MANAGEMENT OF URINARY INCONTINENCE

Clinical Practice Guidelines 2008

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Society for Continence (Singapore)

Singapore Physiotherapy Association

Obstetrical & Gynaecological Society of Singapore

Singapore Urological Association

Society for Geriatric Medicine

Singapore Paediatric Association

Clinical Practice Guidelines 2008

CLINICAL PRACTICE GUIDELINES

MANAGEMENT OF URINARY INCONTINENCE

2008

Statement of Intent

This set of guidelines aims to serve as a guide for practitioners who are involved in caring for patients with urinary incontinence. These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.

The contents of this publication are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not ensure a successful outcome in every case. These guidelines should neither be construed as including all proper methods of care, nor exclude other acceptable methods of care. Each physician is ultimately responsible for the management of his/her unique patient, in the light of the clinical data presented by the patient and the diagnostic and treatment options available.

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Foreword

Urinary incontinence is an unpleasant and distressing condition an individual can suffer from. It affects the quality of life as patients develop urinary tract complications, become restricted in their toilet habits and shy away from the community. Recent awareness of the high prevalence of urinary incontinence in the community led to the formation of the guidelines.

These guidelines aim to assist the general practitioners by providing them with the necessary knowledge and understanding of urinary incontinence, diagnosis and management options in the various age and gender groups as well as what help and services are available to them.

These guidelines are based on the recommendations of the International Consultation on Incontinence and the International Continence Society, with modifications for our local needs based on local clinical research and the availability of resources.

It is hoped that these guidelines will help clinicians and health care providers with the initial treatment of urinary incontinence and decide when to refer to the appropriate specialist when the condition does not improve or when complicated management is envisaged.

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Contents

1 Introduction

1.1 Background

Urinary incontinence (UI) is a common and embarrassing problem that affects the quality of life in the suffering patient. Although UI is a common problem, it is frequently not identified because most affected patients accept it as part of normal ageing or do not express it for fear of embarrassment. The social implications of UI include loss of self esteem, restriction of social and sexual activities, depression and dependence of caregivers. In USA, it is estimated that UI affects more than 10 million adult Americans in the community (NIH, 1988). It also has important medical, psychosocial and economic implications. Similar prevalence studies have not yet been conducted in Singapore but the prevalence of sufferers is expected to be just as high.

1.2 Methodology

These guidelines were developed by a workgroup of urologists, gynaecologists, paediatricians, geriatricians, and continence nurses made up of members from the Society for Continence (Singapore), Singapore Paediatric Society, Singapore Physiotherapy Association, Obstetrical & Gynaecological Society of Singapore, Society for Geriatric Medicine and the Singapore Urological Association.

These guidelines provide recommendations that were adapted from the recommendations of the International Consultations on Incontinence. They were modified for our local needs based on local clinical research, availability of resources in Singapore and expert judgement.

1.3 Target Group

These guidelines are developed for primary care physicians and health care providers involved in the care of patients with urinary incontinence. Because UI afflicts all age groups and the aetiology, investigations and management vary accordingly, the guidelines are split according to the target subpopulations (children, women, men, frail-elderly and neuropathics). As for management algorithm, only the initial treatment options are presented due to the complexity and variability of specialised management should the patient so require. The clinician is advised to make the appropriate specialist referral where the diagnostic workup so indicates and when their initial management has not led to improvement of the incontinence.

2 Levels of Evidence and Grades of Recommendation

Levels of Evidence

Level	Type of Evidence
Ia	Evidence obtained from meta-analysis of randomised controlled trials.
Ib	Evidence obtained from at least one randomised controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomisation.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Grades of Recommendation

Grade	Recommendation
A (evidence levels Ia, Ib)	Requires at least one randomised controlled trial, as part of the body of literature of overall good quality and consistency, addressing the specific recommendation.
B (evidence levels IIa, IIb, III)	Requires availability of well conducted clinical studies, but no randomised clinical trials on the topic of recommendation.
C (evidence level IV)	Requires evidence obtained from expert committee reports or opinions, and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.
GPP (good practice points)	Recommended best practice based on the clinical experience of the guideline development group.

3 Definitions and Types of Urinary Incontinence

The terminology and definitions used are in accordance to the 2005 standardisation report of the International Continence Society (ICS).

3.1 Definition of Urinary Symptoms

Urinary incontinence is defined as the complaint of any involuntary leakage of urine.

Increased daytime frequency is the complaint by the patient who considers that he/she voids too often by day.

Nocturia is the complaint that the individual has to wake at night one or more times to void.

Urgency is the complaint of a sudden compelling desire to pass urine which is difficult to defer.

Enuresis means any involuntary loss of urine. If it is used to denote incontinence during sleep, it should always be qualified with the adjective 'nocturnal'.

Nocturnal enuresis is the complaint of loss of urine occurring during sleep.

3.2 Types of Incontinence

Urge urinary incontinence is involuntary leakage of urine, usually preceded by urgency.

Stress urinary incontinence is the complaint of involuntary leakage on effort or exertion, or on sneezing or coughing.

Mixed urinary incontinence is the complaint of involuntary leakage associated with urgency and also with exertion, effort, sneezing or coughing.

Overflow incontinence is caused by the overflow of urine due to urinary retention, which can be acute or chronic.

Continuous urinary incontinence is the complaint of continuous leakage.

Post-micturition dribble is the term used when an individual describes the involuntary loss of urine immediately after he or she has finished passing urine, usually after leaving the toilet in men, or after rising from the toilet in women.

4 Urinary Incontinence in Children : Daytime

4.1. Introduction

Urinary incontinence in children causes significant social and psychological problems to the child as well as the family. It may affect as many as 10% of otherwise healthy children. As incontinence is associated with punishment at home, ridicule in school and psychological sequelae for the child, it is important to recognise early and initiate treatment as soon as possible.

Clinical presentations by history and symptoms can be divided into 3 groups: wetting at any time of day; incontinence associated with urinary tract abnormalities; neuropathies or previous pelvic surgery; and nocturnal enuresis.

4.2. Background

At birth voiding is a reflex action and the infant voids on average 20 times in a 24-hour period. Voiding frequency will then decrease to about 8 to 10 times per day over the next 2 to 3 years. The majority of children will achieve daytime control by 2 years old and nighttime control by 4 years. Voluntary suppression of an urge will usually be possible also by 4 years of age[1].

Daytime incontinence that is not associated with urinary infection or anatomic abnormalities is less common than nighttime incontinence and tends to disappear much earlier than the nighttime versions. One likely cause of daytime incontinence is an overactive bladder. Many children with daytime incontinence have abnormal elimination habits, the most common being infrequent voiding and constipation. This section covers all types of wetting other than nocturnal enuresis.

Conditions resulting in incontinence may be classified as anatomical or physiological. Surgical treatment is usually aimed at correcting the deficit causing incontinence, be it at the bladder or storage function, or sphincter/urethra level. Multiple mechanisms for incontinence may coexist in the same patient.

4.3 Abnormalities of Storage

4.3.1 Anatomical

a) Bladder exstrophy – the bladder and the urethra is open and splayed out on

the lower anterior abdominal wall;
b) Cloacal exstrophy – the bowel as well as the bladder opens on the lower anterior wall.

4.3.2 Physiological

a) Non-neuropathic – the bladder is overactive due to unco-ordinated detrusor contractions resulting in urgency and urge incontinence;
b) Neuropathic – sacral anomalies and posterior urethral valves can give rise to neurological deficit or bladder outlet obstruction.

4.4 Abnormalities of Sphincter Function

4.4.1 Anatomical

a) Epispadias – in epispadias, the sphincter mechanism is incomplete or closed;
b) Urogenital sinus – in this anomaly, there is only one opening into the female perineum. The sphincteric mechanism is insufficient and neuropathy may be associated;
c) Ectopic ureters – ectopic ureters may open into the sphincter or distal to the sphincter mechanism or end in uretero coeles. Seen mostly in girls, it is often associated with duplicate ureters; the upper pole ureter will drain distally, often into the urethra or vaginal vestibule. The clinical presentation is classical with continence against a background of varied degrees of dampness;
d) Urethral duplication – duplications of the urethra are rare, and one of the urethras may bypass the external sphincter;
e) Vesico-vaginal fistulas – such fistulas are usually iatrogenic following pelvic fractures or bladder neck procedures.

4.4.2 Physiological

a) Spina bifida – sphincter abnormalities secondary to neuropathic dysfunction may result in an overactive or an incompetent sphincter.

4.5 Evaluation

4.5.1 History

Incontinence or wetting exists when the child fails to achieve control of voiding by the expected age. Any voiding dysfunction interview demands a well-tuned elimination interview and a careful search for physical clues[2].

B **Validated questionnaires (Figure 1) are very helpful in structuring the history-taking. The history must include: age of toilet training, current voiding symptoms and status of continence, input, bowel function, past medical history and family history. A quantitative analysis using a frequency-volume chart is also advised[3].**

Grade B, Level II

History-taking

- Questionnaire for voiding and wetting
  - daytime or nighttime wetting
  - urge to void
  - holding manoeuvres
- Bowel function: constipation or soiling
- Urinary diary (frequency/volume chart)
- Behavioural profile/family history

Figure 1 : Structured approach to history-taking in children who wet

4.5.2 Physical Examination (Figure 2)

GPP **In addition to a general examination, examination of the lower abdomen, genitalia/perineum and lumbosacral spine are essential.**

GPP

Physical Examination

- Inspection of genital area
- Lumbosacral signs of spinal dysmorphism
- Neurological defects in lower limbs – pes cavus hyper-reflexia
- Lumbosacral reflex activity when indicated
- Observed any moist perineum or voiding pattern

Figure 2 : Physical examination in children who wet

4.5.3 Investigations

C Conduct urinalysis +/- urine culture to detect urinary infection as a cause.

Grade C, Level IV

GPP Imaging studies are essential to assess anatomical abnormalities causing incontinence.

a) Ultrasound – to assess both kidneys, pelvicalyceal system and ureters and pre- and post-void bladder volumes. A general abdominal scan is also useful.

b) Voiding cystourethrogram – particularly useful in children with a history of urinary tract infection. In neuropathy the VCUG is also essential. Amount of contrast instilled and post-void residues are useful parameters to assess in addition to reflux and bladder configuration.

GPP

GPP Urodynamic studies offer a near-physiological investigation of the bladder and sphincter to help determine the type and nature of the incontinence.

Basic office urodynamic investigation includes a uroflow assessment with pre-and post-void bladder scanning. Water cystometry is used in children without established voluntary voiding and perineal surface electrodes is added when neuropathy or dyssynergia is suspected.

GPP

4.6 Therapeutic Approach

4.6.1 Storage Function

B Non-neurogenic daytime incontinence can be treated with anti-muscarinics.

The antimuscarinics oxybutynin and tolterodine are, presently the most commonly used drugs to treat urge incontinence. Common side effects with these agents are reduced saliva production and worsening constipation. This can be severe and can cause up to 10% of children using oxybutynin

to discontinue treatment. Current evidence suggests that tolterodine has a better safety profile than oxybutynin[4].

Grade B, Level II

B Reduced bladder capacity is the main indication for a bladder augmentation.

Stomach, ileum, large bowel or ureters can be used to achieve the augmentation. In general the patients require intermittent catherisation following augmentation. This can be via the urethra or via a continent catheterisable abdominal wall stoma.

Following augmentation, the physician is committed to long-term follow-up and monitoring for complications such as electrolyte imbalance, reservoir rupture, stone formation and malignant change[5-8].

Following augmentation a vaginal delivery is preferred, as a caesarean section will often disrupt the augment or its vascular pedicle[9].

Grade B, Level III

4.6.2 Sphincter Function

B Sling procedures, artificial sphincter insertion and bladder neck procedures are appropriate choices to correct sphincteric deficiency in children.

In exstrophy/epispadias early anatomic reconstruction may allow normal bladder and sphincter function. Combined bladder and sphincter surgery is often required. The continence rate ranges from 80% to 97%[10, 11].

