UROLOGIC NURSE FORUM

7 FRI. OCTOBER, 2022
09:00~12:00

Room C (203)
(On-line Room D (209))
ASEM Ballroom, COEX

PROVIDING A SAFE TOMORROW,
LEADING A BETTER FUTURE
<table>
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<th>Time</th>
<th>Session</th>
<th>Speaker</th>
<th>Institution</th>
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<tr>
<td>09:00-09:15</td>
<td>Opening address</td>
<td>Sun-Ouck Kim</td>
<td>Director of Women’s Policy Committee, Chonnam National University</td>
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<tr>
<td>09:15-09:35</td>
<td>Congratulatory address</td>
<td>Sang Don Lee</td>
<td>KUA President, Pusan National University</td>
</tr>
<tr>
<td>09:15-09:35</td>
<td>Common Urology Procedures</td>
<td>Moderator: Ju Hyun Shin</td>
<td>Chungnam National University</td>
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<td></td>
<td></td>
<td>Won Tae Kim</td>
<td>Chungbuk National University</td>
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<tr>
<td>09:15-09:35</td>
<td>Management of Foley catheter, Cystostomy, CIC</td>
<td>Kwang Taek Kim</td>
<td>Gachon University</td>
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<tr>
<td>09:35-09:55</td>
<td>Indications for Cystoscopy and Findings</td>
<td>Se Young Choi</td>
<td>Chung-Ang University</td>
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<tr>
<td>09:55-10:15</td>
<td>Urologic Endoscopy Room Manual</td>
<td>Myungsun Shim</td>
<td>Hallym University</td>
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<tr>
<td>10:15-10:25</td>
<td>Q&amp;A</td>
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<tr>
<td>10:25-10:40</td>
<td>Break Time</td>
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<tr>
<td>10:40-11:00</td>
<td>Education for Men’s Health</td>
<td>Moderator: Dong Sup Lee</td>
<td>Catholic University</td>
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<td>Min-Gu Park</td>
<td>Inje University</td>
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<tr>
<td>10:40-11:00</td>
<td>Management of Late Onset Hypogonadism</td>
<td>Sun Tae Ahn</td>
<td>Korea University</td>
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<tr>
<td>11:00-11:20</td>
<td>Management of Erectile Dysfunction</td>
<td>Hyun Cheol Jeong</td>
<td>Hallym University</td>
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<tr>
<td>11:20-11:40</td>
<td>Management of Male Infertility</td>
<td>Dong Soo Kim</td>
<td>Kyung Hee University</td>
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<tr>
<td>11:40-12:00</td>
<td>Q&amp;A</td>
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## Program at a Glance

### 5. October. Wednesday

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<th>Meeting Room</th>
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<tbody>
<tr>
<td>08:30-</td>
<td>Registration (1F Registration Desk)</td>
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<tr>
<td>09:00-10:00</td>
<td>On-Line Symposium 1 [Oncology 1]</td>
<td>Faculty CME 지도전문의교육</td>
<td>Basic CME 필수교육</td>
<td>Ultrasound Hands-on Course for Urology Residents</td>
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<tr>
<td>10:00-11:00</td>
<td>On-Line Symposium 2 [Endourology]</td>
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<td>11:00-12:00</td>
<td>Satellite Luncheon Symposium 1 Teleflex</td>
<td>Satellite Luncheon Symposium 2</td>
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<tr>
<td>12:00-12:30</td>
<td>On-Line Symposium 3 [Andrology]</td>
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<tr>
<td>12:30-13:00</td>
<td>Young Urologist Symposium 1</td>
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<tr>
<td>13:00-14:00</td>
<td>On-Line Symposium 4 [Oncology 2]</td>
<td>Podium Session 1 LUTS/BPH (1) O 001-011</td>
<td>Podium Session 2 Basic Research -Cancer (1) O 012-022</td>
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<td>E-Poster</td>
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<tr>
<td>14:00-15:00</td>
<td>KUA Board Meeting 평의원회 (Rm. 101)</td>
<td>Podium Session 3 Cancer-Prostate (1) O 023-033</td>
<td>Podium Session 4 Pediatrics O 034-044</td>
<td>Podium Session 5 Basic Research-Neurourology &amp; LUTS/BPH &amp; Others O 045-055</td>
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<tr>
<td>15:00-15:30</td>
<td></td>
<td>Podium Session 6 Infections &amp; Geriatrics O 056-066</td>
<td>Podium Session 7 Endourology &amp; Stone Disease (1) O 067-077</td>
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<td>15:30-16:00</td>
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<td>Podium Session 8 LUTS/BPH (2) O 078-088</td>
<td>Podium Session 9 Cancer-Prostate (2) O 089-099</td>
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<tr>
<td>16:00-16:30</td>
<td>Semi Live Surgery 1 LIVE</td>
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<td>16:30-17:00</td>
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<td>Podium Session 8 LUTS/BPH (2) O 078-088</td>
<td>Podium Session 9 Cancer-Prostate (2) O 089-099</td>
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<td>Podium Session 6 Infections &amp; Geriatrics O 056-066</td>
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<td>Podium Session 3 Cancer-Prostate (1) O 023-033</td>
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</table>

