

Urinary Incontinence in Dementia

Der-Sheng Han, M.D., Yen-Ho Wang, M.D.¹

Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital, Bei-Hu Branch, Taipei, Taiwan; Department of Physical Medicine and Rehabilitation¹, National Taiwan University Hospital and National Taiwan University College of Medicine, Taipei, Taiwan

ABSTRACT

Urinary incontinence (UI) in dementia is a common problem which can lead to comorbidities, lower quality of life, and great economic cost. It usually emerges at the stage of moderate dementia. The prevalence rate of UI is 4 times more common in people with dementia than in those without, and is higher in the older population. UI is related to pressure ulcers, urinary tract infection, falls, fractures, low quality of life, earlier institutionalization, and increased risk of suicide and mortality. Functional incontinence and detrusor overactivity are the main causes of UI in dementia. The chain of continence, including sensory function, high cortical function, the sacral micturition reflex, accessibility to toilets and a friendly environment, and manual dexterity, is the key concept of continence. A complete evaluation consists of a medical history, physical examination, postvoid residual volume measurement, and urinalysis. Reversible causes are corrected first. Management should be individualized. The pharmacological options include anticholinergics, antidepressants or antipsychotics, estrogen, alpha-blockers, antibiotics, and laxatives. Behavior treatment includes timed voiding, prompted voiding, bladder training, pelvic muscle rehabilitation, education, environmental alteration, adequate hydration, therapeutic exercise, and continence aids. Multidisciplinary team-work is usually needed to reach the best outcomes.

INTRODUCTION

Due to prolonged life expectancy and the growing number of elderly people, dementia has become an important illness. It requires a great amount of human, medical, and financial resources, and this amount will continue to increase [1]. According to a prevalence study using the 2000 census in the United States, nearly half of people older than 85 have dementia [2]. In 2005, there were 138,000 people with dementia in Taiwan, and it is estimated that this figure will double by 2020 and nearly quintuple by 2050 [3]. Dementia is a syndrome for an array of conditions. The clinical presentation is variable, and its impact is pervasive. Some behavioral disturbances, including incontinence and wandering, may trigger nursing home placement [4]. Urinary incontinence (UI), a very common condition in those with dementia, is recognized as a problem with comorbidities, dissatisfaction with quality of life, and great economic costs. However, UI is usually treated passively or even not treated at all in dementia patients.

In this article, we will review contemporary studies and try to summarize current concepts on UI in dementia.

PREVALENCE

Dementia refers to a group of disorders that result in impaired cognition, decreased functional performance in routine activities, and decline in socially acceptable behavior. The diagnosis of Alzheimer's disease (AD), the most common cause of dementia for individuals 65 years old and older, is based on DSM-IV criteria [5]. The reasons for the increase in the population with AD are a decline in the death rate and an extended life span of dementia patients [2]. Other common types of dementia include vascular dementia, Lewy body dementia (LBD), and frontotemporal dementia. These four types combine to account for 90% of dementia cases [6]. The remaining causes of dementia are relatively rare, eg. Huntington's disease and Creutzfeldt-Jakob disease. There may also be combinations of these etiologies [7].

AD is typically a slow but relentlessly progressive disease with an onset of subtle cognitive change [8]. As the disease progresses, patients experience symptoms such as withdrawal, aggression, anxiety, sleep disturbance, wandering, hallucinations, delusions and functional impairment [9]. Incontinence is a functional impairment, and usually leads to nursing home placement [4]. The progression of the disease is usually classified into the following four stages: mild cognitive impairment, mild dementia, moderate dementia, and severe dementia [10]. Incontinence often emerges in the 3rd stage-moderate dementia. Difficulties with mobility also emerge in the same stage.