Grade B, Level III

4.6.3 Bypassing the Sphincter

B A continent stoma may be created on the anterior abdominal wall. The continent stoma may be combined with bladder augmentation and/or bladder neck closure. Continence rates of 90% to 100% are reported[4,12].

Grade B, Level III

B **Follow-up in small numbers of children for at least 10 years has shown that the system is resilient[13]. Children especially may benefit from a 'pop-off' valve if catheterisation is impossible or forgotten[14].**

Grade B, Level III

5 Urinary Incontinence in Children : Nighttime

5.1 Introduction

Nocturnal enuresis (NE) is a common, socially disruptive and stressful condition affecting 10% of school going children with 1% continuing into adulthood[15-17]. Although there is a high rate of spontaneous resolution and incidence decreases with time[18], the social, emotional and psychological costs to the child and family can be great[19-20] and requires intervention.

5.2 Background

After age 5, wetting at night – often called bedwetting, is more common than daytime wetting. Experts do not know what causes nighttime incontinence. Young people who experience nighttime wetting are usually physically and emotionally normal. Most cases probably result from a mix of factors including slower physical development, an overproduction of urine at night, a lack of response or arousal to a full bladder when asleep. For many, there is a strong family history of bedwetting, suggesting dominant inheritance. About 10% of 5-year olds, 5% of 10-year olds experience nocturnal enuresis. It is twice as common in boys compared to girls.

Rarely bedwetting is unacceptable for children under the age of 5 years[21]. In Singapore it was found that most parents who sought treatment had affected children aged 7 years or older and had severe bedwetting[22].

Nocturnal enuresis appears to be a multi-factorial condition and no treatment is specific enough to guarantee cure. NE can be reviewed as a combination of a) patients having an excessive amount of urine for their bladder capacity plus b) failure to awaken in response to a distended bladder. How genetics influence this mechanism or how genetics influence the maturation of bladder control at night remain unclear.

B **Majority of enuretic children have an abnormally large and diluted urine at night and in many there is a lack of a normal nocturnal rise in vasopressin (AVP) that is responsible for antidiuresis and urine concentration[23-24].**

Grade B, Level IIa

B **Almost all enuretics were 'deep' sleepers with elevated arousal**

thresholds[25-26].

Grade B, Level III

B **Nocturnal enuresis has a strong genetic basis with high rate (60% to 80%) of affected 1st degree relatives [27-28].**

Grade B, Level III

5.3 Definitions

Adapted from a report on standardisation and terminology in lower urinary tract dysfunction in children adopted by the International Children's Continence Society (1998)[29].

Nocturnal Enuresis (NE)/Bedwetting
Wetting while asleep beyond 5 years of age and frequent enough to be disturbing. Usually 2 times or more in a week.

Primary Nocturnal Enuresis
Never been dry for extended period of more than 6 months.

Primary Monosymptomatic Nocturnal Enuresis (PMNE)
Primary Nocturnal Enuresis that occur as the only problem i.e. the patient is otherwise well with normal voiding pattern and no constitutional symptoms.

Secondary Nocturnal Enuresis
Was consistently dry for at least 6 months and then bedwetting recurred. May be stress related or due to other underlying pathology like UTI.

Management of neuropathic bladder, vesicoureteric reflux complicating nocturnal enuresis are not within the scope of this guidelines.

5.4 Evaluation

5.4.1 History

B **Many signs and symptoms pertaining to voiding and wetting are new to the parents and they should be directly and specifically asked for, with the questionnaire as checklist[30].**

Grade B, Level IIa

B **Up to 30% bedwetters of so-called 'Monosymptomatic' enuretics are**

found to have an overactive bladder ("bladder instability"). Identification of this group of patients is important for successful treatment [31-34].

Grade B, Level IIa

5.4.2 Physical Examination

GPP **Physical examination in an enuretic is commonly normal. Careful examination however allays fears of underlying abnormality which constitutes one of important reasons for parents seeking treatment[22].**

A good history and careful examination followed by a simple urinalysis as screen for urinary abnormalities are all that is needed for diagnosis of Primary Monosymptomatic Nocturnal Enuresis (PMNE).

GPP

5.4.3 Investigations

C **Conduct urinalysis +/- urine culture to detect urinary infection as a cause.**

Grade C, Level IV

B **Imaging studies and urodynamic studies should be reserved for those with complicating history or abnormal clinical findings[35].**

Grade B, Level III

5.5 Therapeutic Approach

GPP **Good 'doctoring' is essential – explanation of 'benign' nature and not a psychopathological condition[36].**

GPP

B **Active intervention or therapy can achieve dryness in 30% to 70% enuretic children within 1 to 3 months.**

Grade B, Level IIa

Although outcome can be unpredictable in untreated cases, severe enuretics should be given the benefit of treatment.

GPP **Generally enuretic children older than 5 years of age with wetting more than twice a week should be given the benefit of treatment[21-22].**

GPP

There are two established treatment modalities: pharmacotherapy with desmopressin (dDAVP) and enuresis alarm.

5.5.1 Desmopressin

Desmopressin (dDAVP) is a synthetic analogue of the natural occurring antidiuretic hormone or vasopressin (AVP) but is more potent in its antidiuretic effect and thus will always improve incontinence[37].

B **Tricyclic antidepressant (imipramine) cannot be generally recommended because of its potential fatal side-effect with reported lasting cure rate of 17%[38-39].**

Grade B, Level III

B **Anticholinergics like oxybutynin is ineffective when used alone, but can act as adjunctive therapy when detrusor overactivity is one of aetiologic factors[33, 34, 40].**

Grade B, Level IIa

A **Desmopressin has been proven to be more effective than placebo with up to 70% favourable response rate and is free of clinically significant side-effects[42-46].**

Grade A, Level Ib

In the Cochrane review (2000) examining 21 randomised trials involving 948 children treated with dDAVP, it was concluded that desmopressin rapidly reduced wet nights (within days) compared with placebo, even though some of the trials lacked clear definitions and treatment regimen. However there was some evidence that this favourable response was not sustained when treatment stopped.

A **dDAVP treatment in NE was rarely ever associated with water intoxication. Nonetheless parents and their families need to be warned of potential adverse effects and avoid overdrinking before bedtime[42-47].**

Minor side-effects reported include headache, nausea, abdominal pain and fatigue[40].

Grade A, Level Ib

dDAVP can be given via intranasal or oral route. Oral route is especially helpful in children with allergic rhinitis.

A A dose of 20 to 40 microgram intranasal dDAVP (2-4 puffs/metered dose divided and given through the nostrils) at bedtime is effective and safe[42-45]. Alternatively oral dDAVP of 0.2 to 0.4 mg (1-2 tablets) is equally effective and safe[46-49].

Grade A, Level Ib

GPP An initial 4 to 6 weeks dose titration with dDAVP is recommended and if response is partial or more (>50% reduction), then a longer term treatment should be considered with a stepwise reduction in dose[41, 45].

GPP

GPP To test for cure and avoid over-treatment, medication with dDAVP should be stopped and interrupted for at least 1 week after every 3 months of treatment[45].

GPP

It is not recommended that initial treatment be continued beyond that initial 6 months if there is unsatisfactory response[41,45] (<50% reduction in wet nights).

GPP

The long–term effects of dDAVP treatment in PMNE of a year or more had not been adequately studied except of a Swedish Enuresis open multicentre trial (SWEET trial)[45] – an ongoing trial on 399 children aged 6 to 12 years. At individually adjusted doses of 20 – 40 µg intranasal dDAVP administered for 3 to 12 months, 38% patients became dry on or off treatment (22% completely dry, 16% dry with continued use of desmopressin) and concluded that longer term desmopressin treatment is effective and safe. Most children (83%) who became dry without continued medication did so during the first 6 months. There were no signs of developing tolerance to dDAVP.

5.5.2 Precautions for Use of dDAVP

There had been reports of hyponatremia and water intoxication causing fits and rare instance of death with indiscriminate use of dDAVP.

Precautions include:

- Always instruct parents to monitor water intake;
- No water 1 to 2 hours before taking the medicine and use the minimum amount of water to take dDAVP if it is an oral tablet;
- Omit and interrupt the use of dDAVP in situations or acute illnesses that can lead to increased water consumption or fluid/electrolyte imbalance. Such events can include fever, persistent diarrhea/vomiting, medications that increase thirst, hot weather, vigorous exercise, habitual drinking;
- Contraindicated in patients taking tricyclic antidepressants and seratonin inhibitors.

5.5.3 Enuresis Alarm

B Enuresis alarm is effective with reported success rate generally around 60% to 80%[50-53].

Grade B, Level III

B Alarm training has a reported relapse rate of 15% to 40%. Retreatment is often effective[54, 55].

Grade B, Level III

The Cochrane review (2000) analysed 22 randomised trials of alarm therapy in PMNE involving 1125 children showed that children treated with alarms were significantly more likely than untreated controls to become dry though many of the trials were of poor quality.

C When compared with pharmacotherapy, alarm treatment appeared to have more sustained effect when off treatment.

Grade C, Level IV

B Alarm treatment also suffers from a high drop-out rate up to 35% due to disruptive nature of the training[54, 55].

Grade B, Level III

However despite the demanding nature of the training programme, enuresis alarm remains a cost-effective therapy for PMNE.

5.5.4 Combined Treatment with Alarm and Desmopressin

B **Combined therapy with alarm and dDAVP is superior to monotherapy of either alarm or dDAVP, especially in severe wetting (≥ 6 wet nights per week), children with behavioural problem and psychosocial stress[56].**

Combined therapy should be considered in non-responders with monotherapy. Recommendation included combined therapy for 6 weeks after which desmopressin is discontinued while alarm treatment continues as long as it takes to arrest bedwetting[40].

Grade B, Level III

5.5.5 Anticholinergic Therapy for Non-responders

B **When monotherapy with dDAVP or enuresis alarm fails, the overactive bladder should be carefully excluded[40, 57].**

Grade B, Level IIa

Urodynamic studies may be indicated and bladder training with or without anticholinergic drug (oxybutynin, tolterodine) should be considered.

Indeed symptoms of bladder instability should be carefully elicited at the outset as timed voiding, bladder training and use of anticholinergics prior to dDAVP/ alarm treatment had been shown to improve outcome significantly[34,57].

5.6 Outcome Assessment

The spontaneous annual resolution rate of 15% is not always accounted for in cure rate reports, though one has to bear in mind of this when comparing outcomes of treatment.

