

Urinary Incontinence in Older Persons: A Simple Approach to a Complex Problem

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Abstract

Urinary incontinence is a major geriatric syndrome with significant morbidity and even mortality. However, it is under-recognised and inadequately managed despite its impact and cost. Continence in the older person is maintained by the fine balance between the integrity of the lower urinary tract, the cognitive ability and motivation to keep dry, and adequate mobility and dexterity to void; impairment of any of the three can result in incontinence. The management of older persons with urinary incontinence involves, i) identifying and reversing transient incontinence, ii) excluding urinary retention, iii) deciding on the need of special tests (imaging, screening for malignancy, magnetic resonance imaging [MRI] for spinal cord, urodynamic assessment) to exclude sinister causes, and iv) deciding on the need to refer the specialist. With careful evaluation, continence in the older persons can be restored in most cases.

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Introduction

Urinary incontinence is the involuntary loss of urine which is objectively demonstrable and is a social or hygienic problem.^{1,2} Trivial as it may sound, it is in fact a major geriatric syndrome which may pose as major public health threat with increasing magnitude in this ageing society, due to its prevalence amongst older persons, its adverse impacts and the cost in dealing with this problem. Singapore is not spared of this major health issue.³ However, it is not till recent years that urinary incontinence has managed to “come out of the closet” and received the attention it deserves amongst clinicians and researchers.⁴ Alongside this emerging enthusiasm, there is growing data and evidence to guide the rational management of urinary incontinence. This paper aims to illustrate the impact of this common problem on frail older persons, to put forth a strategy in the initial assessment and management, and to explore the situation where a referral to a tertiary centre for further evaluation or management is necessary.

A Serious Disorder: Impact, Size and Cost

Urinary incontinence has significant physical, psychological and even social impact.^{5,6} While many of its physical effects (such as skin maceration and recurrent urinary tract infection [UTI]) may be considered minor,⁷

other more important morbidity includes decubitus ulcer,^{8,9} falls and fractures,^{10,11} bacteraemia,¹² risk of hospitalisation,^{13,14} institutionalisation¹⁴ and even death.^{14,15} However, for the majority of patients, urinary incontinence exerts its adverse effects primarily via its psychosocial dimension.⁷ Numerous studies had demonstrated the negative influence on the patient’s emotional state, mood, social interaction and quality of life.¹⁶⁻¹⁸

In the geriatric population worldwide, urinary incontinence is a widespread problem, ranging from 5% to 30% in the community¹⁹ to at least 50% in the nursing home.²⁰⁻²² In Singapore, the reported prevalence in the community is 4.6%.³

From the societal view, urinary incontinence imposes a large economic burden. In the United States, the conservative estimate of the annual cost for the management of urinary incontinence in 1995 was \$26.3 billion, or \$3565 per elderly with urinary incontinence.²³ This was more than the amount expended on dialysis and coronary bypass grafting combined together.²⁴ Locally, there is no similar data on the economic impact of urinary incontinence. However, given similar community prevalence, it would be reasonable to assume that urinary incontinence management may be equally expensive locally.

Urinary incontinence is thus a common, serious disorder

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that is costly to manage. Yet, the majority of available literature indicate that less than half of the patients with urinary incontinence sought medial attention.²⁵⁻²⁸ The reason for the under-recognition and under-treatment of urinary incontinence is complex, due in part to ageism, embarrassment, the misconception that assessment of urinary incontinence is complicated and that urinary incontinence is incurable.^{5,25-28} These myths are often shared both by patients and healthcare providers.

Contrary to common belief, evaluation and management of urinary incontinence can be achieved in most patients without the utilisation of sophisticated and costly equipment.^{5,29,30} With careful evaluation, many causes of incontinence are identified as reversible and can be treated.³¹⁻³³

The Continence Triangle: The Impact of Ageing

When faced with a patient suffering from urinary incontinence, most doctors concentrate their efforts in assessing and treating only the lower urinary tract. This approach is appropriate for younger patients, in whom integrity of the lower urinary tract is almost always the sole determinant of continence status.³¹ For the older persons, however, the lower urinary tract is only 1 of the 3 important domains of continence (Fig. 1). The other 2 domains are cognition and mobility. Cognition refers to the mental ability and motivation to keep oneself dry. Hence, a severely demented patient with social disinhibition and a severely depressed person with poor motivation may be incontinent even if the lower urinary tract is intact. Mobility refers not only to the ability to manoeuvre around the environment, but also the dexterity to overcome obstacles (clothing and door knobs) for appropriate voiding to occur at a socially acceptable place. These 3 domains act in concert to ensure

