Diagnosis and Treatment of Geriatric Urinary Incontinence

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INTRODUCTION

The International Continence Society (ICS) [1], defines urinary incontinence as a complaint of any involuntary leakage of urine, which includes stress urinary incontinence, urge urinary incontinence, mixed urinary incontinence, enuresis, nocturnal enuresis, continuous urinary incontinence and other types. The sign of incontinence is defined as urine leakage seen during examination, and it may be urethral or extraurethral. The conditions of incontinence are defined by urodynamic observations and include detrusor overactivity incontinence, urethral relaxation incontinence and urodynamic stress incontinence.

Epidemiologic studies show that the incidence of urinary incontinence increases with age with the range of prevalence estimates among community dwelling patients varying from 2% to 58% [2,3]. The prevalence of urinary incontinence in institutionalized inhabitants is much higher, with many authors suggesting a prevalence of 40%-60% [4,5]. Incontinence is common in the elderly population because aging is associated with a myriad of changes in the urinary tract. The bladder capacity, ability to postpone voiding, urinary flow rate and urethral pressure are often decreased. The ability of the kidneys to concentrate urine at night is diminished. Post-void residual volume is increased and the prostate gland enlarges in men. The urethral mucosa becomes atrophic in females due to estrogen withdrawal. The pathophysiology leading to urinary incontinence in the elderly may be complicated. Thus, the diagnosis and treatment of incontinent geriatric patients are important issues in the healthcare of the elderly population.

CLINICAL EVALUATION OF URINARY INCONTINENCE IN THE ELDERLY

Standard diagnostic steps (Table 1) in geriatric urinary incontinence should consist of the following steps:

Detection of possible anatomical lesions or transient incontinence

Before the diagnosis of lower urinary tract dysfunction can be established, it is important to first rule out any possible anatomical lesions such as tumors or stones, and urinary tract infections. Thus the initial standard evaluation should include a thorough history; urinalysis to detect hematuria, bacteriuria or pyuria; and discretionary imaging studies such as radiography, sonography and endoscopy for suspicious organic lesions.

Senile changes in the urinary tract do not always cause incontinence *per se*, but can act as predisposing factors. In frail elderly

patients, it is important to differentiate transient incontinence from established incontinence. Transient urinary incontinence is usually precipitated by conditions outside the urinary tract. Transient causes account for one-third of incontinence among the community-dwelling elderly population and one-half of cases among acutely-hospitalized older patients. The causes of transient incontinence can easily be remembered by the mnemonic **DIAPPERS:** delirium, infection, atrophic vaginitis, psychological disorders, pharmacological effects, excess urine output, restricted motility and stool impaction (Table 2). The aim of evaluation of transient incontinence includes identification of the type of incontinence, reversible causes and associated conditions. The investigation should not be limited to possible urogenital causes, but also consider more general causes related to the medical condition, drug use, neurological state, cognition, mobility, general independence and living environment. Functional incontinence is a common problem among frail elderly patients due to limitations in their activities of daily living.

Physical examination

In men, a standard urological examination should include a digital rectal examination (DRE). The status of the prostate and the possibility of bladder over-distension should be noted. In women, in addition to a gynecological examination, a Q-tip test, and pad weighing

Table 1. Clinical Evaluation of Urinary Incontinence in the Elderly

Step 1: Detection of anatomical lesions and transient incontinence causes
History
Urinalysis
Imaging studies (discretional) : x-ray, sonography, endoscopy
Step 2: Physical examination
Male urological examination
Female gynecological examination
Stress test
Focused neurological examination
Step 3: Functional evaluation
Urinary diary
Questionnaires
Post-void residual (PVR) volume
Urodynamics (discretional)

Table 2. The Mnemonic "DIAPPERS" for Transient Incontinence

Delirium	Pharmacological effect
Infection	Excess urine output
Atrophic vaginitis	Restricted motility
Psychological disorder	Stool impaction

test, as well as a cough/Valsava stress test in both the supine and standing positions should be performed. A focused neurological examination should include testing of sensation in the perineum, the anal tonus and the bulbocavernous reflex.