*KUA Presidential Dinner (*Invited Only) (Rm. 102+103) (17:30 Welcome Cocktail & Photo Time)*
# Program at a Glance

## 6. October. Thursday

<table>
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<tr>
<th>Time</th>
<th>Room A</th>
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<th>Room D</th>
<th>Room E</th>
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<td></td>
<td>Booth Opening Ceremony (1F, Lobby)</td>
<td>Meet the Expert 1 Kyu-Sung Lee</td>
<td>Meet the Expert 2 Kwangsung Park</td>
<td>KUA Subspeciality Leadership Meeting [Breakfast]</td>
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<td>08:00-09:00</td>
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<tr>
<td>10:30-11:00</td>
<td>Podium Session 10 Basic Research - Cancer (2) O 100-110</td>
<td>Podium Session 11 Infertility &amp; Sexual Dysfunction / Basic Research - Infertility &amp; Sexual Dysfunction O 111-121</td>
<td>ICUrology Workshop</td>
<td>Committee for Training Program Reform and Policy Development - OSCE Model Exhibition (Rm.206)</td>
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<td>12:00-12:20</td>
<td>Satellite Luncheon Symposium 3</td>
<td>Satellite Luncheon Symposium 4</td>
<td>Satellite Luncheon Symposium 5</td>
<td>Satellite Luncheon Symposium 6</td>
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<td>12:20-13:00</td>
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<tr>
<td>13:00-14:00</td>
<td>Video Session 1 V 001-008</td>
<td>On-Line Symposium 1 [Oncology 1]</td>
<td>Women’s Policy Workshop</td>
<td>Committee for Training Program Reform and Policy Development - OSCE Model Exhibition (Rm.206)</td>
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<td>14:00-15:00</td>
<td>Podium Session 12 Cancer-Bladder, Pelvis, Ureter &amp; Others (1) O 122-132</td>
<td>On-Line Symposium 2 [Endourology]</td>
<td>Female Urologist Meeting</td>
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<td>15:00-16:00</td>
<td>Podium Session 13 Trauma &amp; Others O 133-143</td>
<td>Young Urologist Symposium 2</td>
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<td>16:00-17:00</td>
<td>Podium Session 14 Cancer-Kidney (1) O 144-154</td>
<td>KUA Textbook Compilation Committee</td>
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<td>17:00-17:30</td>
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<td>18:00~</td>
<td>Uro Fun Run (1F, Lobby)</td>
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## Program at a Glance