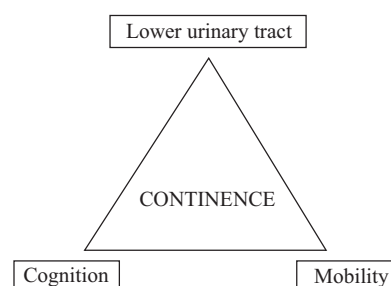


Fig 1. The Continence Triangle.

that an older person is able to maintain continence.

Ageing predispose to incontinence by influencing factors in each domain through age-related physiological changes and age-associated diseases (Table I). Physiological changes alone and mild diseases often do not result in urinary incontinence under normal circumstances. They will, however, result in a state of diminished reserve. The slightest insult, such as drugs or acute illnesses can, either directly or indirectly, tip the delicate balance of the continence triangle into a decompensated state, resulting in incontinence. In fact, such decompensation often occurs as a result of acute impairment in the domains OUTSIDE the lower urinary tract.³¹ Fortunately, it is the impairment in these 2 other domains that are generally more amenable to intervention. Thus, with the correct approach, treating older persons with urinary incontinence can be rewarding.

Urinary Symptoms and Types of Incontinence

Urinary incontinence can be classified based on symptoms (patient's statement of involuntary loss), signs (objective evidence of involuntary loss) or underlying pathophysiology (as demonstrated by clinical or urodynamic techniques)

TABLE I: AGEING AND ITS IMPACT ON THE CONTINENCE TRIANGLE

Domain	The impact of ageing	Clinical implication
Lower urinary tract	Decreased bladder contractility	Increased risk of urinary retention.
	Decreased bladder capacity	Increased frequency of voiding
	Decreased urethral closure pressure in women	Increased risk of stress incontinence
	Altered diurnal production of urine	Increased nocturnal production of urine
	Increased prevalence of benign prostatic enlargement in male	Increased risk of bladder outlet obstruction
	Increased prevalence of uterovaginal prolapse	Increased risk of bladder outlet obstruction
Cognition	Increased risk of atrophic vaginitis	Frequency and urgency of urination; Increased risk of urinary tract infection
	Age associated memory impairment	Increased risk of cognitive impairment interfering with continence
	Increased prevalence of dementia	Increased risk of cognitive impairment interfering with continence
Mobility	Increased prevalence of depression	Increased risk of self neglect
	Decreased response time	Increased risk of urge incontinence
	Increased prevalence of arthritis	Increased risk of environmental obstacles to continence

TABLE II: CLASSIFICATION OF URINARY INCONTINENCE³⁴

A. Classification Based on Symptoms (Complaints by the Patient or Caregivers) or Signs (Observation of Urinary Loss)	
1.	<i>Urge Incontinence</i> : The complaints of (symptoms) or the observation of (signs) involuntary loss of urine associated with a sudden, strong desire to void (urgency)
2.	<i>Stress Incontinence</i> : The complaint of or the observation of involuntary urinary loss that occurs with increases in intra-abdominal pressure from coughing, sneezing, or physical exertion such as sport activities, change of position, etc.
3.	<i>Unconscious (Unaware) Incontinence</i> : Involuntary urinary loss which is unaccompanied by either urge or stress symptoms. Patient may be aware of the incontinent episode by feeling wetness. This may be caused by detrusor overactivity, sphincter abnormalities, overflow or extraurethral incontinence.
4.	<i>Continuous Leakage</i> : Continuous urinary loss. This can be due to sphincter abnormalities or extraurethral incontinence.
5.	<i>Nocturnal Enuresis</i> : Urinary loss during sleep. This may be caused by sphincter abnormalities, detrusor overactivity, or extraurethral incontinence
6.	<i>Postvoid Dribble</i> : Dribbling loss of urine which occurs after voiding. This may be due to retained urine in the urethra distal to sphincter in men. In women, it may be caused by retained urine in the vagina or in a urethral diverticular.
B. Classification Based on Pathophysiology	
1.	<i>Urge Incontinence</i> : Incontinence secondary to <i>detrusor overactivity (previously known as detrusor instability and detrusor hyperactivity)</i> ³⁵
2.	<i>Stress Incontinence</i> : Incontinence due to <i>sphincter abnormalities</i> , such as (in women) Genuine Stress Incontinence (due pelvic floor laxity and displacement of urethra) or intrinsic sphincter deficiency (due to intrinsic malfunction of the urethral sphincter). In men, it is due to the damage of urethra sphincter.
3.	<i>Overflow Incontinence</i> : Leakage of urine at greater than normal bladder capacity. It is associated with incomplete bladder emptying due to either impaired detrusor contractility or bladder outlet obstruction.
4.	<i>Extraurethral Incontinence</i> : Leakage of urine from a source other than the urethra. It may be due to urinary fistula or ectopic ureter.

