Management of Urinary Incontinence in Older Patients

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The Hong Kong Continence Society
Council member
Hong Kong Association of Gerontology
Geriatrician
Urinary incontinence

• The complaint of any involuntary leakage of urine (which is objectively demonstrable and is a social or hygiene problem)
Fig. 3 Mean SF-36 scores for individuals with OAB with and without urge incontinence and age- and sex-matched controls.

Table 3 Mean differences in measures of health-related quality of life (SF-36), depression (CES-D), and quality of sleep (MOS sleep) between OAB cases and age-matched controls.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Controls</th>
<th>OAB without urge incontinence</th>
<th>OAB with urge incontinence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women (n = 344)</td>
<td>Men (n = 178)</td>
<td>Women (n = 82)</td>
</tr>
<tr>
<td>SF-36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>49.4 (0.6)</td>
<td>49.8 (0.7)</td>
<td>45.3 (1.4)(^\text{a})</td>
</tr>
<tr>
<td>Mental</td>
<td>49.7 (0.6)</td>
<td>53.6 (0.6)</td>
<td>45.1 (1.4)(^\text{a})</td>
</tr>
<tr>
<td>CES-D</td>
<td>11.7 (0.6)</td>
<td>7.4 (0.6)</td>
<td>17.3 (1.6)(^\text{c})</td>
</tr>
<tr>
<td>MOS-Sleep</td>
<td>26.4 (0.9)</td>
<td>20.1 (1.1)</td>
<td>35.4 (2.4)(^\text{c})</td>
</tr>
</tbody>
</table>

\(^{a}\)P < 0.01; \(^{b}\)P < 0.001; \(^{c}\)P < 0.005; \(^{d}\)P < 0.05;

Stewart WF, Van Rooyen JB, et al.
Prevalence and burden of overactive bladder in the United States.
Mortality

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Urgency</td>
<td>57%</td>
<td>38%</td>
</tr>
<tr>
<td>Urgency</td>
<td>86%</td>
<td>54%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>RR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgency dry</td>
<td>1.87 (1.28-2.74)</td>
<td>NS</td>
</tr>
<tr>
<td>Urgency wet</td>
<td>3.13 (2.05-4.77)</td>
<td>1.63 (1.03-2.57)</td>
</tr>
</tbody>
</table>

Nuotio M, Tammela TL, Luukkaala T, Jylhä M. 
*Urgency and urge incontinence in an older population: ten-year changes and their association with mortality.* 
### Association of Urinary Incontinence and Falls Among 6049 Women

<table>
<thead>
<tr>
<th>Type of Weekly Incontinence *</th>
<th>Age-Adjusted</th>
<th>Multivariate-Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratio (OR)</td>
<td>95% CI</td>
</tr>
<tr>
<td>Urge</td>
<td>1.46</td>
<td>1.32-1.61</td>
</tr>
<tr>
<td>Stress</td>
<td>1.1</td>
<td>0.99-1.23</td>
</tr>
</tbody>
</table>

### Association of Urinary Incontinence and Non-spine, Nontraumatic Fractures

<table>
<thead>
<tr>
<th>Type of Weekly Incontinence *</th>
<th>Age-Adjusted</th>
<th>Multivariate-adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relative Hazard (RH)</td>
<td>95% CI</td>
</tr>
<tr>
<td>Urge</td>
<td>1.46</td>
<td>1.19-1.80</td>
</tr>
<tr>
<td>Stress</td>
<td>0.86</td>
<td>0.68-1.10</td>
</tr>
</tbody>
</table>

Table 5. Association between incontinence and risk of hospitalization and admission to a skilled nursing facility in women and men