### 7. October. Friday

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<thead>
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<tr>
<td></td>
<td>102+103</td>
<td>201+202</td>
<td>203</td>
<td>209</td>
<td>205A</td>
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<td>08:00-09:00</td>
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<td>Meet the Expert 3</td>
<td>Meet the Expert 4</td>
<td>Meet the Expert 5</td>
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<td></td>
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<td>Kihyuck Moon</td>
<td>Seok-Soo Byun</td>
<td>Gilho Lee</td>
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<tr>
<td>09:00-10:00</td>
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<td>Podium Session 15</td>
<td>Podium Session 16</td>
<td>Nurse Forum</td>
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<td>Cancer-Prostate (3)</td>
<td>Cancer-Bladder, Pelvis, Ureter &amp; Others (2)</td>
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<td>Meeting of Board Examination Committee</td>
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<tr>
<td>10:00-11:00</td>
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<td>Plenary Session 4</td>
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<td>Business meeting of Korean Urological Research Society</td>
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<td>11:00-12:00</td>
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<td>Video Session 2</td>
<td>Satellite Luncheon Symposium 7</td>
<td>Satellite Luncheon Symposium 8</td>
<td>Satellite Luncheon Symposium 9</td>
<td>Luncheon Meeting for Main Sponsors</td>
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<tr>
<td>12:00-13:00</td>
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<td>Satellite Luncheon Symposium 7</td>
<td>Satellite Luncheon Symposium 8</td>
<td>Satellite Luncheon Symposium 9</td>
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<tr>
<td>13:00-14:00</td>
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<td>KUA 74th General Assembly</td>
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<td>14:00-15:00</td>
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<td>Special Lecture - National Insurance Strategy - Kim, Sae Chul’s Awards</td>
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<td>UDS Workshop</td>
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<td>15:00-16:00</td>
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<td>Podium Session 17 Cancer-Bladder, Pelvis, Ureter &amp; Others (3) / Incontinence &amp; Female Urology &amp; Neurourology</td>
<td>Semi Live Surgery 2</td>
<td>Podium Session 18 Cancer-Kidney (2)</td>
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<td>16:00-17:00</td>
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<td>Podium Session 19 Cancer-Prostate (4)</td>
<td>Podium Session 20 Endourology &amp; Stone Disease (2)</td>
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## 8. October. Saturday

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>09:30-17:00</td>
<td>KUA-AUA Resident Review Course</td>
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**COEX Conference Room (South), COEX**

Room 300 (3F)
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## Common Urology Procedures

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<td>Kwang Taek Kim</td>
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<tr>
<td>Indications for Cystoscopy and Findings</td>
<td>Se Young Choi</td>
<td>11</td>
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<tr>
<td>Urologic Endoscopy Room Manual</td>
<td>Myungsun Shim</td>
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## Education for Men’s Health

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<th>Title</th>
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<tr>
<td>Management of Late onset hypogonadism</td>
<td>Sun Tae Ahn</td>
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<td>Management of erectile dysfunction</td>
<td>Hyun Cheol Jeong</td>
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<tr>
<td>Management of Male infertility</td>
<td>Dong Soo Kim</td>
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Common Urology Procedures

Moderator:
Ju Hyun Shin (Chungnam National University),
Won Tae Kim (Chungbuk National University)

Management of Foley catheter, Cystostomy, CIC
Kwang Taek Kim (Gachon University)

Indications for Cystoscopy and Findings
Se Young Choi (Chung-Ang University)

Urologic Endoscopy Room Manual
Myungsun Shim (Hallym University)
Management of Foley catheter, Cystostomy, CIC

Kwang Taek Kim
Gachon University

Contents
- Foley, Cystostomy: Indication/Contraindication
- Catheter complication
- Principle of management
- Patient education
- CIC: Indication & Management

Indication
- Urethral catheter indication
  - Retention/Bladder outlet obstruction
  - Maintain a continuous outflow of urine
  - Need for accurate measurements of urinary output
  - Perioperative use for selected surgical procedures.
  - Need for intra-operative monitoring of urinary output.

- Suprapubic catheter indication
  - In addition to the indications of the urethral catheterization the following indications apply
  - Acute and chronic urine retention that is not able to be adequately drained with a urethral catheter.
  - Preferred by patient due to patient needs e.g. wheelchair user, sexual issues.
  - Acute prostatitis.

(Guideline for prevention of EAUN 2012)
Indication

Suprapubic catheter indication
- Obstruction, stricture, abnormal urethral anatomy
- Pelvic trauma
- Complications of long-term urethral catheterization
- Complex urethral or abdominal surgery
- Fecal incontinent patients

Contraindication

Urethral catheter contraindication
- Acute prostatitis
  - aggravated inflammation
  - risk of complication
- Suspicious of urethral trauma
  - partial injury > complete injury

Contraindication

Suprapubic catheter contraindication
- Known or suspected carcinoma of the bladder
- Previous lower abdominal surgery
- Coagulopathy until the abnormality is corrected
- Ascites
- Prosthetic devices in lower abdomen e.g. hernia mesh

