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**REVIEW ARTICLE****Urinary Incontinence in Elderly***N. S. Neki**Department of Medicine, Government Medical College and Guru Nanak Dev Hospital,  
Amritsar-143001(Punjab) India***Abstract :**

Urinary Incontinence (UI) is defined any involuntary leakage of urine. It is twice as common in women as in men and affects at least 1 in 3 older women. It is not a normal result of aging. Rather it is a medical problem that is often curable and should be treated. Urine is stored in the bladder and emptied via the urethra. During urination, muscles of the bladder wall contract, forcing urine from the bladder into the urethra. Sphincter muscles surrounding the urethra relax thus releasing urine from the body. Incontinence occurs if bladder muscles suddenly contract or sphincter muscles are not strong enough to contain urine. The diagnosis of geriatric urinary incontinence includes evaluation for overflow incontinence, functional incontinence and stress incontinence. 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.

**Keywords:** Urinary incontinence; Enuresis; Urinary bladder; Elderly.

**Introduction:**

Urinary Incontinence (UI) is defined as involuntary urination, or enuresis or complaint of involuntary leakage of urine. It is a very common and distressing problem amongst elderly population, which may have a profound impact on the quality of life. UI almost always results from

an underlying treatable medical condition but is under-reported to medical practitioners [1]. It is a very common condition with prevalence ranging from 10% to 34% especially amongst elderly where prevalence reported is one amongst every three persons. The condition is usually under reported as many women hesitate to seek help or report symptoms to medical practitioners due to the embarrassing and culturally sensitive nature of this condition [2, 3]. The bladder's ability to fill and store urine requires a functional sphincter (muscle controlling output) and a stable bladder wall muscle (detrusor). The bladder of infant contracts automatically when urine is filled upto a certain volume of bladder. As the individual learns to control urination, bladder muscle contraction is prevented by constant inhibition from the cerebral cortex. This allows urination to be delayed until the individual is ready. Undesired bladder muscle contraction may occur as a result of a break in the neurological pathway from the brain to the bladder. It can also occur if the bladder is irritated and the normal neurological impulses to inhibit urination are insufficient to keep the bladder relaxed as it fills [4]. UI can also lead to medical problems such as local skin irritation, rashes and urinary infections. In the debilitated and bed bound patients, it can lead to pressure ulcers

which can increase the risk of localized and systemic infections including osteomyelitis and sepsis.

Psychological, physical and environmental causes may prevent an elderly person from voiding urine normally. Delirium, dementia and psychosis can interfere with a patient's ability to understand the sensation of bladder fullness. Delirium is a common cause of incontinence in hospitalised patients. Frailty, injury, illness, or surgery can also render many elderly patients immobile. Lack of easy access to toilets or prompt help is environmental causes of incontinence [5]. Stress urinary incontinence is the most commonly diagnosed subtype of incontinence in adult women. The median prevalence of female urinary incontinence was 27.6% (range: 4.8-58.4%) and the prevalence of significant incontinence increased with age. Other risk factors included parity, obesity, chronic cough, depression, poor health, lower urinary tract symptoms, previous hysterectomy and stroke [6]. Globally, urinary

incontinence affects the quality of life of at least one third of women. Many women are too embarrassed to talk about it and some believe it to be untreatable even in western countries. This problem is more pronounced in India, where women usually do not seek treatment for their reproductive health problems and do not vocalize their symptoms. There is a "culture of silence" and low consultation rate among Indian women regarding such problems [7].

#### Neurological Causes of Incontinence:

It include Parkinson disease, Alzheimer disease, multiple sclerosis, stroke, brain tumour, multiple system atrophy, herpes, spinal cord lesions (like syringomyelia, spinal stenosis, Gullian Barre syndrome, transverse myelitis, spinal injury, cervical myelopathy), diabetes, cauda equine, amyloidosis, inherited neuropathies, injury to pelvic nerves, Tabes dorsalis, focal neuropathy (peripheral neuropathy due to iatrogenic lesions) interfere with nerve signals involved in the bladder control [4].