<table>
<thead>
<tr>
<th></th>
<th>Hospitalizations</th>
<th></th>
<th>Admissions to skilled nursing facility</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No./1000 P-Y</td>
<td>Adjusted RR (95% CI)</td>
<td>No./1000 P-Y</td>
<td>Adjusted RR (95% CI)</td>
</tr>
<tr>
<td></td>
<td>Age/cohort</td>
<td>Disease</td>
<td>Age/cohort</td>
<td>Disease</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incontinent</td>
<td>282</td>
<td>1.4</td>
<td>1.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>(1.3-1.6)</td>
<td>(1.2-1.5)</td>
<td>(2.1-2.9)</td>
<td></td>
</tr>
<tr>
<td>Continent</td>
<td>198</td>
<td>(1.3-1.6)</td>
<td>31</td>
<td>(2.1-2.9)</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incontinent</td>
<td>437</td>
<td>1.6</td>
<td>1.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>(1.5-1.8)</td>
<td>(1.3-1.6)</td>
<td>(3.2-4.4)</td>
<td></td>
</tr>
<tr>
<td>Continent</td>
<td>272</td>
<td></td>
<td>24</td>
<td>(2.1-2.9)</td>
</tr>
</tbody>
</table>

P-Y, person-years.
<sup>a</sup>Adjusted for age, cohort, dementia, cerebral vascular disease, depression, congestive heart failure, ischaemic heart disease, musculo-skeletal disease, cancer, renal disease and hypertension.
<sup>b</sup>Adjusted for age, cohort, cerebral vascular disease, congestive heart failure, ischaemic heart disease, pulmonary disease and diabetes.
<sup>c</sup>Adjusted for age, cohort, cerebral vascular disease, dementia, depression, ischaemic heart disease, renal disease and hypertension.
<sup>d</sup>Adjusted for age, cohort, cerebral vascular disease, dementia, congestive heart failure, renal disease and diabetes.
Total cost to health care systems across all five countries was estimated at EUR 4.2 billion in 2000, and by 2020, the expected total cost was estimated to be EUR 5.2 billion, an increase of EUR 1 billion (26%).

**Economic cost of OAB in US**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual per capita (USD)</td>
<td>$1925</td>
<td>$1944</td>
<td>$1969</td>
</tr>
<tr>
<td>Total national cost (billions USD)</td>
<td>$65.9</td>
<td>$76.2</td>
<td>$82.6</td>
</tr>
</tbody>
</table>

**Figure 1.** Total national costs of overactive bladder, United States.

Ganz ML, Smalarz AM, et al.  
*Economic Costs of Overactive Bladder in the United States*  
Urology (2010) 75:526-532
Incontinence

Prevalence
For people living at home:

- between 1 in 20 and 1 in 14 women aged 15-44;
- between 1 in 13 and 1 in 7 women aged 45-64;
- between 1 in 10 and 1 in 5 women aged 65 and over;
- over 1 in 33 men aged 15-64;
- between 1 in 14 and 1 in 10 men aged 65 and over.

For people (both sexes) living in institutions:

- 1 in 3 in residential homes
- nearly 2 in every 3 in nursing homes
- 1/2 to 2/3 in wards for elderly and elderly mentally infirm
Elders visiting general practitioners

Table 14.2 Urinary incontinence among different age groups and sex in Hong Kong

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Present</th>
<th></th>
<th></th>
<th></th>
<th>Absent</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M&amp;F</td>
<td>M</td>
<td>F</td>
<td>M&amp;F</td>
<td>M</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>18-39 years (%)</td>
<td>25 (2.5)</td>
<td>181 (13)</td>
<td>206 (8.6)</td>
<td>986 (97.5)</td>
<td>1213 (87)</td>
<td>2198 (91.4)</td>
<td>1011 (45.4)</td>
<td>1394 (65.6)</td>
<td>2494 (100)</td>
</tr>
<tr>
<td>40-59 years (%)</td>
<td>27 (5.2)</td>
<td>182 (34.5)</td>
<td>209 (19.9)</td>
<td>496 (94.8)</td>
<td>345 (65.5)</td>
<td>841 (80.1)</td>
<td>523 (27.5)</td>
<td>527 (27.5)</td>
<td>1050 (100)</td>
</tr>
<tr>
<td>60-74 years (%)</td>
<td>45 (18.1)</td>
<td>74 (36.6)</td>
<td>119 (26.4)</td>
<td>204 (81.9)</td>
<td>128 (63.4)</td>
<td>332 (73.6)</td>
<td>249 (12.5)</td>
<td>202 (10.5)</td>
<td>451 (100)</td>
</tr>
<tr>
<td>≥75 years (%)</td>
<td>18 (29.5)</td>
<td>30 (39.5)</td>
<td>48 (35)</td>
<td>43 (70.5)</td>
<td>46 (60.5)</td>
<td>89 (65)</td>
<td>61 (11.9)</td>
<td>76 (14.8)</td>
<td>137 (100)</td>
</tr>
<tr>
<td>All age (%)</td>
<td>115 (6.2)</td>
<td>467 (21.2)</td>
<td>582 (14.4)</td>
<td>1729 (93.8)</td>
<td>1732 (78.8)</td>
<td>361 (85.6)</td>
<td>1844 (45.8)</td>
<td>2199 (54.2)</td>
<td>4042 (100)</td>
</tr>
</tbody>
</table>