Functional evaluation

A urinary diary and symptom score questionnaires should be used to assess the type and severity of urinary incontinence. The effects of symptoms on a patient's quality of life (QOL) should also be assessed. Post-void residual (PVR) volume measurement can be performed by bladder scan or catheterization. The necessity for urodynamics is controversial and at the physician's discretion. Urodynamic tests try to measure nerve and muscle function, pressures around and in the bladder, flow rates and other factors which might help to explain the incontinence. Some people find these tests embarrassing and uncomfortable. However, they might show the cause or type of incontinence, which would determine the correct treatment and therefore improve the success of treatment. A Cochrane review [6] which included three small trials with 184 subjects, did not find enough evidence to determine whether these tests lead to better outcomes. There was some evidence that urodynamic testing increased the number of people treated by drugs or surgery, but it was not known whether this resulted in less incontinence or a better quality of life. More research is needed, especially randomised studies of treatment decisions based on either patient symptoms and examination alone or the extra information provided by urodynamic tests.

DIFFERENTIAL DIAGNOSIS OF GERIATRIC URINARY INCONTINENCE

In men, the symptoms of incontinence are divided into the following: (1) post-micturitional dribbling; (2) post-prostatectomy incontinence; (3) incontinence with urgency/frequency or overactive bladder (OAB), and (4) complex incontinence associated with neuropathy, pain, hematuria, infection, voiding symptoms, irradiation and surgery. Group 1 patients can be diagnosed and treated from the history alone. For groups 2 and 3, initial general assessments with a urinary diary, symptom/QOL score, physical examination including a DRE, urinalysis and PVR are used to differentiate stress incontinence, mixed incontinence, urge incontinence and overflow incontinence. For group 4 and failed group 2 and 3 patients, advanced assessments are required to differentiate the pathology into sphincteric incompetence, detrusor overactivity, bladder outlet obstruction, underactive detrusor and other lower urinary tract pathology.

In women, the symptoms of incontinence are divided into the following: (1) incontinence with physical activity; (2) incontinence with mixed symptoms; (3) incontinence with urgency/frequency, and (4) complex incontinence associated with neuropathy, pain, hematuria, infection, voiding symptoms, irradiation, surgery and fistula. For the first three groups, initial general assessments with a urinary diary, symptom/QOL score, physical examination (stress test, Q-tip), urinalysis and PVR are used to differentiate stress incontinence, urge incontinence, mixed incontinence and overflow incontinence. For group 4 and failed group 1, 2 and 3 patients, advanced assessments are required to differentiate the pathology into sphincteric incompetence, bladder hypersensitivity, detrusor overactivity, bladder outlet obstruction, underactive detrusor and other lower urinary tract pathology.

TREATMENTS MODALITIES FOR GERIATRIC INCONTINENCE

Life style interventions

Common recommendations include fluid moderation, weight reduction, reduction of cigarette smoking and coffee intake. However, the efficacies of specific lifestyle interventions in the management of urinary incontinence are still undetermined. An ongoing Cochrane study [7] is testing the effects of weight loss, reduction of excessive physical exertion (e.g. during work or exercise), fluid restriction, decreases in caffeine, tobacco and alcohol, treatment of constipation, and lifestyle interventions on urinary incontinence.

Physical therapies

Treatment options include pelvic floor muscle training (PFMT or Kegel's exercise), electrical neurostimulation and electrical neuromodulation. In a Cochrane review [8] with thirteen trials involving 714 women (375 PFMT, 339 controls), women who did PFMT were more likely to report they were cured or improved than women who did not. Women who did PFMT also experienced about one fewer incontinence episode per day. The data were too limited to draw conclusions about effects on other outcomes such as condition specific quality of life. Of the few adverse effects reported, none were serious. Overall, the review provides some support for the widespread recommendation that PFMT be included in first-line conservative management programs for women with stress, urge, or mixed urinary incontinence. In another Cochrane study [9], the effect of vaginal cones for training the pelvic floor muscles to treat urinary incontinence in women was evaluated. Seventeen small studies, involving 1,484 women consistently showed that the use of vaginal weights is better than no treatment. No clear differences were noted compared to other treatments, such as pelvic floor muscle training without weights, and electrical stimulation of the pelvic floor. This may have been because the numbers of participants in the trials were small. Larger numbers may be required for any differences in the effectiveness of treatments to become clear. However, some women find vaginal weights unpleasant or difficult to use, so this treatment may not be useful for all women. Many women with stress urinary incontinence will not be cured by these treatments. Therefore it is important for studies to assess the quality of life during and after treatment, although few of these studies did that. Most of the studies were fairly short term, so it is difficult to predict long-term outcomes in women with stress urinary incontinence.

Electrical stimulation can be divided into two major forms, neurostimulation and neuromodulation. Neurostimulation of the pelvic floor aims at stimulating the motor efferent fibers of the pudendal nerve, which may elicit a direct response from the effector organ, for instance a contraction of the pelvic floor muscles. The object of neuromodulation is to remodel neuronal reflex loops, for instance the detrusor inhibition reflex, by stimulating the afferent nerve fibers of the pudendal nerve that influence these reflex loops. It is still very difficult to clarify the potential value and benefits of electrical stimulation in the treatment of urinary incontinence [10].