C **Outcome is widely defined as[58]:**

Full response – reduction in wet nights of 90% or more
Partial response – reduction in wet nights of 50% to 90%
Non-response – less than 50% reduction in wet nights
Lasting cure – full response still present 6 months or longer after discontinuation of therapy

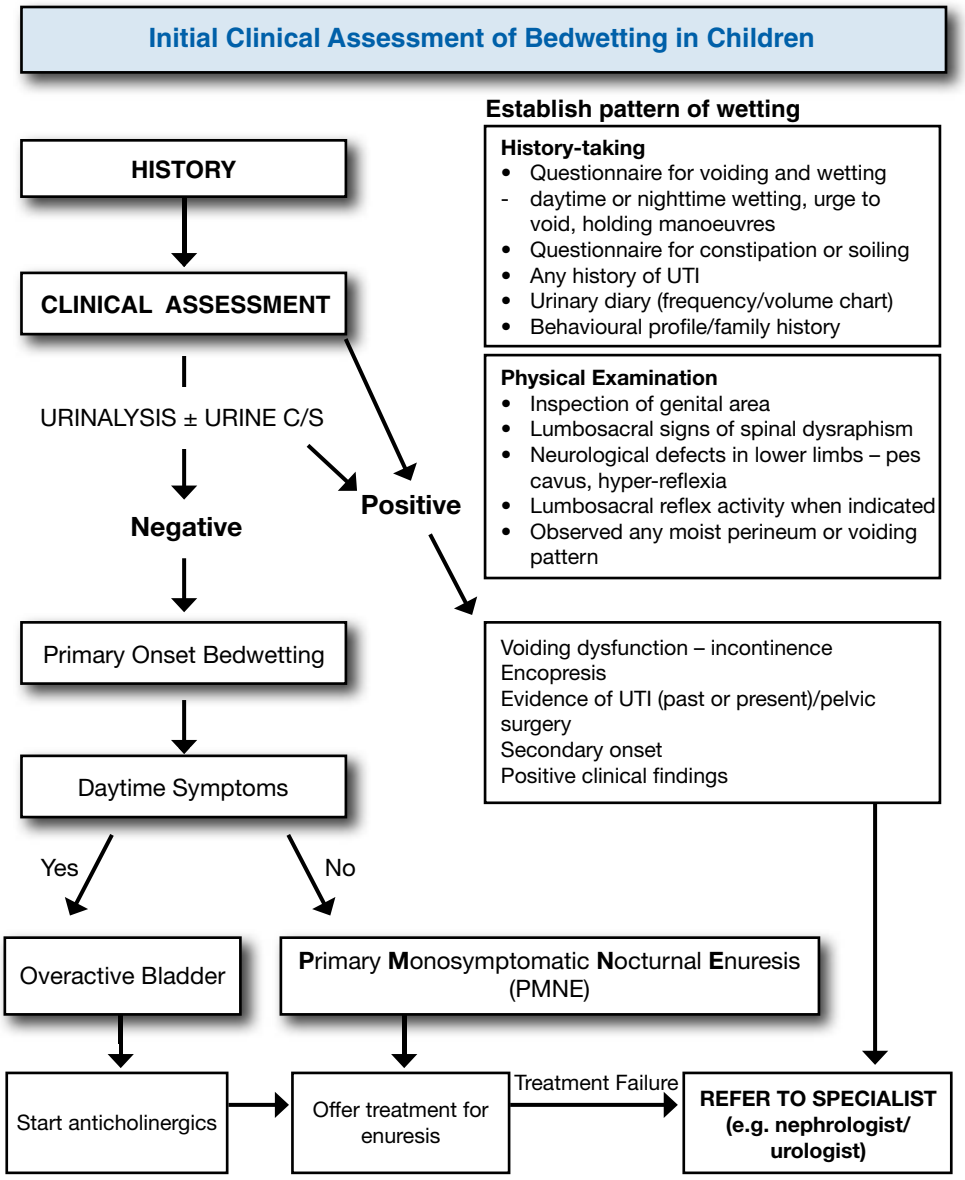
Grade C, Level IV

In absolute terms, a 90% reduction of wet nights from almost daily bedwetting translates to about 3 wet nights per month.

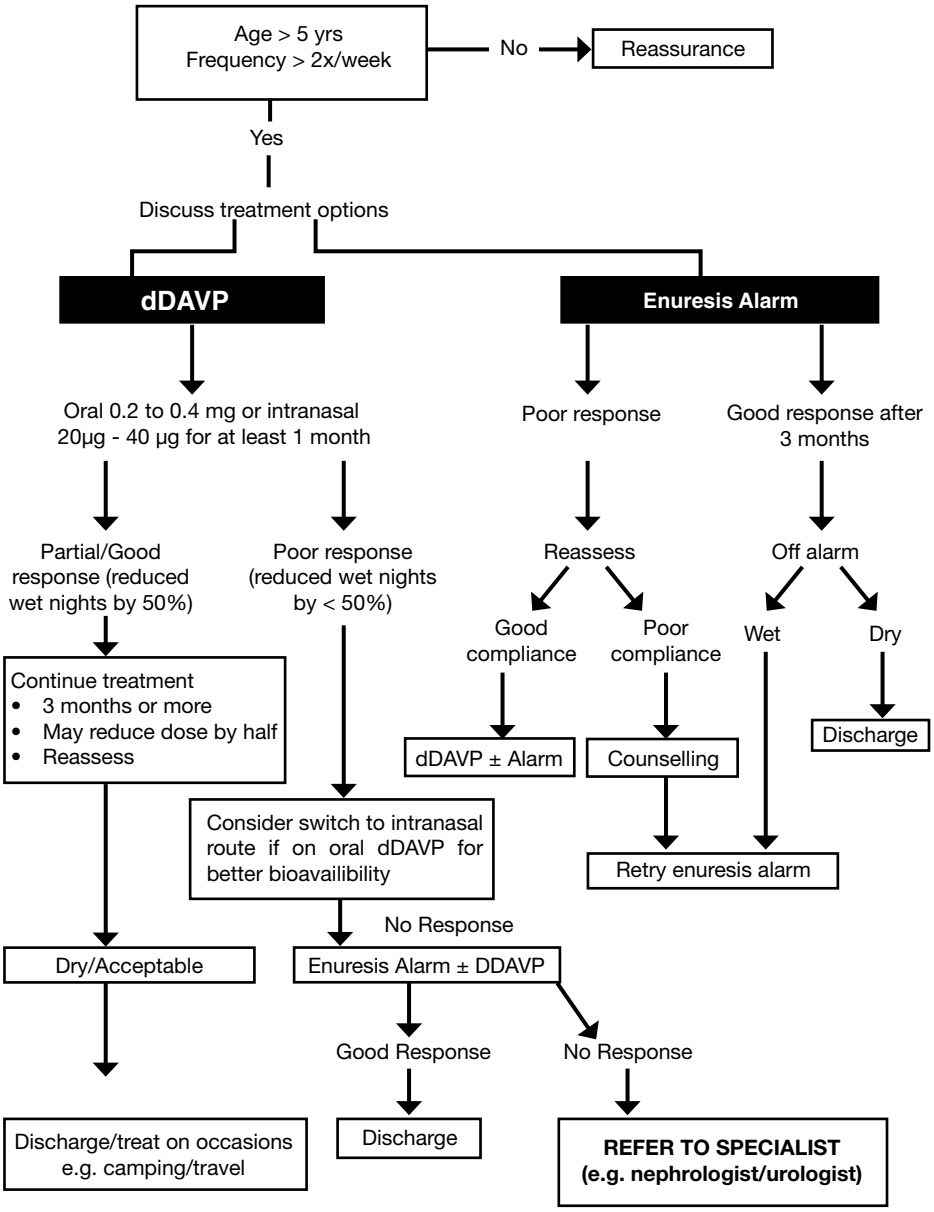
5.7 Conclusion/Priorities for the Future

Desmopressin and enuresis alarm have both achieved satisfactory outcome in the treatment of PMNE either alone, or in combination. Urotherapy further improves outcome in a subgroup of patients. If cure is not achieved with desmopressin, it can be used as a substitution therapy until spontaneous resolution occurs. Every enuretic child should be given the benefit of treatment though up to 30% enuretics have been reported to be resistant to treatment. The key for handling non-responders approaching adolescence and still wetting is that the physician should continue to show support and give reassurance of ultimate dryness in almost all bedwetters.

Future direction includes improving and standardising definitions, subgrouping patients for better treatment outcome. Efforts are still ongoing to elucidate the aetiology and pathophysiologic mechanisms behind PMNE.


Initial Clinical Assessment of Bedwetting in Children
Establish pattern of wetting
HISTORY
CLINICAL ASSESSMENT
History-taking
• Questionnaire for voiding and wetting
- daytime or nighttime wetting, urge to void, holding manoeuvres
• Questionnaire for constipation or soiling
• Any history of UTI
• Urinary diary (frequency/volume chart)
• Behavioural profile/family history
Physical Examination
• Inspection of genital area
• Lumbosacral signs of spinal dysraphism
• Neurological defects in lower limbs – pes cavus, hyper-reflexia
• Lumbosacral reflex activity when indicated
• Observed any moist perineum or voiding pattern
URINALYSIS ± URINE C/S
Negative
Positive
Primary Onset Bedwetting
Voiding dysfunction – incontinence
Encopresis
Evidence of UTI (past or present)/pelvic surgery
Secondary onset
Positive clinical findings
Daytime Symptoms
Yes
No
Overactive Bladder
Primary Monosymptomatic Nocturnal Enuresis (PMNE)
Start anticholinergics
Offer treatment for enuresis
Treatment Failure
REFER TO SPECIALIST (e.g. nephrologist/ urologist)

Treatment Guideline for Primary Monosymptomatic Nocturnal Enuresis



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6 Urinary Incontinence in Men

6.1 Introduction

There are no local studies on the prevalence of urinary incontinence in men. In the United States, amongst men aged 15 to 64 years, as many as 5% are affected[1]. The major causes of male incontinence are post-micturition dribbling, overactive bladder and post-prostatectomy incontinence.

6.2 Background

Post-micturition dribbling is characteristic of male patients and is usually unrelated to either urethral stricture or urethral obstruction. This pathology is due to pooling of urine in the bulbous urethra after micturition, which later drains by gravity or body movement. This symptom is present in 17% of healthy adults and 67% of those with LUTS[2-4]. Post-micturition dribbling is a minor condition which does not hamper health but is a nuisance and causes discomfort and embarrassment.

The overactive bladder (OAB) is still an ill-understood entity. It affects the quality of life because of the distress in searching for a toilet and inability to hold their bladders before reaching the toilet. Urge incontinence results in patients who suffer from severe OAB. In a young male, OAB usually exist without any obstruction to the lower urinary tract. However, in men above the age of 50 years, one has to consider if OAB is secondary to BPH. As the prostate hypertrophies, it causes bladder outlet obstruction (BOO) resulting in detrusor overactivity (DO) which can be demonstrated on urodynamic tests. This DO condition manifests clinically with symptoms of OAB with its attendant frequency, urgency, nocturia and even urge incontinence. DO is a major contributing factor for persistent incontinence post-TURP. It is, however, not possible to predict whether this pathology will subside after TURP. Generally, 50% to 60% of men with DO from BPH subside by 3 months after TURP, although reversal is less common in elderly men[5].

If BPH causing BOO is not relieved, as the obstruction worsens, it results in slow urinary stream, hesitancy, and the sensation of incomplete emptying. In chronic BOO, overflow incontinence can result.

In men, the other common situation for incontinence following prostate surgery is sphincteric damage. Reported rates of stress incontinence after radical prostate surgery is around 15%. Patients who undergo a nerve-sparing radical prostatectomy appear to have a better chance of achieving

continence than those undergoing radical prostatectomy[6]. After TURP for benign disease, rates of permanent incontinence are much lower, in the range of 1% to 3%[7].

6.3 Evaluation

6.3.1 History

Both voiding and storage symptoms are asked. The nature, circumstances and duration of incontinence will help classify the type of incontinence. A urinary diary is recommended to help quantify urinary frequency and incontinence episodes. A 3-day period is sufficient to allow for variation in day-to-day activities.

6.3.2 Physical Examination

Inspect the penis for phimosis and meatal stricture. Examine the abdomen and palpate/percuss for any distended bladder. Do a rectal exam to assess anal tone, prostate size and character. Neurological exam to exclude underlying neurological lesion, e.g. peripheral neuropathy.

6.3.3 Investigations

C Conduct urinalysis to detect haematuria, pyuria and glucosuria.

Grade C, Level IV

C Serum urea, electrolytes, creatinine and glucose is recommended if compromised renal function is suspected or if polyuria (in the absence of diuretics) is present.

Grade C, Level IV

B Uroflowmetry helps determine if there is any infravesical obstruction as the cause of urine flow impairment and overflow incontinence.

Grade B, Level III

B A bladder ultrasound scan is a non-invasive alternative to in/out catheterisation to rule out clinically significant urinary retention[8].

Grade B, Level IIa

Specialised tests are not intended to be part of the basic evaluation. These

comprise of urodynamic tests, cystoscopy, urine cytology and imaging tests.

6.4 Therapeutic Approach

6.4.1 Post-micturition Dribble

B Clinical managements include pelvic floor muscle training and milking the bulbous urethra immediately after micturition[9].

Grade B, Level III

6.4.2 Urge Incontinence from Overactive Bladder

A Anticholinergic agents are the first-line pharmacologic therapy for adults with urge incontinence from overactive bladder[10].

