Global View on Urinary and Fecal Incontinence

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INTRODUCTION

In the year 2007, the world's population has reached over 6.5 billion. In 2000, the United Nations estimated that the world's population was then growing at the rate of 1.14% (or about 75 million people) per year [1]. The United States Census Bureau forecasts that the world's population will increase to 9.4 billion by 2050 [2]. On the other hand, the rate of increase in the world's population has been steadily declining from its peak of 2.19% in 1963. In some developed and developing countries, including Taiwan, there have been decreasing birth rates accompanied by increases in life expectancy, which has led to population aging. This pattern is expected to continue over the next few decades, eventually affecting the whole world. A society is considered relatively old when the fraction of the population aged 65 years and over exceeds 8%-10%. By this standard, the percentage of elderly people in the United States stood at 12.6% in 2000 and is projected to increase to 20% by the year 2030 [3]. Currently, Taiwan is a relatively old society as the proportion of elderly people is already over the 10% mark. Globally, the percentage of elderly people was 6.9% in 2000 and is projected to be 19.3% by 2050 according to the United Nations [4]. Population aging carries with it many important socio-economic and health consequences. It presents challenges for public health, with concerns over possible bankruptcy of medical insurance programs, as well as economic development with shrinkage of the labor force, increase in the old-age dependency ratio and bankruptcy of social welfare systems. As a nation ages, the prevalence of disability, frailty and chronic diseases is expected to increase dramatically. Some experts even raise concerns that humankind may become a "global nursing home" [5].

Urinary incontinence and fecal incontinence are two common and debilitating chronic conditions in the elderly population. These two problems may occur together because of common risk factors and etiologies. Although non-fatal, incontinence has profound detrimental effects on quality of life, and causes embarrassment and anxiety in those who have it, as well as those who care for those affected. The problem is especially severe in nursing homes and institutionalized environments. Moreover, many affected persons do not voluntarily seek help or report the symptoms to their physicians. Geriatric incontinence (GI) is indeed a global issue creating a great challenge and a heavy burden on the healthcare system. The solution for a problem of this magnitude would require coordination of local, national and international efforts.

URINARY INCONTINENCE

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According to the 2002 International Continence Society (ICS) definition [6], the term "urinary incontinence" may represent a symptom, a sign and a condition. The symptom of urinary incontinence is defined as the complaint of any involuntary leakage of urine, and includes stress urinary incontinence (SUI), urge urinary incontinence, mixed urinary incontinence, enuresis, nocturnal enuresis, continuous urinary incontinence and other types. The sign of incontinence is defined as urine leakage seen during examination, which may be urethral and extraurethral. The conditions of incontinence are defined by urodynamic observations, including detrusor overactivity incontinence, urethral relaxation incontinence and urodynamic stress incontinence. Detrusor overactivity incontinence is incontinence due to an involuntary detrusor contraction. Urethral relaxation incontinence is defined as leakage due to urethral relaxation in the absence of raised abdominal pressure or detrusor overactivity. Urodynamic stress incontinence is noted during filling cystometry and is defined as the involuntary leakage of urine during increased abdominal pressure in the absence of a detrusor contraction. Urodynamic stress incontinence is now the preferred term to "genuine stress incontinence".

Epidemiologic studies show that the incidence of urinary incontinence increases with age, with the range of prevalence estimates among community dwelling patients varying enormously from 2% to 58% [7,8]. Urinary incontinence is a prevalent cross-cultural condition. Variation in estimates of urinary incontinence prevalence in the community reflects the effects of differences in definition, population characteristics and study methodology. Future studies should rely on universally accepted standardized definitions to produce meaningful evidence-based clinical and epidemiological data. On the other hand, without doubt, the prevalence of urinary incontinence in institutionalized inhabitants is even higher, with many authors suggesting a prevalence of 40%-60% [9,10].

There is a gender difference in the occurrence of urinary incontinence. According to a MEDLINE search study [11], the median prevalence of female urinary incontinence is found to be 27.6%. Risk factors include parity, obesity, chronic cough, depression, poor health, lower urinary tract symptoms (LUTS), previous hysterectomy and stroke. Although quality of life was affected, most patients did not seek help. The reported urinary incontinence prevalence for men ranges from 3%-11% [12,13] and shows a more steady increase with age than in women. The risk factors include age, LUTS, neurological diseases and prostatectomy.