UI is an involuntary leakage of urine that interferes with the patient's social and other aspects of daily life [11]. Underreporting of UI in the elderly is caused by the misconception that it is an inevitable consequence of aging and that options for treatment are limited [12]. Generally, the prevalence rates of UI have varied considerably from 11% to 90% in dementia patients [13]. In subgroup analysis, UI affects about 22% of people with dementia living in the community and about 84% of those in nursing homes, and is up to 4 times more common in those with dementia than those without [14]. Although UI is twice as common in women as in men among adults older than 60 years old, the difference is not significant between men and women with dementia [15]. The onset of UI occurs earlier in LBD than in AD [16]. In Finland, in people aged 70 years and over, the prevalence of stress, urge, and mixed incontinence was 2%, 17%, 6% in men and 23%, 6%, 30% in women, respectively [17]. In a large scale US community-based survey, nearly 20% of women aged 65 to 74 years reported UI [12]. In Norway, the figure reached 16% [18]. In a large community and nursing home-based Swedish study, UI was reported by 42% and 35% of women and men aged 75 years and older, respectively [19].

UI incurs skin irritation and pressure ulcers, urinary tract infections [20], falls, fractures [21], and low quality of life [22]. It also increases the dependence level of patients, and results in earlier institutionalization [23]. Furthermore, UI has been associated with an increased risk of suicide [24] and mortality [25].

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Address correspondence to: Dr. Yen-Ho Wang, Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital, 7, Chung Shan South Road, Taipei, 10002, Taiwan

E-mail: lukewang@ntu.edu.tw

PATHOPHYSIOLOGY

Detrusor overactivity, both idiopathic and neurogenic, was previously believed to be the major cause of incontinence in dementia [26]. Central nervous lesions, leading to loss of the inhibitory influence on the micturition reflex, result in involuntary bladder contractions. However, recent findings suggest that detrusor overactivity is not necessarily involved in some incontinence in dementia patients. Functional incontinence, defined by physical or cognitive impairments, psychological conditions associated with unwillingness to use the toilet appropriately, the presence of physical barriers, or the lack of needed caregiving assistance, is more common in this group of patients. [27, 28]. Dubeau pointed out that impaired mobility had a stronger relation to incontinence than impaired cognitive function. Many dementia patients have a good chance to remain continent if their mobility function is still intact [29].

UI could also be one of the lower urinary tract symptoms (LUTS) and result from discoordination between bladder storage and urethral resistance. The newly revised standardization of terminology by the International Continence Society emphasizes LUTS as subjective indicators of a disease or change in condition as perceived by the patient or described by the caregiver [11]. The three types of UI in LUTS are urge, stress and mixed incontinence.

UI in dementia is due to a multifactorial breakdown in the integrity of compensatory mechanisms for the physiological changes in the normally aging urological system [30]. Since maintenance of continence in dementia relies on the intact function of multiple domains, the ‘Chain of Continence’ was coined to stress the importance and interaction between these factors. They are listed as following:

1. Sensory function to sense fullness of the bladder. A patient having an over-distended bladder, diabetes or autonomic neuropathy has problems in this domain.
2. High cortical function to provide inhibition of the desire to void. Poor motivation and mentality, such as in patients with normal pressure hydrocephalus, dementia, delirium, depression, frontal lobe lesions, and psychiatric causes, interfere with maintenance of continence.
3. Sacral micturition reflex to control the detrusor and sphincter. Problems with this function occur in typical neurogenic bladder dysfunction found in spinal cord injury, lumbrosacral herniated intervertebral disc, and acute transverse myelitis.
4. Accessibility to the toilet, including both patient’s mobility function and the environment factors. Those patients with stroke, Parkinson’s disease or cerebellar atrophy, who can not move the body to a suitable place and keep the posture to void, belong to this domain. The environmental factors consist of poor care-providing system and poor design of toilet.
5. Manual dexterity to undress, clean and dress. Patients with rheumatic arthritis with hand joint involvement, and anterior cord syndrome or stroke with limb weakness typically have difficulties in this area [29].