Grade A, Level Ia

The antimuscarinics oxybutynin, tolterodine and propiverine are the commonly used drugs to treat urge incontinence. Common side-effects with these agents are reduced saliva production and worsening constipation. Tolterodine possesses selectivity for urinary bladder receptors over salivary receptors. It is the drug of choice if oxybutynin use is limited by excessive dry mouth[11]. In addition, two new antimuscarinics, darifenacin and solifenacin, are expected to possess more favourable tolerability profiles. (Table 1)

B Relief of obstruction reverses detrusor overactivity in 50% to 60% of cases, although reversal is less common in the elderly[5].

Grade B Level III

GPP Addition of an anti-cholinergic agent may improve the incontinence, but at the same time, may compromise bladder emptying, particularly in the presence of severe outlet obstruction or weak detrusor contractility.

GPP

Occasionally, one encounters a patient with refractory OAB, i.e. despite antimuscarinics, the symptoms persist to the point that quality of life becomes miserable. Until recently, the only surgical option for patients with refractory detrusor instability was augmentation cystoplasty, in which bladder capacity is artificially increased and detrusor contractility reduced.

Table 1: Current Antimuscarinic Agents for Treatment of Overactive Bladder in Adults

Drug	Dose	Comments
Oxybutynin		
Extended-release	5–30 mg once daily	Effectiveness and side-effects comparable to those of tolterodine
Immediate-release	2.5–5 mg 3 times daily	Effective but has high incidence of side-effects
Transdermal	3.9 mg twice weekly	Alternative delivery system avoids hepatic first-pass effect
Tolterodine		
Long-acting	4 mg once daily	More selective for the bladder over the salivary gland in vitro, but with greater tolerability
Immediate-release	1–2 mg twice daily	More selective for the bladder over the salivary gland in vitro
Propiverine	15 mg twice daily	Has combined antimuscarinic and calcium-modulating actions
Solifenacin	5–10 mg once daily	Longer half-life may improve results
Darifenacin	7.5–15 mg once daily	Detrusor M3-receptor specific; less cognitive impairment than other agents

A segment of detubularised bowel is introduced into the bladder dome, or the detrusor smooth muscle of the dome is incised to create an iatrogenic bladder diverticulum. More recently, anterior sacral nerve root stimulator implantation has been approved for use in refractory cases. Although this technique is vulnerable to all the complications of any pacemaker-type implant, success rates are encouraging, and patient satisfaction is high[12].

B Intradetrusor injection of botulinum A toxin is an alternative surgical treatment in patients with DO who do not respond to anticholinergic therapy. The duration of effect seems to be at least 6 months[13].

Grade B, Level III

B Neuromodulation is a minimally invasive surgical treatment for detrusor instability offered in specialised centres and may be considered after failure of non-invasive treatments[12].

Grade B, Level IIb

B Augmentation cystoplasty is recommended for individuals with intractable, severe bladder instability or poor bladder compliance that is unresponsive to nonsurgical therapies[14].

Grade B, Level IIb

6.4.3 Post-prostatectomy Incontinence

Detrusor overactivity (DO) is a major contributing factor in post-prostatectomy incontinence. It is, however, not possible to predict whether this pathology will subside after TURP. Urodynamically, 34% of incontinent patients suffered sphincter incompetence, 26% suffered detrusor overactivity, and 33% suffered mixed incontinence[15-17].

In comparison to TURP, incontinence is much more common after radical prostatectomy. Sphincteric incompetence rather than DO is the predominant factor causing post-radical prostatectomy incontinence[18,19]. Patients who undergo a nerve-sparing radical prostatectomy appear to have a better chance of achieving continence than those undergoing standard radical prostatectomy[6].

B Pelvic floor muscle training is beneficial in the treatment of

post-prostatectomy incontinence.

Grade B, Level III

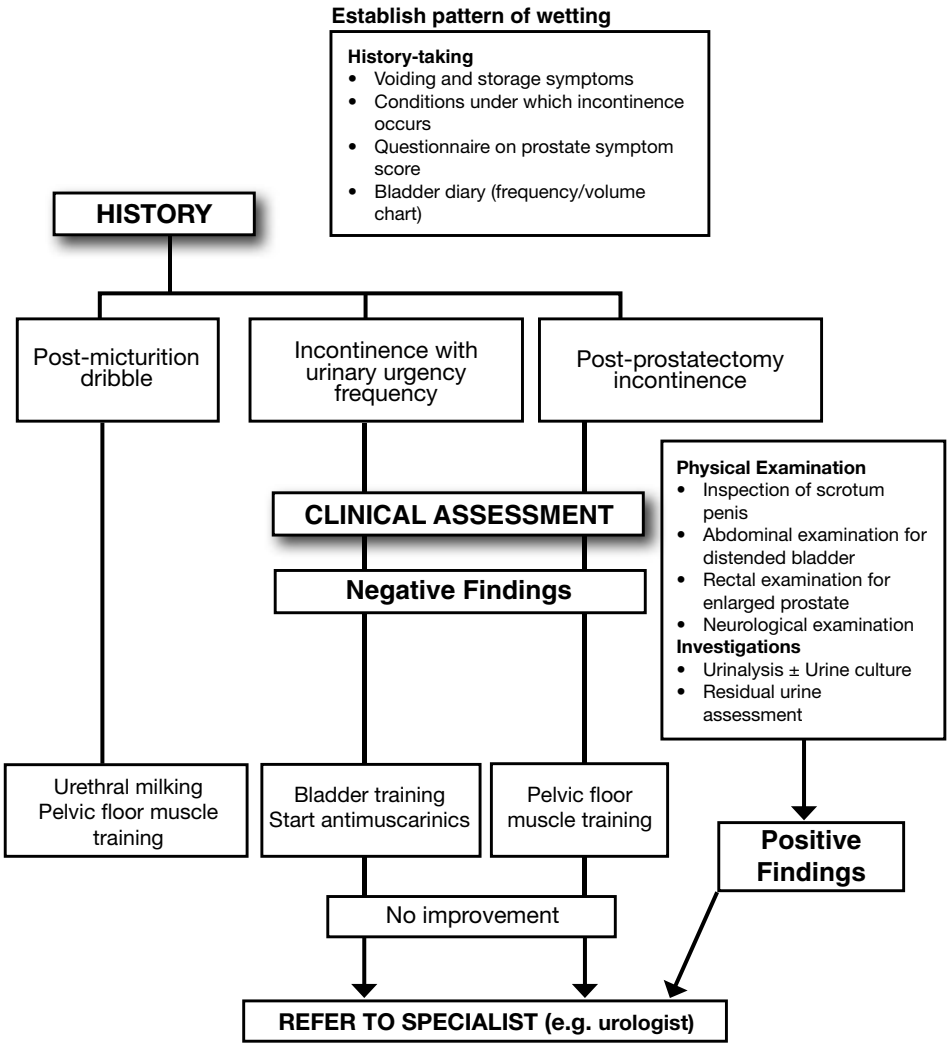
B **After a period of conservative treatment, which may be from 6 to 12 months, the artificial urinary sphincter is the treatment of choice in appropriately selected patients with stress incontinence after prostatectomy.**

Despite these risks, artificial sphincter implant has the best long-term track record for male stress urinary incontinence, with a 97% continence rate 10 years after implantation[20].

Grade B, Level III

Ways of decreasing the rates of incontinence after radical prostatectomy is by sparing the nerve bundles around the prostatic urethra and preserving an adequate urethral stump[20,21].

Initial Clinical Assessment of Incontinence in Men



7 Urinary Incontinence in Women

7.1 Introduction

In women, bladder dysfunction is overwhelmingly due to deficits of urine storage. Stress, urge, and mixed incontinence are the most common types of incontinence in women. Overflow incontinence due to disorders of bladder emptying are less common, and are often due to severe prolapse, prior vaginal or incontinence surgery, paraurethral masses, or neurological disease. For peri- and post-menopausal women, oestrogen deprivation appears to play a role in lower urinary tract dysfunction[22]. There is a clear correlation between urogenital atrophy and increased detrusor muscle activity hyperactivity, deriving symptoms associated with Overactive Bladder Syndrome/Detrusor Overactivity (OAB/DO).

7.2 Background

Although epidemiologic surveys reveal that urinary incontinence among women, is related to increasing age, recent data concerning female urinary tract dysfunction refute the common impression that urinary incontinence is a disease of older women only. A survey of more than 2000 women of all ages showed the overall rate of incontinence to be 69%, and the rate of urinary urgency without incontinence was 61%. A significant impact on quality of life was reported by 30% of those surveyed. Even young athletic women report a very high incidence (up to one-third) of urinary incontinence when engaged in sports[23]. These data give credence to the belief that the anatomy and physiology, i.e. the short length of the average female urethra, the lack of robust sphincter bundles, and the propensity for diminished elasticity, are also risk factors for incontinence.

7.3 Evaluation

7.3.1 History

Women with urinary incontinence should undergo a basic evaluation that includes history and physical examination, post-void residual volume and urinalysis. Assess the quality of life and desire for treatment. A urinary diary is recommended to help quantify urinary frequency and incontinence episodes. A 3-day period is sufficient to allow for variation in day-to-day activities.

7.3.2 Physical Examination

The physical examination includes abdominal, pelvic, and neurological

examinations to assess for distended bladder, pelvic organ prolapse, oestrogen status and neurological status. The cough test is used to demonstrate stress incontinence.

7.3.3 Investigations

Basic investigations include urinalysis and urine culture to assess for any lower urinary tract infection. If infection is found, treat and reassess.

C **Serum urea, electrolytes, creatinine and glucose is recommended if compromised renal function is suspected or if polyuria (in the absence of diuretics) is present.**

Grade C, Level IV

B **Uroflowmetry and measurement of post-void residual urine by bladder scan or catheterisation should be performed in women with symptoms suggestive of voiding dysfunction or recurrent UTI.**

Grade B, Level II

GPP **After the basic evaluation, the type of incontinence should be categorised into either stress, urge or mixed stress/urge. Thereafter, initial treatment can be started. In mixed incontinence, treatment should be directed at the predominant symptom.**

GPP

Specialised tests are not intended to be part of the basic evaluation. These comprise of pad tests, urodynamic tests, cystoscopy, urine cytology and imaging tests.

Risk factors that are associated with urinary incontinence should also be identified and attempts made to modify them. After the basic evaluation and initial treatment, patients who fail or those who are not appropriate for treatment should undergo further evaluation.

The objectives of further evaluation are to:
1. Identify the specific cause or causes of urinary incontinence with reproduction of leakage during testing;
2. Identify conditions that cause similar symptoms but require different treatments, such as outlet obstruction, detrusor muscle weakness, urethral hypermobility, intrinsic sphincter deficiency and urethral diverticulum;

3. Detect functional, neurologic or anatomic lesion affecting the lower urinary tract;
4. Help obtain specific information necessary for choosing the appropriate therapy;
5. Identify risk factors that may influence the outcome of a specific treatment.

7.4 Therapeutic Approach

7.4.1 Stress Incontinence

A Pelvic floor exercises (PFE) are first-line treatment for women with stress urinary incontinence. The duration should be at least 3 months for it to be effective[24,25].

Grade A, Level Ia

A Pelvic floor electrical stimulation can be added in women who are unable to actively contract their pelvic floor muscles[26].

Grade A, Level Ib

A Weighted vaginal cone training may be recommended to pre-menopausal women who suffer from stress urinary incontinence. However, there is no further benefit of adding vaginal cone training to PFE[27, 28].

Grade A, Level Ib

A Systemic oestrogen therapy is not recommended for the treatment or prevention of any type of urinary incontinence[29].

Grade A, Level Ia

There is limited data about the effect of vaginal oestrogen administration on urinary incontinence[30-33]. However, any route of oestrogen administration should not be prescribed for the treatment of any type of urinary incontinence[30-33].

A Duloxetine, a serotonin-nonadrenaline reuptake inhibitor, may be offered as second-line therapy if women prefer pharmacotherapy to surgical treatment or are not suitable for surgery. If prescribed, the side-effects should be made known, especially nausea[32].