(Table II). In addition, 2 other types of incontinence have been described: *Functional incontinence*, in which incontinence occurs as a result of pathology outside the urinary tract, such as impaired cognition or impaired mobility (see discussion on Continence Triangle); and *mixed incontinence*, where leakage occurs as a result of combination of factors as described above. Unfortunately, the classification based on symptoms or signs, in particular urge and stress incontinence, does not correlate well with the classification based on pathophysiology. For example, 'urgency' and the symptoms of urge incontinence have a sensitivity of 78% and a specificity of only 39% in detecting detrusor instability.³⁶ As for stress incontinence, the symptom alone has low specificity (81%) and low sensitivity (38%). When combined with signs of stress incontinence (positive Cough test), the sensitivity increases (94%) but

the specificity decreases (13%).³⁷ Workers in the field of urinary incontinence actually labelled the bladder as an 'unreliable witness' due to this inconsistency between symptoms and the underlying voiding dysfunction.³⁸ Amongst frail older persons, the higher prevalence of cognitive impairment renders urinary symptoms even less reliable.

It does not mean, however, that careful evaluations of urinary symptoms are worthless in the management of urinary incontinence in older people. In contrast, they form the cornerstone of initial management by identifying reversible causes (see below) and excluding sinister pathology. Symptoms also assist in ascertaining the degree of bother by urinary incontinence, the knowledge of which would facilitate medical decision-making that considers the risk-benefit balance of therapeutic interventions. In addition, baseline symptoms serve as a yardstick to evaluate the effectiveness of any intervention.

Goals of Evaluating Urinary Incontinence in the Older Persons

Evaluating urinary incontinence in the frail older persons may appear to be a daunting task. As discussed above, urinary symptoms may not be helpful in identifying the exact lower urinary tract pathology. Secondly, age-associated pathological changes of the lower urinary tract often coexist to manifest as a complex pathophysiological entity. For example, the highly prevalent conditions of impaired contractility and detrusor hyperactivity often coexist as detrusor hyperactivity with impaired contractility (DHIC),^{39,40} posing a diagnostic challenge as it can present as either stress or urge incontinence. The increasing prevalence of bladder outlet obstruction due to prostatic hypertrophy in male will complicate the presentation even more. Thirdly, age-associated pathology OUTSIDE the urinary tract, such as painful arthritis, adds further dimension to the manifestation of urinary incontinence in the older persons.

Despite the complexity of the underlying pathophysiology, it is reassuring to know that initial evaluation and management of urinary incontinence in the older persons can be successfully achieved with simple clinical skills. Many clinical algorithms have been put forth to assist clinicians in medical decision making when dealing with older persons with urinary incontinence.^{1,41-45} While expert opinions differ, there is a common message in these algorithms: that most older persons with urinary incontinence can be managed just with history, physical examination and simple tests like urinalysis and postvoid residual urine volume measurement.