EVALUATION

Knowing the causes of UI is the key step toward successful management. The causes of UI in dementia are usually multiple. The basic evaluation includes a medical history, physical examination, postvoid residual (PVR) volume measurement, and urinalysis [12].

Associated diseases can cause or exacerbate UI. The following data should be obtained; a detailed duration of symptoms; frequency, volume, and timing of incontinence; precipitants to incontinence (sneezing, coughing, exercise, and caffeine, alcohol and excessive water intake); pregnancy history and mode of delivery; past surgeries; sexual function; bowel function-history of constipation and fecal incontinence; social and personal impact (on work, family and sexual function); history of prolapse; and medications [31]. A review of medications can be helpful in finding drugs exacerbating UI. Use of cholinesterase inhibitors for dementia is associated with an increased risk of UI. Clinicians should avoid the use of anticholinergics to counteract the adverse effect of cholinesterase inhibitors [32]. Diuretics increase urine output and frequency. Anticholinergics, narcotics, and calcium channel blockers can decrease bladder contractility.

The physical examination should note the presence of vaginal atrophy and cystocele, and direct observation of urine loss using a cough stress test. Neurological examination should include cognitive function, the Babinski sign, and tests of peripheral nerves [31].

A voiding diary, including volume of fluid intake and urine output, incontinence episodes, and potential reasons for incontinence, is beneficial to finding the causes of UI. PVR is essential in the preliminary differentiation between overflow and urge incontinence. Generally, the PVR increases in the normal aging process. If the volume is larger than 200 mL, inadequate emptying is suspected [33]. Urinalysis can find asymptomatic bacteriuria and UTI. It also screens those with decreased renal function.

Potentially reversible causes of UI can be memorized using the mnemonic DIAPPERS: delirium/dementia, infection/UTI, atrophic vaginitis, pharmaceuticals, psychological disorders, excess fluid, restricted mobility, stool impaction/constipation (Table 1) [34].

Further diagnostic tests should be considered if management fails or frequent UTI and previous surgery are noted [35]. A complete urodynamic study (UDS), including cystometry, uroflowmetry, and ureteral pressure profile, has high sensitivity and specificity in differentiating stress and urge incontinence. Since most UI in dementia patients is not caused by urological problems, UDS should be done only when other attempts at treatment have failed. The results of this examination will have a direct influence on management [13].

MANAGEMENT

Management, which consists of pharmacological and behavioral treatment, is focused on the individual causes identified, and no specific treatment for this group of patients is available [30]. Outlet obstruction usually requires surgical correction [35]. However, other sur-

Table 1. Reversible causes of urinary incontinence

Delirium/Dementia
Infection (UTI)
Atrophic urethritis and vaginitis
Pharmaceuticals
Psychiatric disorders (depression, alcoholism)
Excess fluid (hyperglycemia, hypercalcemia, polyuria, diuretics, caffeine, alcohol, congestive heart failure, edema)
Restricted mobility
Stool impaction (constipation)

gical interventions, such as augmentation cystoplasty and motor-nerve ablation, are seldom adopted in this group of patients [12].

Pharmacological treatment for UI in dementia should start with low doses of drugs which are built up slowly [36].

1. Anticholinergics: This class of drugs is the most common and the most effective in treating overactive bladder and urge incontinence [12]. The two most commonly used drugs are oxybutynin and tolterodine. The clinical efficacy of these two drugs is well established. In one study, UI episodes dropped significantly after administration, and some patients reached complete continence [37]. Side effects such as dry mouth, constipation, blurred vision, gastroesophageal reflux, and adverse central nervous system (CNS) events have been observed, especially in the elderly [38]. CNS adverse events include dizziness, somnolence, insomnia, depression, hypertonia, and cognitive dysfunction. Preparations such as trospium that do not penetrate the blood-brain barrier are thought to have fewer side effects on cognitive function. It is suggested that patients with dementia and elderly patients receive cognitive assessment before initiation of anticholinergic therapy. Extended-release formulations with higher mean relative bioavailability and fewer anticholinergic side effects are now available [12].
2. Antidepressants or antipsychotics: For behavioral and psychological symptoms of dementia.
3. Estrogen: For atrophic vaginitis and female stress incontinence.
4. Alpha-blockers: For benign prostatic hypertrophy to decrease urethral pressure.
5. Antibiotics: For urinary tract infection.
6. Laxatives: For constipation.