Grade A, Level Ia

There is limited data to recommend the use of alpha-adrenergic agonist, imipramine and beta-adrenergic antagonists for the treatment of SUI[10, 32].

GPP Surgery is recommended for treatment of stress incontinence and may be recommended as first-line treatment for patients who do not improve with non-surgical therapies and to the point that their quality of life is affected[10].

GPP

After complete evaluation, if the primary pathophysiologic defect appears to be urethral hypermobility or displacement, 5 main types of procedures are available:

- Retropubic suspension
- Pubovaginal slings
- Mid-urethral vaginal tapes e.g. tension-free vaginal tape (TVT)
- Needle bladder neck suspension
- Anterior vaginal wall repair

A Retropubic suspension, pubovaginal slings or mid-urethral vaginal tapes are recommended for women where hypermobility is the cause for their stress incontinence. On the basis of their greater efficacy and durability, these procedures are preferred over needle suspension and anterior vaginal wall repair[34-36].

Grade A, Level Ia

Where intrinsic sphincter deficiency (ISD) is determined to be the main cause, the following procedures are recommended:

- Pubovaginal sling
- Mid-urethral vaginal tapes, e.g. TVT
- Periurethral bulking injections
- Artificial urinary sphincter (AUS)

B Pubovaginal slings and TVT are recommended for women who have ISD with coexisting hypermobility and also as first-line treatment for ISD[37, 38].

Grade B, Level IIb

B Periurethral bulking injections can be offered to women with ISD who do not have coexisting hypermobility. Although they have low operative morbidity, their long-term success rate is low and repeated

injections may be needed[39].

Grade B, Level IIa

B The AUS can be recommended for ISD patients who have severe incontinence unresponsive to other surgical treatments. However, artificial sphincters in women carry a much higher erosion/complication rate. Because of this, the AUS is rarely used as the first-line choice[40].

Grade B, Level III

7.4.2 Urge Incontinence

A Bladder training for a period of 6 weeks should be offered as first-line treatment to women with urge and mixed urinary incontinence[41].

Grade A, Level Ia

A Anticholinergic agents are the first-line pharmacologic therapy for adults with urge incontinence from overactive bladder who do not respond to bladder training[10].

Grade A, Level Ia

The antimuscarinics oxybutynin, tolterodine and propiverine are the commonly used drugs to treat urge incontinence. Common side effects with these agents are reduced saliva production and worsening constipation. Tolterodine possesses selectivity for urinary bladder receptors over salivary receptors. It is the drug of choice if oxybutynin use is limited by excessive dry mouth[11]. In addition, two new antimuscarinics, darifenacin and solifenacin, are expected to possess more favourable tolerability profiles. (Table 1)

B Flavoxate is not recommended for the treatment of patients with overactive bladder.

Grade B, Level IIb

B The use of tricyclic agents, e.g. imipramine should be reserved for carefully evaluated patients.

Grade B, Level III

The role of oestrogen in the pathophysiology of overactive bladder in women remains controversial.

Table 1: Current Antimuscarinic Agents for Treatment of Overactive Bladder in Adults

Drug	Dose	Comments
Oxybutynin		
Extended-release	5–30 mg once daily	Effectiveness and side-effects comparable to those of tolterodine
Immediate-release	2.5–5 mg 3 times daily	Effective but has high incidence of side-effects
Transdermal	3.9 mg twice weekly	Alternative delivery system avoids hepatic first-pass effect
Tolterodine		
Long-acting	4 mg once daily	More selective for the bladder over the salivary gland in vitro, but with greater tolerability
Immediate-release	1–2 mg twice daily	More selective for the bladder over the salivary gland in vitro
Propiverine	15 mg twice daily	Has combined antimuscarinic and calcium-modulating actions
Solifenacin	5–10 mg once daily	Longer half-life may improve results
Darifenacin	7.5–15 mg once daily	Detrusor M3-receptor specific; less cognitive impairment than other agents

A **Systemic hormone replacement therapy is not recommended for urge incontinence, although intravaginal oestrogens can be recommended to post-menopausal women with vaginal atrophy[29, 30].**

Grade A, Level Ia

A **The use of desmopressin may be considered to reduce nocturia in women who have urge incontinence or overactive bladder[42].**

Grade A, Level Ia

B **Intravesical instillation therapy with capsaicin, resiniferatoxin and local anesthetics such as lidocaine and bupivacaine are alternative treatments[43].**

Grade B, Level III

B **Intradetrusor injection of botulinum A toxin is an alternative surgical treatment in patients who do not respond to anticholinergic therapy. The duration of effect seems to be at least 6 months[13].**

Grade B, Level III

C **Sacral nerve stimulation can be recommended to women whose urge incontinence do not respond to conservative treatment. However, this should be offered to those who have responded to preliminary percutaneous nerve evaluation[44].**

Grade C, Level III

B **Augmentation cystoplasty and urinary diversion is recommended for those patients with intractable, severe bladder instability or poor bladder compliance unresponsive to nonsurgical therapies[14].**

Grade B, Level IIb

A **Bladder training for a period of 6 weeks should be offered as first-line treatment to women with urge and mixed urinary incontinence[45].**

Grade A, Level Ia

C **Priority of treatment for stress incontinence or urge incontinence depends on the predominant symptom that the patient has[46].**

Grade C, Level IV

7.4.3 Overflow Incontinence

B **Intermittent catheterisation or an indwelling catheter may be considered in patients who are not candidates for surgery or who have failed surgery[47].**

Grade B, Level III

C **Intermittent catheterisation is preferable to indwelling catheters for the management of chronic urinary retention from detrusor underactivity. In the event that patients are unable to perform intermittent catheterisation, suprapubic catheter is an acceptable alternative[48].**

Grade C, Level IV

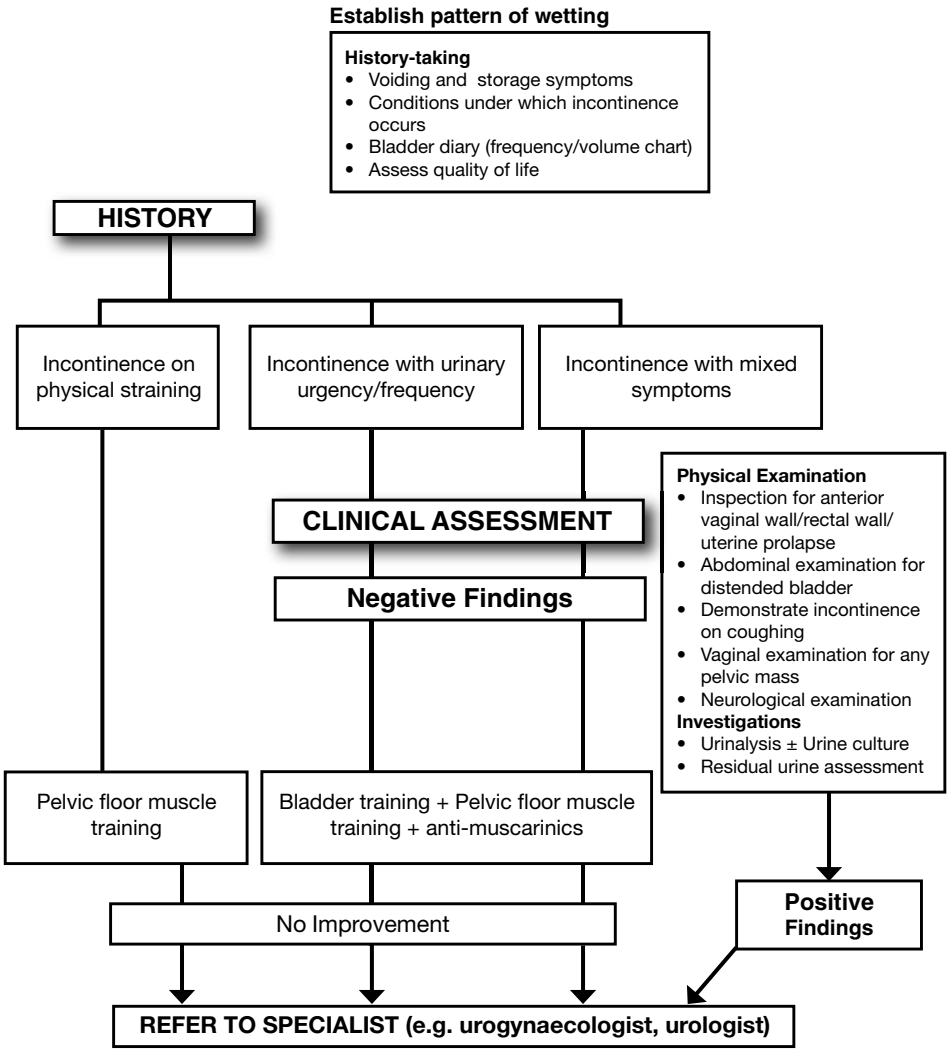
C **There is no evidence to support the use of urethral dilation for the treatment of incontinence in women, although it may be useful in the rare case of primary obstruction[49].**

Grade C, Level IV

C **Internal urethrotomy is not recommended for treating urethral obstruction in women[50].**

Grade C, Level IV

Initial Clinical Assessment of Incontinence in Women



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8 Urinary Incontinence in Frail-Elderly People

8.1 Introduction

In functionally independent older people with no or few co-morbid illnesses, the clinical approach to urinary incontinence should follow that for adults according to gender (men or women). This section focuses on "frail-elderly people", defined as "persons 65 years of age or older with incontinence of urine and who have or are at higher risk of developing physical or cognitive impairment". Compared to the healthier population, urinary incontinence in frail-eldery people is universally multifactorial, and always includes aetiological factors beyond urinary physiology alone[1].

Good evidence for frail-elderly person has been sparse because of the challenges in methodology and conduct of research in this subset of older people. Therefore, expert opinion from respected authorities is relied upon in many areas of this subject where there is absence of directly applicable clinical studies of good quality.

8.2 Background

Age-related changes in the lower urinary tract, such as decreased bladder capacity, urine flow rate and urethral compliance (women) and increased prevalence of involuntary detrusor contractions, post-void residual urine volume and urethral resistance (men), do not cause urinary incontinence on their own[2, 3]. Urinary incontinence in older people is much more likely to be due to a cause outside the lower urinary tract than in the case of younger people[4], and is not due to the natural consequences of ageing[5, 6].

In any older patient diagnosed as having urinary incontinence, a targeted evaluation should be initiated if this has not been previously performed. In addition, when there is a worsening of a pre-existing incontinence, some form of evaluation would also be necessary in most cases[7].

Transient causes of incontinence account for one-third to one-half of cases of urinary incontinence in older people[8]. Most of these causes lie outside the lower urinary tract. They can be remembered using the mnemonic, "DIAPPERS" (Table 1)[9]. When these causes are addressed, continence can be restored even if there is underlying lower urinary tract dysfunction. All these causes should be searched for and treated in all older incontinent patients[10,11,12].

8.3 Evaluation

Irrespective of the presenting symptom complex, the causes of transient incontinence need to be ruled out. After that, the causes of established incontinence can be considered. In addition, the neurological status, mobility, cognition and performance of activities of daily living (ADL) should be assessed[1]. Of particular importance is the drug history as certain medications may induce incontinence (Table 2). Recommended steps in a targeted evaluation of the incontinent older patient are listed in Table 3.

In evaluation of more persistent or established causes of urinary incontinence, determining the type of incontinence (urge, stress, overflow) is key to planning the initial treatment based on clinical evaluation.

8.3.1 History

C Urinary incontinence may be diagnosed when there is involuntary urine leakage, which may be volunteered by the sufferer or caregiver, or when this is directly observed by the health care professional[7].

Grade C, Level IV

B Community-dwelling older people or caregivers of cognitive impaired persons should be questioned directly on the continence status[13]. In hospitals and nursing homes, history-taking should include asking about the condition and observation of incontinence episodes[14].

Grade B, Level IIb

C In instances where an indwelling urinary catheter has been inserted, it is important to review the reason for its introduction[5].