Contents

Foley, Cystostomy: Indication/Contraindication
Catheter complication
Principle of management
Patient education
CIC: Indication & Management

Catheter complication

Catheter Associated Urinary Tract Infection
Epididymitis
Catheter blockage
Catheter bypassing
Iatrogenic trauma
Bladder spasm
Bladder pain

Catheter complication

Hematuria
Granuloma formation
Urinary extravasation
Inability to remove catheter
Squamous Cell Carcinoma (SCC)
Catheter complication

Catheter associated Urinary Tract Infection (CAUTI)

**Definition**
도뇨관이 음동되어 있거나 제거한지 48시간 이내의 환자에서 발생한 요도감염

**Prevention**
Fluid intake
Hand washing
Use of closed drainage systems

(European Associated of urology nurse 2012)

Catheter blockage

40~50% of patients with indwelling catheters

**Etiology**
1. Catheter encrustation : may occur as bacterial cells, such as “Proteus mirabilis”
2. Debris
3. Biofilm
4. Chronic constipation
5. Kinking of the catheter

Latrogenic trauma

**Urethral catheterization**
1. False passage / Urethral stricture in the male Usually at the level of the prostate or bladder neck
2. Paraphimosis
3. Urethral Sphincter disruption in the female

**Suprapubic catheterization**
1. Visceral injury
   previous lower abdominal surgery and neurological disease
2~3% bowel perforation

Bladder spasm / pain

**Etiology**
1. 요도 방광 반사(음뇨관과 방광간 구심신경활성화)
2. Traction. Chronic constipation
3. Too large diameter of the catheter

**Management**
1. Maintaining regular bowel function : high fiber & fluid intake
2. Catheter: smaller lumen and balloon size
3. Anticholinergic drugs

Hematuria

**Etiology**
1. During urethral catheterization, prostatic trauma
2. Decompression of high pressure chronic retention
3. Stone

**Management**
1. Irrigation => fall => formal bladder washout under G/A
Catheter complication

Granuloma formation / stricture/urinary extravasation

This complication is limited to SPC

Management
silver nitrate, surgical excision

Contents

- Foley, Cystostomy: Indication/Contraindication
- Catheter complication
- Principle of management
- Patient education
- CIC: Indication & Management

Principle of management

Aseptic technique
Changing indwelling catheters
Catheter size
Balloon size and filling
Secure the urethral catheter
Urinalysis
Bladder irrigation

Principle of management

Aseptic technique
Following aseptic insertion of the catheter, maintain a closed drainage system
Changing indwelling catheter
Do not fixed intervals
- Immediately replaced
  - Infection
  - Obstruction
  - Closed system is compromised
- Catheter changes are base of
  - Function of the catheter
  - Degree of catheter esrxiation
  - Frequency of blockage
  - Patient discomfort

Principle of management

Catheter size
As small as possible

<table>
<thead>
<tr>
<th>General Guideline (ICS, 2009)</th>
<th>1Fr = 1/3mm</th>
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<tbody>
<tr>
<td>Urethral</td>
<td>12–16Fr</td>
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<tr>
<td>Suprapubic</td>
<td>16–20Fr</td>
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<tr>
<td>Hematuria</td>
<td>20–24Fr</td>
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</tbody>
</table>

Balloon size and filling

5–10cc balloon (per manufacture suggested guidelines)
- Do not use saline: crystallize
- Do not use air: “float” in bladder

Principle of management

Secure the urethral catheter
Management of Foley catheter, Cystostomy, CIC
Kwang Taek Kim

Principle of management

Secure the urethral catheter

Overnight drainage system
Bag fixed at the leg

Principle of management

Urinalysis
Indications
1. Patient is systemically unwell
2. Patient has a high temperature
3. Following lack of response to treatment
4. Admitted/Transferred to hospital to ascertain the presence of HAI or CAI

Principle of management

Bladder irrigation

Routine bladder washouts are not beneficial
- Breaking the closed system to perform a bladder washout will increase the risk of infection
Recommended in special circumstances
1. Removal of encrustation
2. Removal of blood clot after urological surgery
3. Palliative treatment of intractable hematuria
- For the purpose of preventing blockage!!
  to be performed an aseptic technique must be followed!!