Behavioral management includes timed voiding, prompted voiding, bladder training, pelvic muscle rehabilitation, education, environmental alterations, adequate hydration, therapeutic exercise and continence aids.

1. Timed voiding: This caregiver-dependent training program should be scheduled to match the patient's voiding habits. More scheduled toileting can be arranged according to a voiding diary. It is especially suitable for those who are cognitively impaired and functionally disabled. Unnecessary changes in established routine should be avoided.
2. Prompted voiding: The caregiver should use simple, stepwise verbal cues or instructions to eliminate ambiguity in communication. Prompting should be done three times if the patient refuses initially. This technique is suitable for patients able to feel an urge sensation and request toileting assistance. The caregiver must observe carefully for signs of need to void, such as restlessness, anxious behavior, crying, wandering, pressured speech, and tugging on the trousers. If patients can give cues for voiding, the caregiver should give a positive response.
3. Bladder training: Its aim is to teach people to resist the urge to void and gradually expand the interval between voidings. It also consists of active rehabilitation and education techniques [35].
4. Pelvic muscle rehabilitation (pelvic muscle exercise, biofeedback, electrical stimulation): Although these techniques are used in patients with stress incontinence, there is little data to support their use in patients with dementia [33].
5. Education: The public should be informed that UI is not inevitable or shameful. UI is treatable, and, if not, it is manageable. Patient education should be individualized, and should involve caregivers.

6. Environmental alterations: Confusing objects near the commode should be removed to avoid purpose confusion. Simple and straightforward visual cues should be given to locate the place to toilet. Grab bars for bathroom transfer and bathroom alarms or monitors should be installed for safety. Needed objects should be placed within the triangle of nose, right elbow and left elbow to facilitate hand function. The gateway should be widened and the threshold lowered. Distraction of the patient by talking to them should be avoided. Simplification of the environment in the bathroom helps keep the patient concentrated.
7. Adequate hydration: Although less hydration can result in fewer trips to the toilet, it also increases the risk of UTI and acute renal failure. A daily urine output of 1-1.5 liters is appropriate for patients. Hydration in the evening could be shifted to the daytime to avoid enuresis.
8. Therapeutic exercise: Strengthening programs and balance training could be tried. Evaluation for ambulation equipment necessary for toileting should be done. The caregiver should be taught how to transfer the patient safely to the toilet [39].
9. Continence aids: The goals of continence aids are to maintain hygiene, prevent skin irritation and breakdown, reduce the risk of infections and falls, and ease the caregiving task. Frequently used continence aids are indwelling and external catheters, diapers and absorbing pads, and pulldown pants. Indwelling and external catheters have temporary roles in relieving urinary retention, avoiding local skin maceration, and monitoring urine output. However, they predispose to urinary tract infections, pressure ulcers around the genitalia, and local discomfort. The use of diapers and absorbing pads should be limited. It is paramount that the skin be kept dry to prevent skin irritation and breakage. Pulldown pants, usually fixed by Velcro, can facilitate the treatment of toileting problems more easily [40].

CONCLUSIONS

UI in dementia is a significant common problem which results in tremendous social and economic consequences. Since the etiology is often multifactorial, a comprehensive assessment of factors within and outside the lower urinary tract is essential. Clinicians should evaluate through a history, physical examination, PVR volume measurement, and urinalysis, and treat reversible predisposing causes. Treatment plans should be individualized to maintain independence, self esteem and the general health of patients. Functional status and activities of daily life are considered first, and incontinence itself is less important. Multidisciplinary team-work is usually needed to reach the best outcomes.

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