According to data from the Urologic Diseases in America Project [14,15], urinary incontinence affects men of all ages, including 17% of males older than 60 years in the United States, which is an estimated 3.4 million men. Resource use is greatest in the nursing home setting, where more than half of men have urinary incontinence and require assistance with toileting. The overall economic burden for male urinary incontinence was estimated at 18.8 billion dollars in 1998/1999. Medical expenditures for urinary incontinence for male Medicare benefici-

aries who are 65 years of age and older have doubled since 1992. Compared to elderly men without urinary incontinence, the presence of urinary incontinence increases the annual expenditures per person yearly from 3,204 dollars to 7,702 dollars. For women, medical expenditures for urinary incontinence increased substantially during the 1990s, almost doubling from 128.1 million dollars in 1992 to 234.4 million dollars in 1998 for Medicare beneficiaries 65 years of age or older. More recently, the EPIC study [16], a population-based survey of urinary incontinence, overactive bladder (OAB) and other LUTS in five countries, reported a urinary incontinence prevalence rate of 13.1% for women and 5.4% for men. The overall prevalence of any LUTS was 62.5% in men and 66.6% in women.

Although most prevalent in the elderly, incontinence can occur in all age groups. The content of differential diagnosis should be considered according to age and gender, categorized as children, men, women and frail-elderly.

In children, the symptoms of incontinence can be divided into: (1) monosymptomatic nocturnal enuresis; (2) daytime with/without nighttime wetting; and (3) incontinence associated with urinary tract anomaly, neuropathy or pelvic surgery. In men, the symptoms of incontinence are divided into: (1) post-micturitional dribbling; (2) post-prostatectomy incontinence; (3) incontinence with urgency/frequency (OAB); and (4) complex incontinence associated with neuropathy, pain, hematuria, infection, voiding symptoms, irradiation and surgery. In women, the symptoms of incontinence are divided into: (1) incontinence on physical activity (SUI); (2) incontinence with urgency/frequency (OAB); (3) incontinence with mixed symptoms; and (4) complex incontinence associated with neuropathy, pain, hematuria, infection, voiding symptoms, irradiation, surgery and fistula.

GERIATRIC URINARY INCONTINENCE

Incontinence is especially common in the elderly population because aging is associated with a myriad of changes in the urinary tract. The bladder capacity, ability to postpone voiding, urinary flow rate and urethral pressure are often decreased. The ability of the kidneys to concentrate urine at night is diminished. Post-void residual volume is increased and the prostate gland enlarges in males. The urethral mucosa becomes atrophic in females due to estrogen withdrawal. These changes do not cause incontinence *per se* but can act as predisposing factors. In frail elderly patients, it is important to differentiate transient incontinence from established incontinence. Transient urinary incontinence is usually precipitated by conditions outside the urinary tract. Transient causes account for one-third of incontinence among the community-dwelling elderly population and one-half of cases among acutely-hospitalized older patients. The causes of such transient incontinence can easily be remembered by the mnemonic DIAPPERS: delirium, infection, atrophic vaginitis, psychological disorders, pharmacological effects, excess urine output, restricted motility and stool impaction [17]. The prevalence of these eight transient causes of urinary incontinence in the elderly is high.

Clinical evaluation involves history taking, symptom assessments, urinary diary, physical examination and urinalysis. The aim of evaluation of transient incontinence includes identification of the type of incontinence, reversible causes and associated conditions. Look not only for the urogenital causes but also for more general causes related to the neurological state, cognition, mobility, general independence and living environment. Urodynamics are indicated for complicated/surgical cases; cystometry, urethral closure pressure and abdominal leak point pressure measurements are commonly used. The extent of investigations in frail older patients needs to be considered in the context of life expectancy, quality of life and realistic outcome possibilities.

Reversal of the transient precipitating factors alone may restore continence even if any underlying urinary tract dysfunction is not corrected. Targeted treatment modalities for GI include: (1) life style interventions; (2) physical therapies; (3) bladder retraining; (4) pharmacological therapies; and (5) surgical treatments. It is advisable to adopt a more conservative approach in treating the elderly. Common medications include anticholinergics, duloxetine, estrogen and alpha-blockers. Currently, no medication has been approved for the treatment of SUI despite duloxetine being under review by the Food and Drug Administration (FDA). Since elderly people are more susceptible to adverse drug reactions, it is important to start with a low dose, building up the dose slowly. The treatment goal is not merely to improve or cure incontinence but to improve the patient's overall function and quality of life: if independent continence is impossible to achieve, dependent continence or social continence are more realistic goals.