the Hong Kong Continence Society and the Hong Kong College of Family Physicians in 1995
Study on institutionalized elderly 1990

- Acute care hospital: 10.9%
- Convalescent hospital: 37.6%
- C&A Homes: 23.2%

- 63.8% has concomitant fecal incontinence
- Medical diagnosis in incontinent subject: Cerebrovascular disease, dementia, Diabetes mellitus, cataract, osteoarthritis etc

JHKGS 1992;3(1):35-38
Lower Urinary Tract function in controlling urination
The bladder muscle and urethra work in coordination to control urination. When the bladder muscle is squeezed shut, the urethra is closed, and the sphincter muscles are relaxed. Conversely, when the bladder muscle is relaxed, the urethra is open, and the sphincter muscles are squeezed shut.
Fig. 15-1. Normal micturition occurs when bladder contraction is coordinated with urethral sphincter relaxation. Four nervous system components are involved: (1) The central nervous system inhibits voiding until the appropriate time; it also coordinates and facilitates input from the bladder to start and complete voiding. (2) The sympathetic system contracts the smooth muscle sphincter through α-adrenergic fibers from the hypogastric nerve. (3) The parasympathetic system contracts the bladder detrusor muscle through cholinergic fibers from the pelvic nerve. (4) The somatic nervous system contracts the striated muscle sphincter through cholinergic fibers from the pudendal nerve. (Adapted from DuBeau CE, Resnick NM, with the Massachusetts Department of Health EDUCATE project collaborators. Urinary incontinence in the Older Adult: An Annotated Speaker/Teacher Kit, 1993; used with permission of the authors.)
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Age related changes in lower urinary tract

Decrease bladder capacity
Decrease bladder contractility
Decrease ability to postpone voiding
Slight rise in post voiding residual < 50 ml

URINARY INCONTINENCE IS NOT A PART OF AGING
CAUSE OF URINARY INCONTINENCE

Transient
Established
Cause of transient incontinence DIAPPERS

Resnick NM 1984

- Delirium
- Infection, urinary
- Atrophic urethritis/ vaginitis
- Pharmaceutical
- Psychological
- Excessive urine output
  - Large fluid intake
  - Diuretic agents: caffeinated beverages, alcohol
  - Metabolic caused: sugar, calcium
- Restricted mobility
- Stool impaction
# Iatrogenic Incontinence

<table>
<thead>
<tr>
<th>Effects</th>
<th>Drug classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium, sedation</td>
<td>Anticholinergics, antipsychotics, TCA, Antiparkinsonic drugs, Sedative/hypnotics, nacrotic analgesics, alcohol</td>
</tr>
<tr>
<td>Cough</td>
<td>ACEI</td>
</tr>
<tr>
<td>Polyuria</td>
<td>Diuretics, alcohol</td>
</tr>
<tr>
<td>Bladder stimulation</td>
<td>Caffeinated beverages</td>
</tr>
<tr>
<td>Bladder relaxation</td>
<td>Anticholinergics, calcium channel blocker</td>
</tr>
<tr>
<td>Sphincter contraction</td>
<td>Alpha-adrenergic agonist</td>
</tr>
<tr>
<td>Sphincter relaxation</td>
<td>Alpha-adrenergic blockers</td>
</tr>
<tr>
<td>Constipation</td>
<td>Anticholinergics, narcotic analgesics, calcium channel blockers etc</td>
</tr>
<tr>
<td>Edema</td>
<td>Calcium channel blocker, vasodilators</td>
</tr>
</tbody>
</table>
Established cause of incontinence