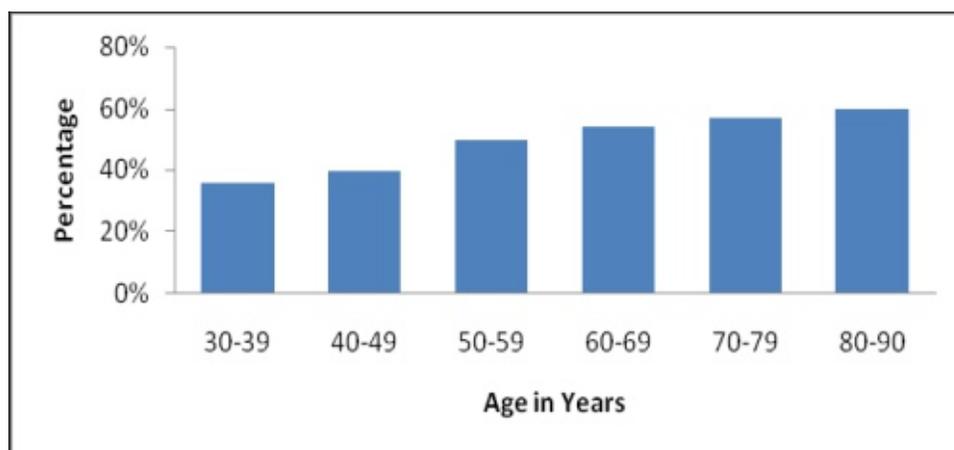


Fig.1: Prevalence of Urinary Incontinence by Decade of Life [8]

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**Types of Incontinence [9]**

- 1. Urge incontinence-** It is defined as an abrupt and intense urge to urinate that cannot be suppressed, followed by an uncontrollable loss of urine. The amount of urine lost may be small or large. People with urge incontinence usually have very little time to get to the bathroom before they have an "accident". Most people with urge incontinence urinate more frequently, not only during the day but also at night (nocturia). The combination of urgency, increased frequency of urination and increased urination during the night is often referred to as an overactive bladder, whether or not the combination leads to incontinence [10].
- 2. Stress incontinence-** It is the uncontrollable loss of small amounts of urine when coughing, straining, sneezing, lifting heavy objects or during any activity that suddenly increases pressure within the abdomen. This increased pressure overcomes the resistance of the closed urinary sphincter. Urine then flows into and through the urethra. Stress incontinence is common in women but uncommon in men [11].
- 3. Overflow incontinence-** It is the uncontrollable leakage of small amounts of urine, usually caused by some type of blockage or by weak contractions of the bladder muscle. When urine flow is blocked or the bladder muscles can no longer contract, urine is retained in the bladder (urinary retention) and the bladder enlarges. Pressure in the bladder continues to increase until small amounts of

urine dribble out. The increased pressure in the bladder can also damage the kidneys [12].

- 4. Functional incontinence-** It refers to urine loss resulting from the inability (or sometimes unwillingness) to get to a toilet. The most common causes are conditions that lead to immobility such as stroke or severe arthritis and conditions that interfere with mental function such as dementia due to Alzheimer's disease. In rare cases, people become so depressed that they do not go to the toilet (psychogenic incontinence) [13].

**Pathophysiology:**

The maintenance of continence in the lower urinary tract is by means of an integrated neurological control mechanism as well as factors like a sound mental state, mobility, dexterity and motivation. The genesis of UI in the aged is associated with changes in bladder function characterised by an increased frequency of uninhibited contractions as well as an abnormal relaxation pattern of the detrusor, impaired contractility and reduced bladder capacity. There is an increase in nocturnal urine production. Sex-specific changes are the increase in prostate size in males and urethral shortening as well as sphincter weakness in females (Table 1).

UI has many possible risk factors, such as a bladder infection, a broken hip, delirium, enlarged prostate in men or dementia. Incontinence may resolve and never recur. Alternatively, it may persist, recurring sporadically or, in some cases, frequently.

Table 1: Comparison between Normal and Aging Bladder

Normal Bladder		Aging Bladder	
Filling & Storage	Voiding	Filling & Storage	Voiding
<b>Bladder filling</b>	Detrusor contraction	Increased bladder excitability	Increased outlet obstruction
<b>Detrusor relaxation</b>	Sphincter relaxed	Reduced outflow resistance	Decreases contractility
<b>Sphincter contracted</b>	Smooth urine flow	-	Palpable bladder
<b>Continent</b>	Normal micturition in an appropriate environment.	Urge incontinence Stress incontinence	Continuous dribbling

### Evaluation of incontinence

Keeping urge, stress and overflow incontinence in mind, family physicians can undertake the basic evaluation of patients with incontinence. In most patients, the evaluation requires only a medical history, a physical examination, urinalysis and measurement of post void residual (PVR) urine volume. Occasionally simple OPD tests of lower urinary tract function are helpful. The first goal of the basic evaluation is to identify transient (i.e., easily reversible) causes of incontinence so that effective treatments can be instituted. The second goal is to identify conditions that may require special evaluation or referral to urologist or urogynecologist. After transient causes and indications for special evaluation or referral have

been excluded, the third goal is to decide if the patient's symptoms are more indicative of urge incontinence or stress incontinence and initiate treatment accordingly.