There are 4 simple steps in the initial management of older person with urinary incontinence:

1. Identify and treat reversible causes of urinary incontinence
2. Exclude urinary retention
3. Exclude sinister causes of urinary incontinence and identify the need for specialised investigation
4. Identify the need for specialised treatment

Step I. Transient Incontinence

The single most important step in the treatment of urinary incontinence in the older persons is to identify and treat transient causes. This step is simple yet gratifying, and would help to avoid unnecessary referrals and investigations that may be risky and costly. Resnick⁶ developed a useful acronym “DIAPPERS” to illustrate the reversible causes of urinary incontinence. This is a useful checklist for physicians evaluating older persons with urinary incontinence, especially if of recent onset or exacerbation. It is clear from the list (Table III) that most of the causes can be identified with careful history and physical examination. Confusion (delirium), severe depression, polyuria (often associated with polydipsia) and immobility can be easily uncovered by a detailed history. Atrophic vaginitis and impacted stool will be obvious after a targeted physical examination. Detailed review of medications often reveals agents that might contribute to incontinence by affecting

TABLE III: TRANSIENT REVERSIBLE CAUSES OF URINARY INCONTINENCE^{31,45,46}

Acronyms	Description	Diagnostic process
D	Delirium	History and mental state examination
I	Infection of the urinary tract	Urinalysis
A	Atrophic urethritis and vaginitis	Pelvic examination in female.
P	Pharmacological agents affecting lower urinary tract, mobility or cognition	Medication review
P	Psychological problems: Depression	History and mental state examination
E	Excess urine output: secondary to diuretics, diabetes mellitus, diabetes insipidus, hypercalcaemia	Urine output chart, medication review, blood glucose level, serum electrolytes, serum calcium
R	Restricted mobility	Functional assessment
S	Stool impaction	Rectal examination

factors in one or more domains of the continence triangle (Table IV).

After this, only simple investigations such as urinalysis, electrolytes, fasting glucose and calcium, if indicated, are

TABLE IV: DRUGS WHICH MAY CONTRIBUTE TO INCONTINENCE^{41,45}

Class	Mechanism	Comments
Anticholinergics	Urinary retention, fecal impaction, delirium	Many drugs including cough mixtures, antihistamines, antipsychotics, antidepressants and narcotics have anticholinergics properties.
Antidepressants	Anticholinergics properties, sedation	Tricyclic antidepressants have significant anticholinergics properties. A safer alternative would be selective serotonergic reuptake inhibitor, which is not known to affect lower urinary tract significantly.
Antipsychotics	Anticholinergic properties, antidopaminergic properties (parkinsonism), sedation	Atypical antipsychotic, such as risperidone or olanzapine, may have less anticholinergic or antidopaminergic properties.
Narcotics	Sedation, anticholinergic properties, delirium	Some cough mixtures and analgesics may contain narcotics.
Beta-antagonists and calcium antagonists	Urinary retention. Calcium antagonist may cause pedal oedema, which may contribute to nocturia.	There is little data on calcium antagonist and beta-antagonists causing clinically significant urinary retention. Depending on the cardiovascular status of the patient, it may be essential to retain these medications in spite of overt urinary retention.
Alpha antagonist	Urethral relaxation	
Diuretics	Excessive urine output, frequency and urgency	Dose adjustment (such as reduction or modification of dosing schedule) may be adequate.
Alpha agonist	Urinary retention	
Sedatives and anxiolytics, e.g. benzodiazepines	Sedation, delirium, immobility	
Antihistamines	Anticholinergic properties, sedation	
Caffeinated beverages, alcohol	Excessive urine output, frequency and urgency. Alcohol can also cause delirium and immobility	Discontinuation or dose reduction may be necessary.

required to complete identification of transient causes. While choice of the investigations depends on the clinical setting, we routinely send urinalysis for all older patients with urinary incontinence. If there is evidence of infection, we will treat the patient with a short course of antibiotic and then reassess the continence status.

Treatment of transient causes is usually simple, safe and rewarding. For example, identification of delirium as the cause of urinary incontinence requires careful evaluation of underlying causes that can be potentially dangerous themselves. Urinary incontinence secondary to glycosuria does not require urodynamic assessment but proper management of the diabetes mellitus.

Even when successful treatment of transient causes does not ameliorate urinary incontinence totally, it is of help in the subsequent management of established urinary incontinence. For example, improving mobility by either specific treatment (such as antiparkinson's therapy or analgesics for painful arthritis) or removal of offending agent (removing drugs with sedative effects) would enable an older patient with overactive bladder to cope with urge incontinence better.