- Detrusor overactivity
- Detrusor underactivity
- Reduced outlet resistance
- Increased outlet resistance
<table>
<thead>
<tr>
<th>Type</th>
<th>Urge Incontinence</th>
<th>Stress Incontinence</th>
<th>Overflow Incontinence</th>
<th>Functional Incontinence</th>
</tr>
</thead>
</table>
| **Cause**              | Detrusor overactivity
Uninhibited bladder contraction causing leakage of moderate to large amounts of urine | Reduced outlet resistance
Increase in intraabdominal pressure, eg. coughing, sneezing, laughing or other physical activity, causing leakage of small to moderate amount of urine | Increased outlet resistance
Detrusor underactivity
Distension of bladder causing overflow leakage of small amount of urine | Unrelated to lower urine tract cause
Inability or unwillingness of a normal continent elderly to go to the toilet |
| **Etiology**           | Cystitis
Bladder stone/ neoplasm
CNS disorder
Spinal cord disease
Idiopathic | Obesity
Estrogen deficiency
Childbirth
Weakness and laxity of pelvic floor muscles
Post-prostatectomy | Prostatic enlargement
Urethral stricture
Spinal cord disease
Faecal impaction | Musuloskeletal disorders
Impaired mental status
Unfamiliar environment
Depression
Hostility
Sedating medication
Use of physical restraints |
| **Mixed incontinence** |                                                                                  |                                                                                     |                                                                                     |                                                                                    |
CLINICAL TYPE OF URINARY INCONTINENCE

**Urge incontinence**- the complaint of involuntary leakage accompanied by or immediately preceded by urgency (sudden compelling desire to pass urine which is difficult to defer (ICS 2002)

**Stress incontinence**- the complaint of involuntary leakage on effort or exertion, or on sneezing or coughing (ICS 2002)

**Mixed incontinence**- the complaint of involuntary leakage associated with urgency and also with exertion, effort, sneezing or coughing (ICS 2002)

**Overflow incontinence**- involuntary loss of urine when the intravesical pressure exceeds the maximum urethral pressure due to an elevation of intravesical pressure associated with bladder distension but in the absence of detrusor activity (ICS 1976)

**Functional incontinence**- unrelated to lower urine tract cause

- cognitive defect
- mobility problem
Fig. 5.3 Distant toilet + slow painful mobility + urgency = incontinence.
Requirements in achieving continence

- Lower urinary tract function
- Mental function
- Mobility and dexterity
- Environment
- Motivation - both patients and cares
Fig. 5.4 Suspect incontinence at the home visit.

HOME VISIT

I AM WET AT NIGHT

Use eyes nose
Suspect
Sensitive questioning
Check toilet potties etc...

---

"Fig. 5.4 Suspect incontinence at the home visit."
Urodynamic investigation

Frequency volume chart
Pad test
Post void residual
Flow rate study
Cystometry - filling cystometry
  voiding cystometry
Urethral pressure profile
Videocystourethrography
Management of urinary incontinence depends on causes
Management of Urinary Incontinence in Frail Older Persons

**HISTORY/SYMPOM ASSESSMENT**

**CLINICAL ASSESSMENT**

- Delirium
- Infection
- Pharmaceuticals
- Psychological
- Excess urine output
- Reduced Mobility
- Stool impaction and other factors
  - Avoid overtreatment of asymptomatic bacteriuria

**CLINICAL DIAGNOSIS**

* These diagnoses may overlap in various combinations, e.g., Mixed UI, DHIC (see text)