Grade C, Level IV

8.3.2 Physical Examination

The physical examination includes abdominal, pelvic, and neurological status to assess for distended bladder, impacted faeces or rectal prolapse. In men, examine the penis for phimosis or meatal stenosis. In women, exclude uterine prolapse. The cough test is used to demonstrate stress incontinence.

8.3.3 Investigations

Basic investigations include urinalysis and urine culture to assess for any lower

urinary tract infection. If infection is found, treat and reassess.

C **The extent of investigation needs to be considered on the basis of the clinical context, bother of the incontinence, life expectancy, quality of life and patient or caregiver preference[5].**

Grade C, Level IV

C **Measurement of post-void residual urine volume is an essential component of the assessment[5].**

Grade C, Level IV

The aim is to identify urinary retention that requires bladder decompression and initiation for its underlying causes.

Specialised tests are not intended to be part of the basic evaluation. These comprise pad tests, urodynamic tests, cystoscopy, urine cytology and imaging tests.

C **Specialised tests such as urodynamic studies are important in the following situations:**

1. **when surgery is contemplated;**
2. **when there is increased post-void residual urine volume and drug or surgical therapy is being considered;**
3. **when overactive bladder is suspected but there is inadequate response to empirical drug therapy and where other therapies are being sought[5].**

Grade C, Level IV

C **Serum urea, electrolytes, creatinine and glucose is recommended if compromised renal function is suspected or if polyuria (in the absence of diuretics) is present.**

Grade C, Level IV

Although clinical algorithms for frail-elderly people with urinary incontinence have been proposed[15-17], none have been rigorously evaluated in actual practice. A proposed algorithm adapted from 3rd International Consultation on Incontinence[1] on the initial management of urinary incontinence in frail-disabled elderly people is shown in Figure 1. Clinical judgement still plays a central role when applying such algorithms to individual patients.

8.4 Therapeutic Approach

In managing urinary incontinence in frail-elderly people, it is important to define realistic management end-points. A proposed classification defines 3 levels of continence that can be targeted:

- "independent continence" – where persons are able to void independently and remain continent;
- "dependent continence" – where persons can remain continent with assistance given by others;
- "social or contained continence" – where persons are incontinent but the problem is contained with use of appropriate aids and appliances to improve personal dignity and caregiver morale[1, 18].

Because of the paucity of good controlled studies on pharmacological intervention in frail-elderly people, its benefits are more uncertain for this subset of older people. However, it is reasonable to consider its use in selected patients as an adjunct to other measures such as behavioural intervention[5].

A Prompted voiding should be considered to achieve dependent continence. This is because improvement has been achieved in cognitively and physically impaired older people using this behavioural intervention[1, 19].

Grade A, Level 1b

C Continence aids and appliances such as pads and condom catheters can be valuable where the incontinence is refractory to other treatment measures. They are also useful in the attainment of social continence while other interventions are attempted[5].

Grade C, Level IV

8.4.1 Transient Incontinence

C Identified causes of transient incontinence should be addressed and treated on their own merits before treatment for suspected causes of established incontinence[20].

Grade C, Level IV

8.4.2 Overflow Incontinence

C Patients with urinary retention (with or without overflow incontinence) should have bladder decompression with urinary

catheterisation. Measures to monitor for and prevent complications of urinary retention are warranted till the underlying cause is corrected if possible (e.g. TURP for prostatic obstruction)[7].

Grade C, Level IV

C Although there is no specific data for frail or disabled older people, intermittent catheterisation appears to be a reasonable alternative for patients with chronic urinary retention[1]. This can be performed by self or by caregivers.

Grade C, Level IV

8.4.3 Urge Incontinence

C Before starting drug therapy, all other medications taken should be reviewed to assess the likelihood of their contribution to the incontinence and to be modified where appropriate[1].

Grade C, Level IV

B When initiating drug therapy, it is prudent to start with lower dosages than that suggested in the drug literature, and to gradually increase the dose while monitoring for the desired outcome and adverse effects[1].

Grade B, Level IIb

For anti-cholinergic agents (e.g. oxybutynin, tolterodine), the most troublesome unwanted effects in addition to dry mouth are cognitive decline, constipation and urinary retention. For alpha-adrenergic antagonist agents (e.g. prazosin, terazosin, alfuzosin), the main unwanted effect is postural hypotension that can predispose to falls and immobility.

8.4.4 Stress Incontinence

Age per se should not be a barrier to surgery. Instead, the likelihood of the operation improving the quality of life of the patient should be considered when non-surgical treatment fails[1]. In addition, co-morbid medical conditions and peri-operative risk should be assessed so that the risk-benefit balance of individual patients can be estimated and discussed with patients or their caregiver. The types of surgery for stress incontinence in women are generally the same as for younger or more independent patients.

Although initial and empirical treatment of established incontinence would be

according to the type of incontinence (urge, stress or overflow), more definitive treatment options are summarised in Table 4[18, 21].

Table 1: Causes of Transient Incontinence in Older People (adapted)[11]

Cause	Notes
Delirium	Results from any medical illness or medication; incontinence is secondary and abates when the cause of delirium has been corrected
Infection, urinary (symptomatic)	Asymptomatic bacteriuria usually does not cause incontinence
Atrophic urethritis/ vaginitis	May cause or contribute to incontinence; responds to topical oestrogen therapy
Pharmaceuticals	Many drugs can cause or contribute to incontinence (Table 2); includes non-prescribed agents
Psychological	Severe depression; rarely the cause of incontinence
Excessive urine output	Results from a large fluid intake, diuretic agents, metabolic disorders (hyperglycaemia, hypercalcaemia); nocturnal incontinence may result from mobilisation of fluid from peripheral oedema
Restricted mobility	Often results from overlooked, correctable causes such as arthritis, postural hypotension, or fear of falling
Stool impaction	Disimpaction restores continence

Table 2: Drugs that can Cause or Contribute to Urinary Incontinence[22]

Drug class	Mechanism of incontinence
Drugs causing overflow incontinence	
Anticholinergics	
Antidepressants	Decreased bladder contractions with retention
Antipsychotics	
Sedative-hypnotics	
Antihistamines	
CNS depressants	
Narcotics	Decreased bladder contractions with retention
Alcohol	
Calcium channel blockers	Decreased bladder contractions with retention
Alpha-adrenergic agonists	Sphincter contraction with outflow obstruction
Drugs causing stress incontinence	
Alpha-adrenergic antagonists	Sphincter relaxation with urinary leakage
Drugs causing urge incontinence	
Diuretics	Contractions stimulated by high urine flow
Caffeine	Diuretic effect
Sedative-hypnotics	Depressed central inhibition of micturition
Alcohol	Diuretic effect and depressed central inhibition

Table 3: Targeted Evaluation of the Incontinent Older Patient (adapted)[11]

History
Type (urge, stress, overflow, mixed)
Frequency, severity, duration
Pattern (diurnal, nocturnal, both or after taking medication)
Associated symptoms (reduced stream, straining, incomplete emptying, dysuria, haematuria)
Alteration in bowel habit
Other relevant factors (diabetes mellitus, neurological disease, urinary tract infections, pelvic/lower urinary tract surgery or irradiation)
Medications (including non-prescription items)
Functional assessment (mobility, ADL ability, cognition)

Physical Examination
Identify other relevant medical conditions (e.g. heart failure, peripheral oedema)
Stress test (for female)
Palpate for bladder distension after voiding
Pelvic examination (atrophic vaginitis, pelvic muscle laxity, pelvic mass)
Rectal examination (anal tone, faecal impaction, prostate nodule)
Neurological examination (including sacral reflexes and perianal sensation)

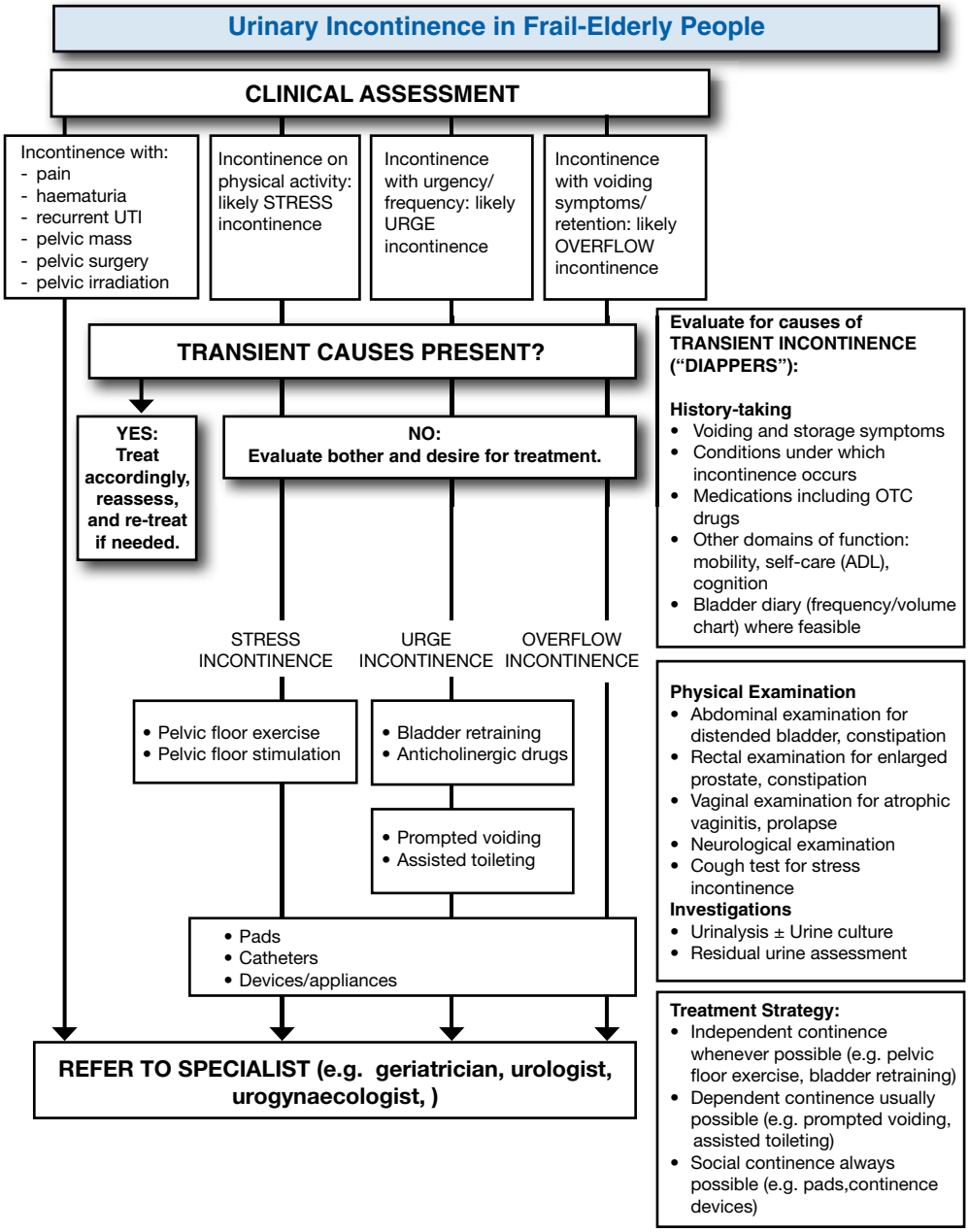
Investigations
Bladder/continence chart
Measurement of post-void residual urine by ultrasound or catheterisation
Urinalysis and urine culture
Blood tests (electrolytes, creatinine, glucose, calcium)*
Renal ultrasound (if high post-void residual urine volume)*
Uroflow study*
Pressure-flow urodynamic study (see text for indications)*
Cystoscopy (if haematuria or suspicion of lower urinary tract lesion)*

* Tests indicated for selected patients only.