Step II: Exclude Urinary Retention

Voiding symptoms (hesitancy, incomplete emptying, terminal dribbling, intermittency and poor stream) when associated with urinary incontinence often alert to the possibility of urinary retention. However, they are neither sensitive nor specific for impaired detrusor contraction or bladder outlet obstruction.^{47,48} Many experts suggest abdominal palpation for detection of urinary retention.^{1,41,42} While large volume bladders can be detected by abdominal palpation (more than 300 mL),^{42,49} smaller volumes may require the use of an instrument. Optimally, postvoid residual urine volume is measured within 5 minutes of a usual void.⁴⁵ The gold standard for postvoid residual urine volume measurement is bladder catheterisation,^{50,51} which unfortunately is invasive, and carries the risk of trauma, infection and, more commonly, discomfort, especially in the male patient. Alternatively, the volume can be safely, accurately and precisely ascertained using a portable ultrasound machine.⁵²⁻⁵⁴ In Singapore, most hospitals are equipped with portable ultrasound scanners that can be operated by staff nurses or nurse clinicians.

There is little information about what the postvoid residual urine volume should be for asymptomatic people with normal voiding function. Based on common observation, the volume is usually negligible,⁵¹ but it increases with age.⁵⁰ Most experts agree that a normal postvoid residual urine volume should be less than 50 mL, and volume higher than 100 mL is abnormal.^{41,51}

Postvoid residual urine volume is a composite function

of bladder contraction and bladder outlet resistance. In another word, it can indicate either a weak detrusor contraction or an obstruction at the bladder outlet. Interpretation and management of high postvoid residual urine volume warrant a separate detailed discussion itself, and is beyond the scope of this review. Most importantly, there is still debate on the clinical significance of postvoid residual urine volume between 100 mL and 200 mL, though this is considered abnormal.

An important uncertainty thus remains: what is the critical level of postvoid residual urine volume that would require urgent catheterisation (using either intermittent catheterisation or indwelling catheter) while waiting for a more definitive therapy? No data is available on the volume that will confer significant risk of recurrent UTI or urinary stones. However, evidence suggests that upper tract dilatation and even renal insufficiency occurred with very high volume (in excess of 300 mL) in patients with bladder outlet obstruction.⁵⁵⁻⁵⁷ Hence, we suggest that when postvoid residual urine volume is very high, such as more than 300 mL, or if it is lower but patient has hydronephrosis, and/or renal failure, it would be more urgent to ensure early drainage. Referral to specialist would be necessary to evaluate the cause and further management of the elevated postvoid residual urine volume.

Step III: Exclude Dangerous Causes and Further Investigations

Consideration should be given to appropriate patients whether specialised investigations are required for assessment of older patients presenting with urinary incontinence. Such investigations include: imaging of the upper urinary tract, screening for malignancy, such as cytology or prostatic specific antigen level, magnetic resonance imaging (MRI) of the spinal cord and urodynamic assessment.

1. Imaging of the upper urinary tract

When there is urinary retention, there is always a question as to whether the retention has resulted in the dilatation of the upper urinary tract, which may in turn result in a reversible renal impairment. In male patients with bladder outlet obstruction and postvoid residual urine volume greater than 300 mL, 41% of patients would have evidence of upper tract dilatation.⁵⁵ When the postvoid residual urine volume is greater than 1000 mL, this figure increased to 84.6%.⁵⁷ Therefore, it is recommended that if postvoid residual urine volume is more than 300 mL, imaging of the upper urinary tract should be performed. Imaging would also be necessary if blood investigations indicate renal impairment in the presence of elevated postvoid residual urine volume. Upper tract dilatation would require urgent referral to the urologist.

2. Cytology and prostatic specific antigen

For patients who presented with storage symptoms (frequency, urgency, incontinence; previously known as irritative symptoms), one must always be wary of local bladder pathology, especially if the symptoms are associated with pelvic pain or macroscopic haematuria.⁵⁸⁻⁶⁰ Differential diagnoses include bladder carcinoma, bladder stone and interstitial cystitis.