**INITIAL MANAGEMENT**

(if Mixed UI, initially treat most bothersome symptoms)

**ONGOING MANAGEMENT and REASSESSMENT**

Active Case Finding in Frail Elderly

- Assess, treat and reassess potentially treatable conditions, including relevant comorbidities and ADLs (see text)
- Assess QoL, desire for Rx, goals for Rx, pt & caregiver preference
- Targeted physical exam including cognition, mobility, neurological and rectal exams
- Urinalysis
- Consider frequency volume chart or wet checks, especially if nocturia present

**URGENCY UI**

- Lifestyle interventions
- Behavioral therapies
- Consider addition and trial of antimuscarinic drug

If insufficient improvement, reassess for treatment of contributing comorbidity ± functional impairment

**SIGNIFICANT PVR**

- Treat constipation
- Review medications
- Consider trial of alpha-blocker (men)
- Catheter drainage if PVR 200-500 ml, then reassess (see text)

**STRESS UI**

- Lifestyle interventions
- Pelvic floor muscle exercises

If continued insufficient improvement, or severe associated symptoms are present, consider specialist referral as appropriate per patient preferences and comorbidity (see text)

**UI associated with:**

- Pain
- Haematuria
- Recurrent symptomatic UTI
- Pelvic mass
- Pelvic irradiation
- Pelvic / LUT surgery
- Prolapse beyond hymen (women)
- Suspected fistula

* Other

**Recommendations of the International Scientific Committee: VII. Urinary Incontinence in Frail Older Men and Women.**

Life style modification

• Adequacy of fluid: 6-8 glass per day
• Avoid caffeinated beverage and alcohol
• Skin care/ cleansing
• Toilet habit:
  – Allow time to empty bladder
  – Ensure complete emptying
  – Avoid going to toilet ‘just in case’
• Avoid constipation
• Weight reduction
## Voiding regime and bladder training

### Table 1. Scheduling Regimens Used as Behavioral Interventions for Urinary Incontinence

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Interval Between Micturitions</th>
<th>Characteristics</th>
<th>Clinical Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder training</td>
<td>Increased</td>
<td>Intervals progressively increased; increments may be mandatory or self-adjusted</td>
<td>Mostly used in functionally and mentally intact subjects</td>
</tr>
<tr>
<td>Habit retraining</td>
<td>Increased or decreased</td>
<td>The schedule is adjusted to the patient’s natural pattern, but patient then tries to increase the interval</td>
<td>Same</td>
</tr>
<tr>
<td>Timed voiding</td>
<td>Unchanged or fixed</td>
<td>Typically every two hours</td>
<td>Mostly used in nursing home residents or patients with neurogenic dysfunctions</td>
</tr>
<tr>
<td>Prompted voiding</td>
<td>Voidings are prompted and schedules are variable</td>
<td></td>
<td>Used in institutionalized subjects with cognitive and mobility impairment</td>
</tr>
</tbody>
</table>

*Modified from Hadley et al.*

Prompt voiding (PV) principles

**Monitoring**: This involves asking the incontinent individual, at regular intervals, if he or she needs to use the toilet. The care provider may look for behaviours that the client needs to be toileted (e.g., restlessness, agitation, disrobing), and take the client to the toilet at regular intervals specific to their schedule, rather than routinely every two hours.

**Prompting**: This process includes prompting the person to use the toilet at regular intervals, and encourages the maintenance of bladder control between prompted voiding sessions.

**Praising**: This important step is the positive reinforcement of dryness and appropriate toileting, and is the response from the care provider to the individual’s success with maintaining bladder control.