In summary, clinical features characteristic of GI include:

1. Apart from the urinary tract, continence depends on the integrity of multiple domains: mentality, mobility, manual dexterity, medical factors and motivation. This notion is especially relevant in dealing with GI.
2. Incontinence in younger patients usually results from lower urinary tract dysfunction (LUTD) alone but incontinence in older patients often results from deficits in multiple domains, including predisposing factors and precipitating factors.
3. The reversible causes of transient incontinence should be identified and treated before embarking on complex diagnostic investigation and management.
4. The treatment goal should be realistic and aim to improve the patient's functional status and quality of life.
5. The clinical management of GI requires a holistic treatment approach. Thus, multidisciplinary team-work involving urologists, gynecologists, family physicians and nursing specialists is needed to achieve the best outcomes.

FECAL INCONTINENCE

Anal incontinence is the involuntary loss of flatus, liquid or stool that is a social or hygiene problem. The definition of fecal incontinence is similar, with the exclusion of flatus incontinence [18]. A recent systemic review of the prevalence of anal and fecal incontinence reported a range of 2%-24% and 0.4%-18%, respectively [19]. More than 5.5 million Americans have fecal incontinence. It affects people of all ages but is more common in women than in men. Fecal incontinence is also more prevalent in old age, with one-third of those over 65 year having symptoms at least once a year. The prevalence is approximately 50% among the institutionalized [20]. It is a devastating illness resulting in considerable embarrassment, shame and humiliation. Some do not want to leave the house for fear they might have an accident in public. Most try to hide the problem as long as possible, so they withdraw from friends and family, ending up in social isolation or institutionalization. Over 50% of patients with major fecal incontinence report a significant negative impact on quality of life [21].

Essential elements for maintaining normal anal control include anal sphincter muscles, rectal sensation and rectal accommodation. The ability to hold stools requires the normal function of the rectum, anus and nervous system. In addition, normal physical and mental capabilities to recognize and appropriately respond to the urge to defecate are also needed. Common causes of fecal incontinence in elderly patients include:

1. Constipation: It is one of the most common causes of fecal incontinence. Chronic constipation with large, hard stools weakens the anal sphincter and damages the nerves. Watery stool eventually leaks around the hardened stool. In addition, patients with chronic constipation may have a problem with laxative abuse.
2. Dysfunction of the anal sphincter muscles: In women, sphincter damage often occurs during childbirth. Hemorrhoid surgery can also damage the anal sphincters. In elderly people, muscles and ligaments that support the pelvis and anus can weaken leading to loss of anal strength. Patients with rectal prolapse or rectocele may also suffer from fecal incontinence.
3. Nerve dysfunction: Nerve damage can be caused by childbirth, stroke, spinal cord injury, diabetes, multiple sclerosis and other neurological diseases.
4. Diarrhea: Loose or watery stool is more difficult to control than solid-formed stool, especially in elderly people with weak anal sphincters.
5. Loss of storage capacity in the rectum: Normally, the rectum stretches to accommodate the stool. If the rectum is scarred or stiffened from surgery, irradiation or inflammatory bowel diseases, the decreased rectal capacity can lead to fecal incontinence.
6. Psychological and behavioral problems: Patients with severe depression or dementia frequently have problems of fecal incontinence.

Preliminary diagnostic investigation includes history taking, physical examination and anal tone assessment. Anal manometry, anorectal ultrasonography, proctography, proctosigmoidoscopy, anal electromyography and endoanal magnetic resonance imaging (MRI) are optional procedures in selected cases. As for treatment, it depends on the cause and severity of fecal incontinence, and may include dietary changes, medication, bowel training, biofeedback or surgery. Loperamide, opiates and amitriptyline are drug options. Invasive intervention includes anal sphincter repair, sphincter augmentation, sacral nerve stimulation, bulking agent injection, artificial sphincter and stoma formation. Very often, combined treatments may be necessary for successful control. In a recent review of the literature using MEDLINE, the Cochrane database and standard textbooks [22], it is concluded that the long-term outcome of surgery is uncertain, although stoma formation is a definitive option for some patients. Modern approaches favor conservative measures, such as biofeedback and less invasive procedures. Current treatment of fecal incontinence is evolving from a sphincter-focused view to a more holistic one, recognizing the influence of the pelvic floor and psyche in maintaining continence.

TAIWAN EPIDEMIOLOGY DATA ON INCONTINENCE

Chen et al [23] reported a community-based study to evaluate the prevalence of female urinary incontinence and OAB. They also assessed the influences of these conditions on quality of life and associated risk factors. Of the 1,581 women sampled, 1,253 (79.1%) women were successfully interviewed. A total of 53.7% of the women sampled suffered from urinary incontinence and related symptoms. The prevalence of self-reported SUI, OAB and mixed incontinence were 18.0%, 18.6% and 17.1%, respectively. Judging by the criteria of the ICS, the prevalence of the above three conditions was 4.3%, 2.4% and 1.8%, respectively. The occurrence of SUI increased with age up to 65 years. Among the incontinent women, approximately two-thirds had restricted social activities and 19% had an affected sex life. Only 27.1% of the women with urinary incontinence and related symptoms in this study reported seeking medical help.