Table 4: Recommended Treatment Options for Established Incontinence (adapted)[18,21]

Condition	Type of incontinence	Treatment options
Detrusor overactivity	Urge	1. Bladder retraining or prompted voiding 2. Bladder relaxant drug therapy (e.g. oxybutynin, tolterodine)
Reduced outlet resistance (outlet incompetence)	Stress	1. Pelvic floor exercises 2. Electrical stimulation of pelvic floor 3. Surgery for genuine stress incontinence
Detrusor underactivity	Urge/overflow	1. Intermittent catheterisation (by self or caregiver) 2. Indwelling catheterisation (less preferred)
Increased outlet resistance (outlet obstruction)	Urge/overflow	1. Surgery (e.g. TURP for prostatic obstruction) 2. Alpha-adrenergic antagonist drugs (e.g. prazosin, terazosin, alfuzosin) 3. Alpha-reductase drugs (e.g. finasteride)

Figure 1: Clinical Algorithm of Management of Urinary Incontinence in Frail-Elderly People (adapted from the 3rd International Consultation on Incontinence[1])



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9 Urinary Incontinence in Neuropathic Patient

9.1 Introduction

Most neurological diseases that affect the spinal cord and some that affect the brain cause bladder dysfunction. Such bladder dysfunction in turn, can lead to urinary incontinence. Such incontinence is also known as neurogenic urinary incontinence. Assessment and treatment depends on an understanding of the likely mechanisms producing the incontinence, which in turn, depend upon the site of the nervous system abnormality.

9.2 Background

Neuropathic bladder can be caused by (a) suprapontine, (b) spinal cord and (c) subsacral (cauda equina and peripheral nerves) lesions.

a) Suprapontine Level
In suprapontine lesions, e.g. Parkinson's disease, cerebrovascular accidents and dementia, urinary incontinence results from uninhibited detrusor contractions[1]. This detrusor hyperreflexia (DH) is due to damage to the cerebral inhibitory centers[2]. A significant number of new stroke patients develop urinary retention for several weeks before detrusor hyperreflexia occurs.

b) Spinal Cord Level
Neurological injury, which can involve parasympathetic, sympathetic, and somatic nerve fibers, can result in a complex combination of signs and symptoms. The urodynamic investigation of those with neurological impairment can provide objective information regarding the nature and extent of the effect on lower urinary tract function. For this reason, urodynamic testing should be an integral part in the evaluation of all patients.

In spinal cord injury (SCI), neurologically incomplete injuries are slightly more common (53.8%) than complete injuries (46.2%)[3]. Urodynamically, the most common pattern seen is detrusor hyperreflexia (about 70%), with half of these cases having co-existent detrusor-external sphincter dyssynergia (DSD)[4-6]. Detrusor areflexia is seen in 20% to 30% of cases, and these patients strain to void[7].

c) Subsacral Level
These lesions may affect the cauda equina including the sacral roots

and the peripheral nerves. Common causes are pelvic plexus injury, e.g. pelvic fractures, abdominal-perineal resection and hysterectomy.

Decreased parasympathetic innervation generally results in decreased detrusor contractility and potential areflexia, while impaired sympathetic transmission results in incomplete bladder neck closure, internal sphincter dysfunction, and stress incontinence. Up to 80% of patients with voiding disturbances after significant pelvic procedures will resume normal voiding within 6 months[6].

Diabetes mellitus is another common cause. Classically, patients experience decreased urinary frequency, hesitancy, and slowing of the urinary stream. These symptoms progress eventually to urinary dribbling from overflow incontinence.

9.3 Evaluation

Adequate time is needed for a proper and complete clinical evaluation. This is because the level of the neuropathic lesion needs to be determined.

9.3.1 History

The general history should include questions relevant to neurological and congenital abnormalities. Specific urinary history includes type of incontinence and severity.

9.3.2 Physical Examination

Attention should be paid to the physical and possible mental handicaps that may limit the investigation. Impaired mobility and limb spasticity may make it difficult for patient positioning during urodynamics. The neurological examination includes sensation, motor power, reflexes of limbs, perianal and bulbocavernosus. Remember to assess the anal sphincter tone too.

9.3.3 Investigations

C **Conduct urinalysis +/- urine culture to detect urinary infection.**

Grade C, Level IV

C **Serum urea, electrolytes, creatinine and glucose to detect if there is any compromised renal function.**

Grade C, Level IV

Specialised tests are not intended to be part of the basic evaluation. These comprise of urodynamic tests, cystoscopy and imaging tests.

9.4 Therapeutic Approach

Therapy of neurogenic incontinence is primarily a conservative one unless the patient has intractable incontinence, recurrent infections and at risk of upper tract damage.

9.4.1 Conservative Management

Continence control and avoidance of urinary tract infections are the aims of treatment.

a) Bladder Reflex Triggering
This refers to various manoeuvres performed by patients to elicit reflex detrusor contractions through exteroceptive stimuli. The most commonly used manoeuvres are: suprapubic tapping, thigh scratching and anal/ rectal stimulation.

C Triggered voiding could be recommended for patients whose situation has proven to be urodynamically safe and stable, and who can manage reflex incontinence. Reflex voiding can only be recommended if an adequate follow-up is guaranteed.

Grade C Level IV

b) Bladder Expression
This comprise of various techniques that increase intravesical pressure to facilitate bladder emptying. The most commonly used are the Valsalva (abdominal straining) and the Cred (manual compression of the lower abdomen). However, the use of Valsalva or Cred are potentially hazardous for the urinary tract due to functional obstruction at the level of the pelvic floor[7]. Before recommending such bladder expressions, it must be proved that the situation in the lower urinary tract is urodynamically safe.

GPP Valsalva and Cred give a reasonable quality of life as long as the indication is proper and when the neurological lesion remains stable.

GPP

c) Catheters
It is still common practice to manage spinal cord injured (SCI) and other neuropathic patients with indwelling urethral cathetherisation (ID) or

suprapubic catheterisation (SC). However, such indwelling catheters are associated with various complications such as urethral trauma and bleeding, urethritis, fistula, bladder stones, and recurrent UTI. Many of these complications were related to long-term usage[10].

C Transurethral indwelling and suprapubic catheter are not recommended as safe methods for long-term use in the neuropathic patients.

Grade C Level IV

Nowadays, clean intermittent catheterisation (CIC) is recommended for neuropathic patients. Many studies showed good results in continence with less complications and a better quality of life[9-11].

B Intermittent (self-) catheterisation is the method of choice nowadays to empty an unbalanced reflex bladder and to manage reflex-incontinence.

Grade B Level III

In neuropathic male patients, a condom catheter (CC) is also one of the choices to control incontinence[12-15].

C Long-term use may cause bacteriuria but it does not increase the risk of UTI when compared to other methods of bladder management.

Grade C Level IV

d) Pharmacotherapy

Antimuscarinics are still the most widely used treatment for DH cases troubled by urge and urge incontinence[16]. In spinal DH where there is functional outflow obstruction due to detrusor-sphincter-dyssynergia (DSD), anti-muscarinics are used to suppress reflex detrusor activity completely and facilitate CIC[17-18].

A Bladder relaxant drugs, including oxybutynin and tolterodine have a documented suppressive effect on incontinence by controlling overactive bladder, thereby improving storage function.

Grade A Level 1b

Botulinum toxin A and the vanilloids, capsaicin and resiniferatoxin are recently discovered agents that activate nociceptive sensory nerve fibers through an ion channel[19-22].

C Intravesical RTX and botulinum toxin injection may be an alternative for DH if conventional therapy fails.

Grade C Level IV

e) Electrical Neuromodulation
Sacral nerve neuromodulation has been confirmed as a valuable treatment option to treat patients with symptoms of the overactive bladder when pharmacotherapy has been ineffective or caused intolerable side-effects[23]. It is not really known how neuromodulation works, but there is now evidence that neuromodulation works at the spinal and at the supraspinal level[24].

C If pharmacotherapy fails to relax the hyperreflexic detrusor, electrical neuromodulation is an alternative in patients with incomplete lesions. However, non-invasive electrical neuromodulation should always be applied before invasive electrical neuro-modulation (sacral nerve stimulation of S3) is considered.

Grade C Level IV

9.4.2 Surgical Management

Surgery may correct the incontinence in many patients but is usually indicated only after all conservative therapies have been attempted and been ineffective. This is justified in those with low compliant bladders at risk of upper tract damage, and those with recurrent infections and intractable incontinence. In addition, other issues to be considered are social circumstances, degree of disability, cost effectiveness, technical difficulty and potential complications.

The type of surgery depends on the clinical lesion:

a) Failure to Empty
Stimulation of the anterior sacral roots, mainly S3 and S4, results in bladder contraction with simultaneous activation of the urethral sphincter and pelvic floor.

C Adding posterior rhizotomy promotes detrusor arreflexia and normal compliance, thus avoiding reflex incontinence. With this technique more

than 80% of the patients were able to achieve sufficient intravesical pressure to produce efficient voiding[25-27].

Grade C Level IV

Endoscopic incision of the male external sphincter is a procedure that helps decrease urinary outlet resistance due to detrusor-sphincter dyssynergia (DSD). The goal is to reduce the intravesical voiding pressure that results from the detrusor contracting against a dyssynergically contracted external urethral sphincter[28, 29].

C In the male patient with functional outlet resistance due to DSD, transurethral external sphincterotomy can be performed to promote bladder emptying.

Grade C Level IV

Botulinum-A toxin injected into the sphincter endoscopically is a new alternative to conventional sphincterotomy, and has been shown to be effective by some authors[30,31].

b) Failure to Store
In detrusor overactivity, surgery is aimed at enlarging the bladder capacity and in doing so, reduce the detrusor contractility. These procedures are enterocystoplasty, gastrocystoplasty, autoaugmentation, and ureterocystoplasty.

C Although the levels of evidence are relatively poor for enterocystoplasty, these being multiple series describing retrospective results of this procedure, the results are uniformly good in terms of continence and improvement or stabilisation of upper tracts. Many studies also confirm the associated enhancement of urodynamic storage characteristics[32-35].

Grade C Level IV

In patients with sphincteric incontinence, the artificial urinary sphincter (AUS) is a device that gives the patient better continence control.

C The AUS is commonly used in patients with congenital neurological disease, e.g. spina bifida with a success rate of 70% to 95% and a revision rate between 16% and 18%[34, 35]. The reported continence rate is generally high with few complications[36, 37].

Grade C Level IV

The use of pubovaginal slings is established in the neurological female patient as an alternative to the artificial urinary sphincter[38, 39].

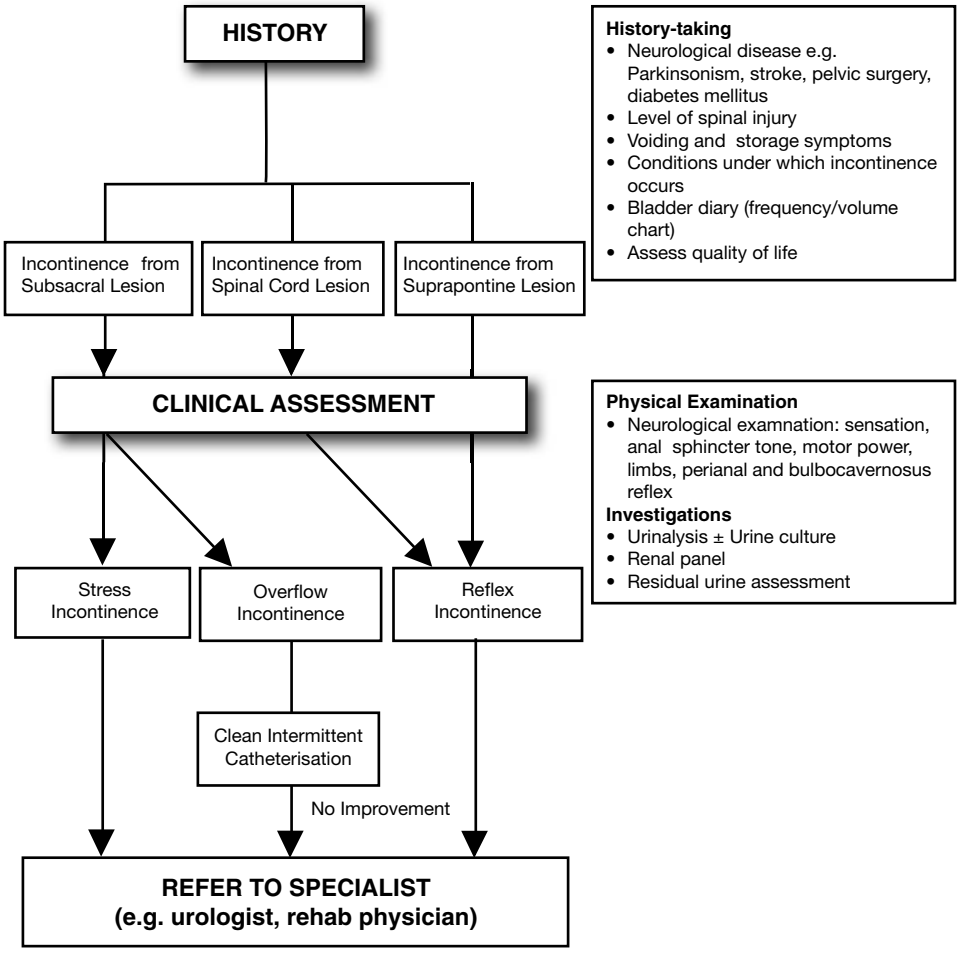
Periurethral injection materials to provide bulk for urethral closure and continence has been tried on children with neurogenic vesico-urethral dysfunction[40-42]. At present there are no studies reporting the use of bulking agents in the adult neurogenic population.