### Transient (reversible) conditions that cause or contribute to urinary incontinence<sup>14</sup>

**Detectable by history:** drug side effects, delirium or hypoxia, recent prostatectomy, excessive fluid intake, impaired mobility.

**Detectable by physical examination:** atrophic vaginitis, fecal impaction

**Detectable by urinalysis:** urinary tract infection, glycosuria

**Table 2: Drugs that Can Cause or Contribute to Urinary Incontinence**

Drug class		Mechanism of incontinence
<b>1. Drugs causing overflow incontinence</b>		
<b>(a) Anticholinergics</b>		
1	Antidepressants	Decreased bladder contractions with retention
2	Antipsychotics	Decreased bladder contractions with retention
3	Sedative-hypnotics	Decreased bladder contractions with retention
4	Antihistamines	Decreased bladder contractions with retention
<b>(b) Nervous system depressants</b>		
1	Narcotics	Decreased bladder contractions with retention
2	Alcohol	Decreased bladder contractions with retention
3	Calcium channel blockers	Decreased bladder contractions with retention
4	Alpha-adrenergic agonists	Sphincter contraction with outflow obstruction
5	Beta-adrenergic blockers	Sphincter contraction with outflow obstruction
<b>2. Drugs causing stress incontinence</b>		
Alpha-adrenergic antagonists		Sphincter relaxation with urinary leakage
<b>3. Drugs causing urge incontinence</b>		
Diuretics		Contractions stimulated by high urine flow
Caffeine		Diuretic effect

**Treatment of Incontinence [15]**

The management can be considered as: i) Non-pharmacologic ii) Pharmacologic iii) Invasive/Definitive surgery iv) Appropriate referral for urodynamic studies, urologic or gynaecologic evaluation.

**i) Non-pharmacologic Treatment [16]**

These are behavioral interventions which are modified according to the patient. The goal is to restore normal pattern of voiding and continence. They include rehabilitative exercises focusing on pelvic muscles (Kegel) which if correctly performed can be effective in urge, stress and mixed forms of incontinence. Bladder training is also a useful modality in the above types of UI while bladder retraining is used after a period of temporary catheterization.

Other method is for mentally retarded patients. It includes prompted voiding by the caregiver at scheduled 2 hour intervals during the day; habit training based on patients voiding patterns and scheduled toileting for those with severe cognitive impairment who cannot respond to communication.

**ii) Pharmacologic Treatment [17]**

The contraction of the detrusor muscle depends on the muscarinic receptors of the bladder. Selective agents are better. Of the muscarinic receptors, M3 mediate direct detrusor muscle contraction while M2 inhibit bladder relaxation and modulation of bladder contraction in pathologic conditions. Oxybutynin is a relatively non-selective agent acting on M1, M2, M3 receptors. The dose is 2.5 - 5.0 mg thrice daily. Tolterodine is more selective

acting on M2, M3 receptors. The extended release form is more efficacious. M3 selective agents like darifenacin and solifenacin are effective in overactive bladder but are not yet in the mainstream of the geriatric practice. Trospium is another approved agent with low CNS side-effects. In cases with stress incontinence, imipramine hydrochloride is a useful drug as it

increases bladder capacity and bladder outlet resistance but side-effects in the elderly may produce more harm than benefit. Similarly, alpha-receptor agonists e.g. pseudoephedrine are useful but should be prescribed with caution. Vaginal estrogen creams and low-dose conjugated estrogens may be used in females.

**Table 3: Drugs Commonly Used to Treat Different Types of Urinary Incontinence**

Drugs	Adult Dose	Comments
<b>I) Drugs with predominantly anticholinergic or antimuscarinic effects</b>		
<b>Darifenacin</b>	7.5-15 mg/d	Selective for M3 muscarinic receptors in bladder with fewer cognitive side effects
<b>Fesoterodine</b>	4-8 mg/d	Active metabolite is identical to active metabolite of tolterodine
<b>Oxybutynine</b>	2.5-5 mg 5-30 mg/d 10% topical gel daily	Long acting and transdermal preparation preferred
<b>Solifenacin</b>	5-10 mg/d	Some selectivity for bladder M3 muscarinic receptors
<b>Tolterodine</b>	2-4 mg/d	Limited ability to cross blood brain barrier
<b>Trospium</b>	20 mg twice daily	Less likely to cross blood brain barrier
<b>II) Estrogen (for women)</b> Cream, esterdiol local vaginal preparations ring,		
<b>III) Serotonin and noradrenaline reuptake inhibitors</b> Duloxetine 20-80 mg/d improvement in stress UI.		
<b>IV) Alpha adrenergic antagonists (for men)</b>		
<b>Alfuzosin</b>	10 mg/d	Postural hypotension serious side effect
<b>Doxazosin</b>	1-8 mg/d	
<b>Prazosin (nonselective)</b>	1-5 mg/d	Also used for post traumatic stress disorder in men
<b>Silodosin</b>	4-8 mg/	
<b>Tamsulosin</b>	0.4-0.8 mg/d	
<b>Terazosin</b>	1-10 mg/d HS	
<b>V) 5 alpha reductase inhibitors (for men)</b> Dutasteride 0.5 mg/d Finasteride 5 mg/d		

**iii) Invasive/Definitive Surgery [18]:**

Overflow incontinence due to prostatic hypertrophy responds to prostatectomy.