A study by Tseng et al [24] investigated the prevalence and clinical characteristics of urinary incontinence among elderly individuals living at home. A total of 504 elderly subjects aged 65 years and older residing in Tungkang, a rural town at southern Taiwan, were randomly sampled and interviewed by registered nurses. About 22% of respondents reported that they had experienced involuntary loss of urine in daily life. Women, people who were overweight and those who were aged 70 years or older were at higher risk. While women were more likely to suffer from SUI, men were at higher risk of urge incontinence. Women, illiterate individuals and those who perceived incontinence as a normal part of the aging process showed low intention to seek treatment.

Yu et al [25] investigated the quality of life impact of urinary incontinence and examined its relationship with treatment seeking in adult Taiwanese women. A short form incontinence impact questionnaire (IIQ-7) was used. The mean IIQ-7 score of the 205 (12.7%) women who reported urinary leakage more than once per month in the preceding 12 months was 5.0 (range: 0-19), which showed a significant correlation with the severity of incontinence ($r = 0.59$, $p<0.001$). Women with mixed type incontinence had a higher IIQ-7 score compared to those with SUI or urge incontinence. Fifty-five (26.8%) incontinent women had sought medical help. Treatment seeking was highly related to IIQ-7 scores; 75% of incontinent women with IIQ-7 scores greater than 10 had sough medical help in contrast to only 5% among those with a score less than or equal to 3 ($p<0.001$).

The epidemiology of female anal incontinence and constipation in the community was reported by Chen et al [26]. The prevalence of fecal incontinence and flatus incontinence was 35 (2.8%) and 107 (8.6%), respectively. There were 306 (24.5%) participants who reported constipation. The prevalence of anal incontinence did not increase after the age of 65 years. The prevalence of constipation significantly increased in the women aged 65 years and over. The results demonstrated that constipation shares some of the same risk factors that predispose women to the occurrence of anal incontinence, namely symptoms of uterovaginal prolapse, prior gynecological surgery and OAB.

TAIWANESE INCONTINENCE SOCIETY (TCS) GUIDELINES

The prevalence of urinary and fecal incontinence is increasing in Taiwan because of population aging. Consequently, the healthcare and economic burdens associated with incontinence will be enormous in the years to come. Clinical practice guidelines are systemically developed statements designed to assist practitioner and patient decisions about appropriate health care for specific clinical conditions and/or circumstances. The purpose of practice guidelines is to reduce unwanted variations by setting agreed standards based on the best available evidence. Further, a good guideline should also be patient-focused, user-friendly and location specific. Under the leadership of Professor Hann-Chorg Kuo, president of the TCS, a three-year project

has been launched to establish Taiwan clinical practice guidelines for five entities of LUTD: LUTS/benign prostatic hyperplasia (BPH), OAB, SUI/pelvic floor prolapse (POP), interstitial cystitis (IC) and GI. The guidelines are aimed at rationalizing practices concerning the diagnosis, treatment and care of patients with incontinence in such a way that healthcare deliveries are effective, economical and evidence-based. Under the TCS Guidelines Committee, five *ad hoc* sub-committees (LUTS/BPH, OAB, SUI/POP, IC and GI) were set up. Expert meetings will be held to define the clinical issues and controversies, as well as to search and organize evidence. The action plan aims to complete the first draft of diagnostic guidelines in the first year and treatment guidelines in the second year. By the end of second year, preliminary reports for the LUTD guidelines will be published. Pilot clinical testing will be performed during the third year at selected locations. Feedback responses on the preliminary recommendations will be gathered and evaluated, after which the guidelines will be amended and updated with any upcoming new evidence. The final recommendations report will be released at the end of the third year. It is our belief and hope that the guidelines will offer useful assistance to healthcare practitioners, providers and planners when dealing with patients with incontinence.

CONCLUSIONS

Population growth and aging are problems on a global scale. With an ever-increasing elderly population, the burden on healthcare is enormous. GI is a debilitating condition with profound detrimental effects on quality of life. Very often, it is also the final straw that breaks the bond between a senior citizen and family and society, since taking care of an incontinent individual is a daunting responsibility. With the decreased birth rate and death rate, Taiwan is a rapidly aging society. Our healthcare system should be well prepared to tackle this looming problem by setting up national policies to treat and care for elderly incontinent citizens. It is the mission of the TCS not to be absent from such an endeavor. The development of the TCS guidelines on GI is one way we can contribute to looking after the benefits of our senior citizens.

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