(Cochrane Database of Systematic Reviews)

Contents

Foley, Cystostomy: Indication/Contraindication
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Patient education

Hand washing
Fluid intake
Maintain a closed system
Maintain a unobstructed urine flow
Perineal cleansing
Prophylactic antibiotics

Patient education

Possible color and odor changes in urine due to food or medication

<table>
<thead>
<tr>
<th>Medication</th>
<th>Color/Odor</th>
<th>Food and drink</th>
<th>Color/Odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amitriptyline</td>
<td>Blue-green</td>
<td>Asparagus</td>
<td>Green</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Offensive smell</td>
<td>Beetroot</td>
<td>Pink to dark red</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>Red</td>
<td>Red fruit drinks</td>
<td>Pink to dark red</td>
</tr>
<tr>
<td>Levodopa</td>
<td>Darkens</td>
<td>Oily fish</td>
<td>Fishy</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>Red to brown</td>
<td>Certain food smells appears to pass through into the urine e.g. onion, garlic, some spices</td>
<td></td>
</tr>
<tr>
<td>Sulfonamides</td>
<td>Greenish blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin Bcom</td>
<td>Dark yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warfarin</td>
<td>Orange</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### The principles of bladder management

- The bladder should empty regularly and efficiently.
- Bladder management should be appropriate to functional capacity. (UDS/voiding diary)
  - Needs to be monitored closely and adjusted as necessary.
- Bladder emptying should be independent of caregivers.
- Effective bowel management is critical to effective bladder management.
- There are sex differences in neurogenic bladder management.
  - Requires gender-specific considerations and interventions.

### Indication

**CIC indication**

*Best practice / the gold standard*

The principles of using intermittent catheterisation are based on regular (typically 4-6 times daily) and complete emptying of the bladder to maintain a low bladder pressure and minimal residual urine volumes, consequently securing bladder and renal health.

**Rationale:** Intermittent catheterisation provides a method of emptying the neurogenic bladder without leaving an indwelling catheter and lessens the frequency of long-term complications.

### Contraindication

**CIC contraindication**

- High intravesical pressure: requires free drainage to prevent renal damage (Vahre et al, 2013)
- Patients with serious physical disabilities or impaired hand function: impossible to undertake
- Patients with a small-capacity bladder (below 200mL) -> not suitable: require frequent catheterisation
- Can cause occasional urethral false passage formation
- Procedure can be time consuming

### EAUN guidelines categorizes catheter with various factors

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-use</td>
<td>Anti-fog</td>
<td>- Secure catheter</td>
<td>- Single</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Catheter connectors</th>
<th>Catheter lubrication / catheter cooling</th>
<th>Cytoreactive and hydrophobic</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Single</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Types of catheter

<table>
<thead>
<tr>
<th>Single-use</th>
<th>Single-use catheter with coating or gel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-use</td>
<td>Single-use catheter with coating or gel</td>
</tr>
</tbody>
</table>

- Hydrophilic gel
- Cytoreactive coating
- Anti-fog properties
- Secure catheter design

- Compliant (smooth surface)
- Non-compliant (rough surface)
- Single-use catheter
- Pre-lubricated single-use catheter
- Catheter with an additional feature
Using hydrophilic coated catheters can decrease the risk of UTI by ~20%.

- Data from hospital settings is the best measure for a difference in UTI rates, since UTI rates are higher in hospital setting community.

- Systematic review of hydrophilic coated catheters explicit on UTI, presented by Compant at UUS 2014 in Brazil report decreased risk of UTI in hospital settings.

| Study | Number of patients | Untreated | Hydrophilic coated | Hydrophilic coated | UTI rate%
|-------|--------------------|-----------|-------------------|-------------------|-----------
| Study 1 | 100 | 20 | 80 | 20 | 10%
| Study 2 | 150 | 30 | 120 | 30 | 12%
| Study 3 | 200 | 40 | 160 | 40 | 16%
| UTI overall | 21 | 80 | 320 | 80 | 21%

- Data from various studies on UTI in hospital settings.

Hydrophilic catheters is associated with less urethral damage measured by hematuria.