Pelvic floor exercise

+ biofeedback
+ use of vaginal cone
+ use of electrical stimulation

To reinforce the awareness of pelvic muscle group
To retrain pelvic floor muscles
方法：

1. 雙膝分開，坐在椅子上，雙腳觸地，身體向前

2. 緊縮尿道及肛門附近肌肉，像阻止尿液排出般

3. 維持五秒，然後放鬆

4. 休息五秒後再重複

此練習可隨時隨地進行！！
運動時姿勢

運動骨盤底肌時可使用以下任何一種姿勢：

坐立
- 坐在椅子前端
- 雙腳分開平放在地上
- 體靠前，使骨盤底肌肉貼近座位

躺臥
- 舒適地躺在床上
- 雙腿微微分開

站立
- 站立時雙腳微微分開
運動計劃

・每日分三個時段做運動

・每時段做十次
Drugs Use in Urinary Incontinence
## Drug treatment of UI

<table>
<thead>
<tr>
<th>Type</th>
<th>Pathogenesis</th>
<th>Drugs</th>
<th>Side Effect/ Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urge UI</td>
<td>Detrusor overactivity</td>
<td>Anti-cholinergic agent</td>
<td>GI- dry mouth, constipation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oxybutynin (Ditropan), Propantheline, Tolterodine (Detrositol), Tropism (Spasmolyt), Solifenacin (Vesicare), Darifenacin (Enablex)</td>
<td>Urological- urine retention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Botulinum toxin- intradetrusor injections</td>
<td>Neurological- Delirium, fatigue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ocular- blurred vision</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cardiac- arrthymia</td>
</tr>
<tr>
<td>Stress UI</td>
<td>Outlet laxity</td>
<td>Alpha-adrenergic agonist</td>
<td>Hypertension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Phenylpropanolamine, Ephedrine, Pseudoephedrin</td>
<td>Increase incident of stroke</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Duloxetine</td>
<td>Nausea</td>
</tr>
<tr>
<td>Overflow UI</td>
<td>Outlet obstruction</td>
<td>Alpha-adrenergic blocker</td>
<td>Postural hypotension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prazocin (Minipress), Terazocin (Hytrin), Doxazocin (Cardura), Alfuzosin (Xatral RS/XL), Tamsulosin (Harnal)</td>
<td>Intraoperative floppy iris syndrome</td>
</tr>
<tr>
<td></td>
<td>Detrusor underactivity</td>
<td>5-Alpha reductase inhibitor</td>
<td>Slow onset of action</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Finasteride (Proscar), Dutasteride (Avodart)</td>
<td>Only act on big prostate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cholinergic agonist</td>
<td>GI- diarrhoea, abdominal pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distigmine (Ubetid), Bethanechol (Urecholine)</td>
<td>Urological- Increase intravesicular pressure</td>
</tr>
</tbody>
</table>
Surgery

Surgery for stress incontinence

- Urethral bulking agent
- Tension free vaginal tap
- Colposuspension
  - Open
  - Laproscopic
- Sling operation
- Artificial sphincter
Surgery

Relieve of outflow obstruction

Surgery for overactive bladder
  Bladder reconstruction
  Sacral nerve neuromodulation
Catheterization

Intermittent catheterization
Indwelling catheter
Suprapubic catheter
Fig. 37 Potential places of entry for germs in the urinary system.
Indwelling urinary catheter

- Urinary infection
- Local ulceration at urethra and bladder
- Stricture
- Encrustation
- Urine leak
- Discomfort/ pain
- Hinder walking
- ?Bladder cancer
Intermittent catheterization

• Doesn’t requires aseptic technique
• Studies mainly on children, adult with spinal cord problems
• When used in the hip surgery post-operative period, satisfactory voiding resumes (on average 4 days) earlier when compared with indwelling catheter  Skelly 1992; CMAJ 146:1185-1189
Aids and environment modification

- Toilet nearby
- Urinal
- Commode chair
- Pads
- Special undergarment
- Mattress cover
- Draw sheet
- Condom catheter
Fig. 1. A paradigm for continence (see text for explanation).
Diapering

• Development of skin irritation and breakdown when diapers are not changed at appropriate intervals
• Cost
• Associating with infancy
• Encourage incontinence by giving the signal to both patient and caregiver that wetting is medically acceptable
• Difficult for an elderly patient who wish to void in removing a diaper

Starer P, Libow LS
Obscuring Urinary Incontinence. Diapering of the elderly
JAGS 1985 33:842-6