**Role of Surgery in Women [15]:**

**Periurethral Injections:** One of the surgical treatments for this condition, used in both males and females, is urethral injections of bulking agents to improve the coaptation of the urethral mucosa. The injections are given under local anesthesia with the use of a cystoscope and a small needle.

**Sub-urethral Sling Procedures [19]:**

The most common and most popular surgery for stress incontinence is the sling procedure.

**Retropubic Colposuspension [20]:**

Another option is abdominal surgery in which the vaginal tissues or periurethral tissues are affixed to the pubic bone.

**Bladder Neck Needle Suspension:**

A long needle is used in these procedures to thread suture from the vagina to the abdominal wall. The suture incorporates paraurethral tissue at the level of the bladder neck.

**Anterior Vaginal Repair [21]:**

Sutures are placed in the periurethral tissue and fascia in order to elevate and support the bladder neck.

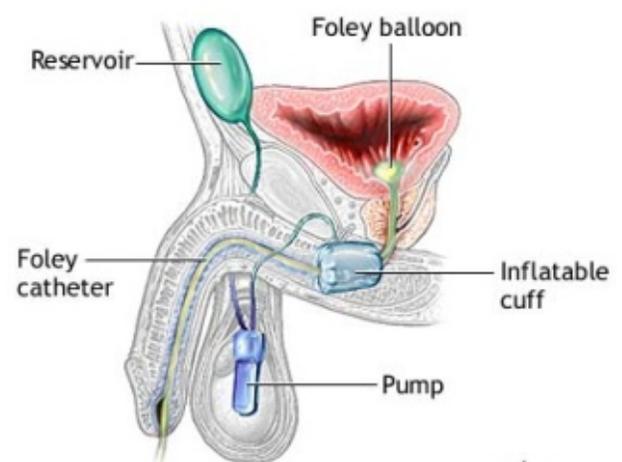
**Role of Surgery in Men [22]:****Male Sling:**

The male sling procedure is based upon the concept of passive external urethral compression. In male patients with stress incontinence, an

alternative is to perform a urethral compression procedure, called a male sling. This is done with the use of a segment of cadaveric tissue or soft mesh to compress the urethra against the pubic bone. It is placed through an incision in the perineum (the area between the scrotum and the rectum).

**Artificial Urinary Sphincter [23]:**

This device is made from silicone and has three components that are implanted into the patient. The cuff is the portion that provides circular compression of the urethra and therefore prevents leakage of urine from occurring. This is placed around the urethra after an incision is made in the perineum. A small fluid-filled pressure-regulating balloon is placed in the abdomen and a small pump is placed in the scrotum to be controlled by the patient. The fluid in the abdominal balloon is transferred to the urethral cuff, closing the urethra and preventing leakage of urine.



**Fig. 2: Inflatable Artificial Urinary Sphincter**

Read justable Mechanical External (REMEEX) [24] device can be re-accessed under local anesthesia to fine tune the sling should incontinence reappear months or years after the initial surgery.

### Conclusion:

UI is highly prevalent in older persons and results in significantly decreased quality of life, morbidity and high costs. In older persons, UI is not simply a lower urinary tract disorder but represents a geriatric syndrome with broadly based, patient level risk factors that include age-related changes in physiology, co-morbidity,

medications, and functional impairments. Older persons should be actively screened for UI, and an initial office based evaluation based on history, examination and urinalysis is sufficient to initiate treatment. UI treatment should be stepwise, progressing from behavioural and medication therapy to more invasive approaches, as needed and appropriate. Behavioural therapy (bladder training and pelvic muscle exercises) is effective in reducing urge and stress urinary incontinence. Antimuscarinic medications for urge UI have similar efficacy and drug choice should be guided by anticipated adverse effects and other factors.

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\***Author for Correspondence:** Dr. N. S. Neki, Department of Medicine, Govt. Medical College and Guru Nanak Dev Hospital, Amritsar, 143001, Punjab (India) Email: drneki123@gmail.com Cell: 09501029128