using undergarments or protective pads or by altering their voiding behaviors [22,23]. Due to a lack of knowledge of urinary incontinence and because their patients often do not report this problem, many health care professionals also underreport incontinence.

Incidence of urinary incontinence is defined as the probability of becoming incontinent during a defined interval of time, presuming incontinence at the beginning of the time interval. As few long-term longitudinal studies have been performed, there is little information available regarding the incidence of urinary incontinence. Studies of elderly patients have shown that about 10% of originally continent adults developed urinary incontinence over a 3-year period [24].

Therefore, in reviewing studies that address the prevalence and incidence of urinary incontinence, several issues should be kept in mind: (1) the definition

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of urinary incontinence used in the study; (2) the methods of sampling used; (3) the setting studied; (4) the sample or population demographics; (5) the reliability and validity of the study; (6) the methods of data collection and procedures; and (7) the response rate of study participants [21].

III. RISK FACTORS FOR URINARY INCONTINENCE

A. Sex

Incontinence is two to three times more common in women than men [24]. Differences in sex are most pronounced among adults under 60 years of age, which is most likely related to the very low prevalence of incontinence among younger men. In patients over 60 years of age, one study showed uncontrolled urine loss was reported in 18% of men and 38% of women [24]. These differences appear to be consistent among men and women no matter what the definition of urinary incontinence. Stress incontinence is relatively uncommon in men and far more common in women. Voiding problems, in general, are more common in elderly men [24].

B. Age

The prevalence of urinary incontinence appears to increase with age. Thomas et al. found that the percentage of British women reporting urinary leakage at least two times per month steadily increased from 4% of women aged 15 to 24 years to 16% of women over 75 years old [2]. Type of incontinence was shown to vary with age as well. Stress urinary incontinence was more common in women less than 65 years of age. Urge incontinence and mixed incontinence were more common after age 65. Yarnell and St. Leger found an increase in the reporting of incontinence by women across different age groups, with 28% of women 17 to 34 years of age reporting incontinence, and 59% of women over 75 years old reporting some degree of incontinence [25]. However, the prevalence rates did not differ by decades after 35 years of age [25].

The reasons for differences in the prevalence of incontinence with aging are unknown. With normal aging, there is a decline in the reserve capacity of all organ systems. Bladder capacity, voluntary restriction of micturition, bladder compliance, and urinary flow rate probably decrease with increasing age in both men and women. Postvoid residual urine volumes and the occurrence of uninhibited bladder contractions increase with aging. These changes in bladder function, along with changes in urethral function, appear to be directly related to the aging process.

Sier et al. reported that over one third of elderly patients admitted to the medical and surgical wards of a major teaching hospital experienced urinary incontinence at some time during their hospital stay [26]. The study also found that, in persons over 75 years of age, urinary incontinence was associated with other functional disabilities, such as difficulties with ambulation and cognitive impairment. The authors found that the urinary incontinence persisted and was not just a transient problem associated with the hospitalization.

Among residents of nursing homes, the prevalence of urinary incontinence varies from 40% to 70% depending on the proportion of functionally impaired

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residents [27,28]. A substantial proportion of nursing home residents are already incontinent at the time of admission. When compared to ambulatory, community-dwelling elderly persons, nursing home residents suffer from urinary incontinence that is more severe and is more commonly associated with fecal incontinence. Incontinent nursing home residents generally have multiple episodes of urinary incontinence throughout the day and night [29].

C. Race

There is little information available regarding racial differences in urinary incontinence. In Chinese, Eskimo, and black women, pelvic prolapse, enterocele, and stress incontinence are uncommon [24]. Studies have been done to look at the general anatomic relationship of the levator ani musculature and urethra among different racial groups, and although certain differences were identified, the work was uncontrolled and subjective and should therefore not be considered a definitive explanation [24].

D. Childbirth

An association between urinary incontinence and parity has been shown [2]. Nulliparous women report incontinence less often than parous women regardless of age. However, no difference in rate of incontinence was noted for women who had three or fewer births. Women who had at least four births were most likely to report incontinence. The increase in prevalence of incontinence with parity is primarily due to an increase of stress and mixed urinary incontinence. There is little or no association between urge incontinence and parity [24].

Injury to pelvic support muscles resulting from childbirth has been implicated as a major etiological factor in stress urinary incontinence. In addition to vaginal delivery directly damaging the pelvic support muscles, there may be partial denervation of the pelvic floor and urethral muscles during childbirth [24]. Most of the muscle injury that occurs with childbirth is recoverable with exercise. Women who have delivered via cesarean section demonstrate increased pelvic muscle strength during and after the postpartum period compared to women who have delivered vaginally [24].

History of abortion was inversely related to the prevalence of daytime urinary frequency, but was positively associated with the sensation of an empty bladder [6]. Obstetrical complications, such as with episiotomies, anal sphincter lesions, deliveries of a large fetus, and prolonged delivery times, might predispose women to postpregnancy urinary incontinence [7].