C The continence rates achieved in children ranges from 30% to 80% in the short term and 30% to 40% in the long-term.

Grade C Level IV

Finally, surgery to circumvent the bladder can be done. Although less frequently used, continent or non-continent urinary diversion is an acceptable treatment for selected cases of neurogenic voiding dysfunction patients[43].

Initial Clinical Assessment of Incontinence in Neuropathic Patient



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Annex 1 – Pelvic Floor Muscle Rehabilitation

Pelvic floor muscle training (PFMT) aims to strengthen the periurethral and perivaginal muscles as it is these muscles that perform anticipatory and voluntary closure of the urethra and support of the viscera. Some studies showed a relationship between changes in various pelvic floor muscle (PFM) strength such as anal sphincter strength or maximum urethral closure pressure, and reduction in incontinence[1-3]. Patients should be taught to contract the PFM before and during situations when leakage occurs, to condition the PFM to contract with increases in intra-abdominal pressures.

A PFMT are the first-line conservative management programmes for women with stress, urge, and mixed urinary incontinence. The treatment effect might be greater in younger women (in their 40's and 50's) with stress urinary incontinence who participate in a supervised PFMT programme for at least 3 months[4].

Grade A, Level Ia

C They are also effective in reducing incontinence following prostatic surgery in men[5].

Grade C, Level IV

A Pelvic floor muscle rehabilitation and bladder inhibition using biofeedback therapy are recommended for patients with stress, urge incontinence, and mixed urinary incontinence[6].

Grade A, Level Ia

The pelvic floor muscle exercise is performed at a basic and advance level. The first step is to re-educate and establish better awareness of the PFM function. PFM exercises are performed by the "forward pull" and "upward lift" of the perivaginal muscle and anal sphincter as if to control urination or defecation with minimal contraction of the abdominal, buttock, or inner thigh muscles.

The health care provider must teach the patient the correct method of distinguishing and contracting the pelvic floor muscle through education and vaginal examination. Palpation, verbal feedback, vaginal weights and biofeedback are used to ensure accurate performance of the muscle contraction. During PFMT, both "quick" and 'held' (sustained) contractions are

recommended to achieve the most effective results[1,7,8]. The PFM contraction is sustained for at least 10 seconds with equal or more rest period depending on the level of exercise.

PFMT need to be performed for at least 3 months for improvement. The elderly person or persons with weak PFM may require a longer training period.

C **Pessaries are recommended for women who have symptomatic pelvic organ prolapse with severe medical conditions, declined surgery, awaiting for surgery or previous failed surgical treatment. However, data is not available to recommend or discourage the use of pessaries for the treatment of urinary incontinence in women[9].**

Grade C, Level IV

Annex 2 – Catheter Care

Intermittent Urinary Catheterisation

Intermittent catheterisation is recommended as a supportive measure for patients with spinal cord injury, persistent UI, chronic urinary retention due to underactive or partially obstructed bladder.

(D/4 – Fantl et al, 1996)

Rationale

- Intermittent catheterisation prevents the bladder from becoming overly distended. It helps to reduce infection and minimise UI.
- Overly distended bladder may have high intra-vesical pressure which can cause damage to the upper urinary tract as a result of reflux to the kidneys.

(Fantl et al, 1996)

Note

- Intermittent catheterisation can be performed by patient or caregiver. It involves passing a catheter into the bladder every 3 to 6 hours.

(Fantl et al, 1996)

Indwelling Urinary Catheterisation

An indwelling catheter is recommended for a patient with an obstructive cause whether other interventions are not feasible. It is also useful for the terminally ill; or patients with pressure ulcers, or for severely impaired individuals for whom alternative interventions are not an option. It may also be used when a caregiver is not available for other supportive measures.

(D/4 – Fantl et al, 1996)

The patient is assessed periodically for voiding trials or bladder training.

(D/4 – Fantl et al, 1996)

Rationale

- An indwelling catheter aids in monitoring fluid balance. It also prevents wetting of clothes and bed linen, thus reducing the frequency of clothes and linen. An indwelling catheter minimises pain from intermittent catheterisation, disruption to the patient and lessens skin irritation and the risk of developing pressure ulcers.

(Fantl et al, 1996)

Extracted from: MOH Nursing Clinical Practice Guidelines 1 / 2003. Nursing Management of Patients with Urinary Incontinence. 2003. Ministry of Health, Singapore.

Annex 3 – Other Measures and Supportive Care

External Collection Systems

The uro-sheath is recommended for an incontinent man, who can adequately empty his bladder and has intact penile skin, and in whom other therapies have failed or are not appropriate.

(D/4 – Fantl et al, 1996)

Rationale

- The uro-sheath drains the urine and keeps the skin dry. However, improper or prolonged use of uro-sheaths can cause contact dermatitis, maceration of the penis, ischemia and penile constriction.

(Fantl et al 1996, Ouslander et al 1987, Jayachandran et al 1985)

Absorbent Products

Absorbent products are recommended during evaluation, as an adjunct to other therapies, and for long-term care of patients with chronic, intractable UI.

(D/4 – Fantl et al, 1996)

Rationale

- Absorbent products are helpful during assessment and treatment of UI. However, early dependence of absorbent products may be a deterrent to continence and removes the wearer's motivation to seek professional help. Improper use of absorbent products may contribute to skin breakdown and UTI.

(Starer & Libow, 1985; Fantl et al, 1996)

Skin Care

Inspect genitor-perineal area daily. Identify signs of contact dermatitis and skin excoriation.

(D/4 – Fantl et al, 1996)

Cleanse skin immediately after urine leakage.

(D/4 – Fantl et al, 1996)

Use appropriate skin cleansers and barrier creams.

(Fantl et al, 1996)

Rationale

Good skin care promotes skin integrity and prevents skin breakdown.

(Fantl et al, 1996)

Dietary and Fluid Management

Encourage adequate fluid and fibre intake. Discourage consumption of caffeinated products such as coffee, tea, colas and chocolate.

(D/4; Fantl et al, 1996)

Rationale

Inadequate fluid intake contributes to constipation. Elimination of bowel impaction and consequent pressure on the bladder and urethra are often necessary first steps in the treatment of chronic UI.

(Fantl et al, 1996)

Eliminating dietary caffeine such as coffee, tea, colas and chocolate is particularly important for persons with urge UI and frequency of urination.

(Creighton and Stanton, 1990).

Extracted from: MOH Nursing Clinical Practice Guidelines 1 / 2003. Nursing Management of Patients with Urinary Incontinence. 2003. Ministry of Health, Singapore.

Annex 4 – Bladder Chart

CONTINENCE CHART / BLADDER CHART

NAME : _____ DATE : _____
NRIC : _____

	DAY 1		DAY 2		DAY 3		DAY 4		SLEEPING TIME:
TIME	Urine Passed	Fluids Taken	Urine Passed	Fluids Taken	Urine Passed	Fluids Taken	Urine Passed	Fluids Taken	Range:
6 AM									Amount and types of Fluids taken
7 AM									Total:
8 AM									
9 AM									Frequency:
10 AM									Daytime:
11 AM									Nocturia:
12 NN									
1 PM									Range:
2 PM									Amount of urine voided:
3 PM									Total:
4 PM									Each time: Minimum volume:
5 PM									Each time: Maximum volume:
6 PM									
7 PM									
8 PM									Interval time between voiding:
9 PM									
10 PM									
11 PM									
12 MN									Incontinent episodes:
1 AM									
2 AM									
3 AM									Amount of pad used:
4 AM									
5 AM									

Continence Chart

INSTRUCTIONS:
(1) Tick (✓) each time you pass urine
(2) Cross (×) each time you wet yourself
(3) If you pass urine at 10.05 AM and 10.50 AM and wet yourself at 10.30 AM. enter ✓× ✓in the 10.00 AM space
(4) Write (✓) each time you take a cup of drink

Bladder Chart

INSTRUCTIONS:
(1) Each time you pass urine, measure the amount and record in ml. or oz.
(2) Cross (×) each time you wet yourself
(3) Measure and record each time you drink, and what kind of drinks/fluids taken

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10 Self-assessment (MCQs)

After reading the Clinical Practice Guidelines, you can claim one CME point under Category III (Self-Study) of the SMC Online CME System. We also encourage you to evaluate whether you have mastered the key points in the Guidelines by completing this set of multiple choice questions. This is an extension of the learning process and is not intended to "judge" your knowledge and is not compulsory. The answers can be found at the end of the questionnaire.

Instruction: Choose the best answer

1. Most children should achieve nighttime bladder control by the age of

   A. 2 years
   B. 3 years
   C. 4 years
   D. 5 years

2. The following are acceptable treatment options for nocturnal enuresis except

   A. desmopressin
   B. tolterodine
   C. alarm
   D. imipramine

3. The following are acceptable therapeutic options for men with urinary incontinence except

   A. urethral massage for post-micturition dribble
   B. anti-cholinergics for urge incontinence
   C. pelvic floor exercises for post-prostatectomy incontinence
   D. augmentation cystoplasty for post-prostatectomy incontinence

4. The following are acceptable therapeutic options for women with urinary incontinence except

   A. pelvic floor exercises for stress incontinence
   B. pubovaginal slings for stress incontinence
   C. systemic oestrogen for urge incontinence
   D. bladder training for mixed incontinence

5. One of the following is not a transient cause for incontinence in the frail-elderly

   A. delirium
   B. anatomic hypermobility
   C. infection
   D. atrophic vaginitis

6. In the frail-elderly, which of the following drugs does not cause overflow incontinence?

   A. desmopressin
   B. oxybutynin
   C. atenolol
   D. valium

7. Which of the following is the safest method of managing neurogenic incontinence?

   A. intermittent self-catheterisation
   B. indwelling catheterisation
   C. suprapubic catheterisation
   D. bladder compression

8. Pelvic floor muscle training is recommended for the following types of incontinence except

   A. stress incontinence
   B. urge incontinence
   C. overflow incontinence
   D. mixed incontinence

Answers to MCQs

Qn	Answer
1	D
2	D
3	D
4	C
5	B
6	A
7	A
8	C

11 Workgroup Members

The members of the workgroup who were appointed in their personal professional capacity are:

Chairman:	A/Prof Chin Chong Min
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12 Partners

Society for Continence (Singapore)

Singapore Physiotherapy Association

Obstetrical & Gynaecological Society of Singapore

Singapore Urological Association

Society for Geriatric Medicine, Singapore

Singapore Paediatric Society

13 Acknowledgements

(in alphabetical order)