Bladder retraining

The principal elements in a bladder retraining program include patient education, scheduled voiding (timed voiding), urgency control strategies (take a deep breath, transfer attention, tighten buttocks,

biofeedback), self-monitoring and positive reinforcement by doctors and care-givers. Bladder training encourages people to extend the time between voiding gradually so that continence might be regained. This can take months to achieve but may help people who are physically and mentally able to use this method. A current review from clinical trials did not find enough rigorous evidence and concluded that more research is needed. The limited evidence available suggests that bladder training may be helpful in treating urinary incontinence but this is not definite [11].

Pharmacological therapies

Drugs to improve OAB symptoms include, anticholinergic agents (tolterodine, trospium, solifenacin, darifenacin), drugs with mixed anticholinergic and muscle relaxant actions (oxybutynin, flavoxate), and tricyclic antidepressants (imipramine). Recently, botulinum toxin intravesical injection has been advocated for intractable cases. Drugs to improve stress incontinence include adrenergic agents, estrogens and duloxetine (an inhibitor of serotonin and norepinephrine reuptake). Anticholinergic agents are effective but may cause many side effects, especially in elderly patients. Since elderly people are more susceptible to drug adverse reactions, it is important to start with low doses and to increase the dosage slowly. According to a Cochrane review of thirteen trials with 1,770 participants, symptomatic improvement was more common among those on an anticholinergic drug compared with patients using bladder training, and more symptomatic improvement was seen among those on combination therapy with an anticholinergic plus bladder training than bladder training alone. Dry mouth was the main adverse effect and was reported in about a third of those taking an anticholinergic drug. The included trials were generally small and of moderate quality, with no data addressing long-term performance [12].

In women, low estrogen levels may contribute to urinary incontinence. A review of trials [13] found that taking extra estrogen may help both stress and urge incontinence, but treatment with estrogen combined with a progestogen may make incontinence worse. There was no evidence about the benefits after stopping treatment. There may be risks from long-term use of estrogen.

Surgical treatments

Surgical options include bladder augmentation, colposuspension, a sling operation and implantation of an artificial sphincter. Open retropubic colposuspension involves lifting the tissues around the junction between the bladder and the urethra. A review of trials [14] found that this is an effective surgical technique for stress and mixed urinary incontinence in women, resulting in a long-term cure for most women. New techniques, particularly sling operations (including the use of tension-free vaginal tape) and keyhole (laparoscopic) colposuspension, look promising but further research, particularly on long term performance, is needed. On the other hand, needle suspension surgery appears to be less effective for urinary incontinence than abdominal surgery, and there is not enough evidence comparing it with other treatments [15]. Traditional sling operations aim to hold up the bladder with a strip of material which may be biological or synthetic. The results of a Cochrane survey [16] showed that there is not enough information on which to judge whether traditional sling operations are better than other treatments. Long term results are awaited. In this review there were few trials comparing slings with other forms of surgery and only one study comparing sling operations with non-surgical treatment.

TREATMENT STRATEGY IN GERIATRIC URINARY INCONTINENCE

Best treatment outcomes in geriatric incontinence can only be achieved by a holistic treatment approach. Thus multidisciplinary teamwork involving urologists, gynecologists, family physicians, nursing specialists, family members and the patient is needed to achieve the best outcomes. It is advisable to adopt a more conservative approach in treating the elderly. In transient incontinence, reversal of the precipitating factors alone may restore continence even if any underlying urinary tract dysfunction is not corrected. The treatment goal is not merely to improve or cure incontinence, but to improve the patient's overall function and quality of life. On the other hand, if independent continence is impossible to achieve, dependent continence or social continence are more realistic goals.
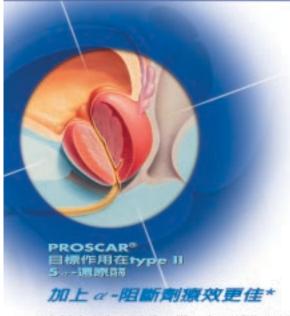
CONCLUSIONS

The diagnosis of geriatric urinary incontinence includes evaluation for overflow incontinence, functional incontinence and transient incontinence. Reversible causes of transient incontinence should be identified and treated before embarking on a complex diagnostic investigation and management. The treatment goal should be realistic and aim to improve the patient's functional status and quality of life. Best treatment outcomes can only be achieved by a holistic treatment approach.

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