In the absence of pain and haematuria, however, the need to exclude local pathology becomes less clear. In male patients presenting with lower urinary tract symptoms in the absence of haematuria, 1.5% had positive urine cytology and cancer of the bladder was detected in only 0.6%.⁶¹ Higher prevalence of bladder cancer in patients presented with lower urinary tract symptoms were reported in other studies (2.9% and 6.5%) but both studies did not exclude men presenting with haematuria.^{62,63}

In symptomatic older persons with microscopic haematuria, especially if persistent, there is a need to refer for further evaluation, since a significant proportion (3% to 10%) of patients may have malignancy.^{58,64} Assessment of microscopic haematuria should be based on urine microscopy rather than dipstick.⁶⁵

The role of cytology in patients with haematuria is controversial. Cytology has high specificity (93% to 97%) but poor sensitivity (42%),^{66,67} with its corresponding likelihood ratio positive (LR+) being 6 to 14, and likelihood ratio negative (LR-) of 0.6. Thus, some investigators suggested that routine urine cytology is not relevant in the investigation of patients with haematuria.⁶⁶

Even more controversial is the screening for prostatic carcinoma. Experts worldwide are widely divided on prostatic carcinoma screening amongst asymptomatic patients.⁶⁸⁻⁷⁰ Currently, evidence is limited for the benefits of early detection of prostate cancer through screening, though there is clear evidence of harm.⁷¹ Most prostate cancer detected by screening is localised and indolent, and pose little threat to life.⁷² In fact, most men died with the disease rather than of the disease.^{72,73} Hence, based on current evidence, screening for prostate cancer cannot be advocated for low-risk, asymptomatic patients,⁷¹ especially for those above 70, with significant medical problems and have life expectancy of fewer than 10 years.⁷⁴ On the issue of case findings for men presenting with lower urinary tract symptoms, evidence suggests that such men are at no greater risk than asymptomatic men of the same age.⁷⁵ Hence, lower urinary tract symptoms alone should not be the reason for prostatic carcinoma screening. However, many men with lower urinary tract symptoms will seek medical help because of their concern of cancer, and management of this group of patients would be suboptimal

if this fear is not addressed explicitly.⁷⁶ Screening should perhaps be considered for men with lower urinary tract symptoms after appropriate counselling, and this may reduce much of the bother and anxiety associated with their symptoms.⁷⁶

Digital rectal examination has little value as a screening test.^{71,77} Serum prostatic specific antigen remains the main tool for screening of prostatic carcinoma. However, what constitutes an abnormal prostatic specific antigen is still debatable. The usual cut-off point at 4 ug/L yields a sensitivity of 44% and specificity of 94%,⁷⁸ with corresponding LR+ of 7 and LR- of 0.6. With this cut-off, however, two-third of cancers would have been missed.⁷⁹ A lower cut-off of 3 ug/L has been used by some investigators,⁸⁰ but this requires further validation.

3. MRI of the spinal cord

Urinary retention can be due either to bladder outlet obstruction or weak detrusor contraction. A poorly contracting detrusor can be myogenic or neurogenic in origin. The most important neurogenic cause to consider when evaluating older patients with urinary retention is spinal cord lesions, such as cord compression, transverse myelitis or cauda equina syndrome.^{81,82} They may also affect the bladder outlet, by causing a functional disorder known as detrusor-sphincter-dyssynergia (DSD). In DSD, the urethra fails to relax during bladder contraction and this may result in high-pressure backflow damaging the upper urinary tract. Hence, clinicians facing patients with high postvoid residual urine volume would need to have a high index of suspicion for spinal cord lesions, especially when urinary complaints may be the presenting symptoms.^{83,84}

The clue to spinal cord lesion relies heavily on a detailed history and a very careful but targeted neurological examination (power and reflexes of the lower limbs, integrity of S2-S4 dermatomes, anal reflexes and tone, and bulbocavernosus reflexes). A history of metastatic malignant disease, pathological low back pain, neurological symptoms as well as rapid onset of symptoms may suggest the possibility of cord disease. If this diagnosis is suspected, an urgent referral or an urgent MRI of the cord would be needed.

4. Urodynamic assessment

Urodynamic study utilises the principles of hydrodynamics to characterise the functional behaviour of the bladder and its outlet. In established urinary incontinence (that is, urinary incontinence with all the transient factors removed), symptomatology fails to specifically identify the underlying pathophysiology. Urodynamic study is useful in identifying the exact voiding disorder that can account for the patient's lower urinary tract symptoms and in assisting with specific treatment. In the management of

lower urinary tract symptoms, urodynamic study has been compared with electrocardiogram in the management of chest pain. Treating lower urinary tract symptoms blindly can be ineffective, costly or even risky.