These data suggest that childbirth adversely affects the function of the lower urinary tract and may even explain some cases of genuine stress urinary incontinence, but further research is needed to understand fully the roles of pregnancy and childbirth in the etiology of pelvic muscle dysfunction and urinary incontinence.

E. Menopause

There is little epidemiological evidence to support the association between menopause and urinary incontinence. Normal urethral function in the female is affected

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by age and estrogen status. Maximum urethral pressure and urethral length increase from birth until 25 years of age and then decrease [24]. A further decrease in functional urethral length occurs after menopause, possibly due to estrogen deprivation. Continence is normally maintained by a complex interaction of urethral smooth muscle, urethral wall elasticity and vascularity, and periurethral striated muscle [24]. Decreased urethral vascularity and abnormal smooth and skeletal muscle function result in low resting urethral pressure and an abnormal stress response, which may explain a relationship between menopause and incontinence.

Burgio et al. [16] in the United States and Jolleys [30] in the United Kingdom reported significantly lower prevalence rates of incontinence in postmenopausal women compared with premenopausal women, whereas studies in Sweden, Denmark, and the Netherlands demonstrated no significant differences between these two groups [8,31,32]. Although Rekers et al. [32] noted no differences in premenopausal and postmenopausal prevalence rates, they noted that most postmenopausal women who were incontinent stated that their incontinence began at menopause.

F. Smoking

A significant relationship between cigarette smoking and the development of all forms of urinary incontinence has been shown [33]. Smoking was associated with a two- to threefold increase in relative risk of urinary incontinence [24,33]. This information may encourage women to avoid smoking or to stop smoking if they have already begun.

G. Obesity

Obesity is well established as a risk factor for urinary incontinence [34,35]. Moller et al. described a positive and almost linear association between obesity and urinary incontinence, and there was a similar association between other lower urinary tract symptoms and obesity [6]. Dwyer et al. defined obesity as a weight greater than 120% of the average for height and age and found that obesity was significantly more common in women with genuine stress incontinence and detrusor instability than in the normal population [36]. Obesity was related to age, prior incontinence operations, and parity, but there were no significant differences for any of the urodynamic variables measured between obese and nonobese incontinent women [24]. Therefore, it is not known whether obesity is an independent risk factor in the development of urinary incontinence. In another study, however, Wingate et al. demonstrated obesity to be a significant risk factor for urinary incontinence independent of obstetric history, surgery, smoking, and family history [37]. Several other epidemiological studies have shown obesity and increased body mass index to be a significant and independent risk factor for urinary incontinence [16,34,38]. Subjective resolution of stress and urge urinary incontinence and objective resolution of detrusor instability, genuine stress incontinence, and the combination of the two conditions have been documented in a group of morbidly obese women who underwent bariatric surgery with resultant massive weight loss [10].

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H. Constipation

Chronic constipation with repeated prolonged straining efforts to defecate has been shown to contribute to progressive neuropathy and dysfunction of the pudendal nerve, thereby resulting in various degrees of urinary incontinence [39,40]. Older women with urinary incontinence are much more likely to have both constipation and fecal incontinence than are women without urinary incontinence [41].

I. Recreational Stresses

Despite the fact that recreational activities that result in excessive and repetitive increase in abdominal pressure would seem to contribute to the development of pelvic floor dysfunction and lower urinary tract symptoms, few studies have investigated the potentially causative mechanism. Studies have demonstrated that urinary incontinence is not uncommon among young nulliparous athletes, is more common in those women who exercise than in those women who do not, and increases in severity with higher impact activities [14,42,43].

J. Surgery

The thought that hysterectomy causes de novo bladder and urethral dysfunction in previously normal women may not be entirely correct. Most of the studies mentioned to support this conviction are anecdotal or retrospective, do not have appropriate control groups, or are based on subjective parameters [14]. Studies that have included preoperative and postoperative urodynamic parameters have demonstrated variable and inconsequential changes in bladder function related to hysterectomy [44–46].

K. Medications

Medications can act directly by affecting the partially decompensated lower urinary tract and precipitate or worsen the severity of urinary incontinence (e.g., α-adrenergic receptor blockers, caffeine, and diuretics) [47,48]. Other medications can indirectly affect the development of urinary incontinence by promoting such other risk factors as severe constipation (e.g., nonsteroidal anti-inflammatory agents, antacids, and iron) or causing a severe nonproductive cough (e.g., some angiotensin-converting enzyme inhibitors) [49,50].

IV. SUMMARY

Urinary incontinence is a prevalent, disruptive, and complex problem that affects a large number of adults and thereby presents a significant burden to health and economic resources. A relatively small number of patients with urinary incontinence volunteer their symptoms. Urinary incontinence is not a normal consequence of aging and is curable, if not manageable, in most instances. However, many individuals with this condition are not seriously evaluated and managed by health care professionals.

Risk factor identification and the development of proper strategies for prevention should be priorities for future research. Defining the relative importance

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of various risk factors for the development of urinary incontinence is paramount to prevention.

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