The term urodynamic study encompasses several different measurements of the lower urinary tract using specialised equipment. For the older patient in Singapore, the commonest urodynamic study done is a pressure-flow study. It involves catheterisation of the bladder and insertion of the rectal tube for simultaneous measurement of the bladder and abdominal pressures using pressure transducers. This is followed by infusion of sterile saline solution into the bladder to reproduce bladder filling, and the measurement of pressures will represent the storage capability of the bladder. When the bladder is filled to full, patient is then asked to void and the pressure change recorded during voiding will reflect the voiding characteristics of the lower urinary tract.

However, urodynamic study in the evaluation of lower urinary tract symptoms in the older persons is highly controversial. Firstly, there is differing opinions on the clinical utility of urodynamic study in the management of lower urinary tract symptoms.⁸⁵⁻⁸⁸ Secondly, urodynamic study procedures are technically complex. The accuracy and precision are highly dependent on the vigilance and experience of the performer on one hand, and the degree of cooperation by the patient on the other. The latter is a practical issue amongst frail older persons due to communication difficulties that occur commonly. If a urodynamic study is not conducted carefully and interpreted appropriately, it may be potentially harmful by misleading diagnosis and misguiding therapy. Thirdly, as mentioned earlier, urodynamic study studies are invasive and carry the risk of discomfort, trauma and infection.⁸⁹

Thus, if the outcome of the study will not change the management plan, then one should refrain from subjecting the older persons to urodynamic study assessment. In fact, many experts recommend a trial of medical therapy for older persons with established urinary incontinence based on clinical assessment. Only if the patient failed to respond would urodynamic study be considered, especially if surgery is considered. For some very frail older persons, even medical therapy may be considered too hazardous. For example, alpha antagonist for patients with postural hypotension, and anticholinergics for cognitively impaired patients. Thus, the decision on whether to perform urodynamic study should be individualised on the basis on the risk-benefit profile of each patient.

Step IV: Referral to the Specialists

It may be necessary to refer the patient to a specialist for 3 reasons:

1. To exclude anatomical or other sinister causes of lower urinary tract symptoms when there are suspicious clinical features
2. To evaluate and manage established incontinence when urinary incontinence remains problematic even after transient factors are excluded or treated.
3. To consider surgical therapy.

Table V illustrates the criteria for referral to a specialist for urinary incontinence. Some patients who meet the criteria may not be appropriate for referral if such evaluation or treatment is not desired or feasible. A good example is a terminally ill patient with urinary incontinence that is not felt to be troublesome.

TABLE V: RECOMMENDATIONS ON REFERRAL FOR FURTHER EVALUATION AND MANAGEMENT FOR OLDER PERSONS WITH URINARY INCONTINENCE^{41,44}

1. History
 - a. Presence of severe storage symptoms, especially of recent onset
 - b. Presence of pelvic pain
 - c. Presence of gross haematuria
 - d. Recurrent symptomatic urinary tract infection
 - e. Past history of pelvic irradiation or pelvic surgery
 - f. History of neurological comorbidities such as spinal cord lesions or injury, transverse myelitis
2. Physical examination
 - a. Marked pelvic prolapse
 - b. Marked prostatic enlargement and/or suspicion of carcinoma
 - c. New neurological signs
 - d. Presence of neurological signs suggestive of cord lesion or caudal equine syndrome
 - e. Complete urinary retention
3. Simple investigation
 - a. Elevated postvoid residual urine volume, after excluding transient reversible causes (such as drugs, fecal impaction, urinary tract infection)
 - b. Microscopic haematuria in the absence of urinary tract infection
4. Others
 - a. Presence of delirium
 - b. Uncertain diagnosis after initial evaluation
 - c. Failure to respond to adequate trial for urge and/or stress incontinence

Conclusion

Urinary incontinence is an increasingly prevalent geriatric syndrome that poses a serious threat to the health and quality of life of older patients and their caregivers, and is costly to manage. We have presented a simple and practical approach to a seemingly complex problem that is rewarding to deal with since many of the precipitating factors can be easily identified and reversed. Treatment of established incontinence is not discussed in detail as this warrants a separate discussion. By following the 4 simple steps: i) identifying and reversing transient incontinence

(DIAPPERS), ii) excluding urinary retention (assess postvoid residual urine volume), iii) deciding on the need of special tests to exclude sinister causes, and iv) deciding on the need to refer the specialist, many older persons with urinary incontinence can be appropriately managed.

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