<table>
<thead>
<tr>
<th>Study</th>
<th>Untreated</th>
<th>Hydrophilic coated</th>
<th>Hematuria</th>
<th>Hydrophilic coated</th>
<th>Hematuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1</td>
<td>20%</td>
<td>10%</td>
<td>80%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Study 2</td>
<td>30%</td>
<td>25%</td>
<td>90%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>Study 3</td>
<td>40%</td>
<td>35%</td>
<td>100%</td>
<td>90%</td>
<td></td>
</tr>
</tbody>
</table>

Intermittent catheterisation – a well defined treatment

- Mean catheterisation volumes <600 mL is associated with fewer UTI's (p<0.001).

**Recommendation**

- Intermittent catheterisation should:
  - Be done with hands dry.
  - Ensure catheter insertion in the bladder.
  - Ensure that urine catheterisation volumes do not exceed 400 mL and keeping the bladder pressure low.

- How to perform intermittent catheterisation

An aseptic technique is generally recommended in a clinical setting, whereas the clean technique is used in community.

- All medical students and practitioners agree that all catheters should be sterile and inserted using an aseptic technique, when catheterised by staff at hospital and in other health care institutions. A clean setting is a feasible option for men in community.

**Aseptic technique**

- Aseptic technique means a sterile catheter, which is inserted into the urethra, has no direct contact with the person performing the catheterisation. This minimizes the potential for external contamination. Methods for an aseptic technique vary from product to product and between hose brands. (Hose is optional)

**Clean technique**

- The clean technique is the most often used outside a professional healthcare setting. It is similar to a normal catheter, where you have not inserted the catheter, but that hands and parts of a catheter have been washed thoroughly with soap and water.

The catheterisation process for a man

- Start by washing your hands thoroughly with soap and water.

- To prevent pushing bacteria into the urethra and bladder, you must clean the head of your penis thoroughly. Gently rub the foreskin back, if not circumcised, around the head of the penis and wash it off. Gently rub the head of the penis and wash it off.

- Keep your penis gently apart and close to your stomach. This will ease the insertion of the catheter.

- Place your right hand on the handle of the catheter to keep it in place. The catheter should be held in a comfortable position for at least 5 minutes. If you feel resistance, stop for a few seconds and then gently continue to insert the catheter. The resistance will ease. Gently push the catheter into the bladder and then slowly insert it into the urethra.

- Continue to hold the catheter until it reaches your bladder and the urine starts to flow. Then continue to the urethra continues to flow. Then continue to the urethra continues to flow. Then continue to the urethra continues to flow. Then continue to the urethra continues to flow.

- If you feel resistance, stop for a few seconds and then gently continue to insert the catheter. The resistance will ease. Gently push the catheter into the bladder and then slowly insert it into the urethra.

- When the flow stops, stop and tighten the valve up. Withdraw the catheter, check to ensure that you drained any remaining urine at the base of your bladder. Wash your hands thoroughly as per the Ontario.
The catheterisation process for a woman

1. Wash your hands thoroughly with water and soap.
2. If you are wearing a urinary catheter, place the catheter under the urine stream. Gently insert the tube into the urethra and slowly push the catheter into the bladder. Be sure to follow your doctor's instructions.
3. Wash your hands thoroughly as you did before.
Indications for Cystoscopy and Findings

Se Young Choi
Chung-Ang University

Contents

- History of cystoscopy
- Anatomy
- Indications
- Complications

History of cystoscopy

- Early prototype
  - 1805 Philip Bozzini (Germany, father of endoscopy)
  - Army surgeon: frustrated by the difficulties of locating bullets
  - "Light Conductor" consisted of interchangeable viewing funnels
  - attached to a candle in a sharkskin-covered box
  - visualizing the pharynx, nasal cavities or urethra
  - But poor visualization → burns

Lampoldi et al. BJU Int. 2009

History of cystoscopy

- Early prototype
  - 1826 Pierre Segalas (Paris)
  - developed a thin cylindrical tube into the bladder
  - 1826 John Fischer (Boston)
  - reflecting a beam of light from lamp into the cavity, using a mirror

Miran et al. The History of Technologic Advancements in Urology, 2018
History of cystoscopy

- **Early prototype**
  - 1853 Antoine Desormeaux (Paris)
  - able to diagnose urethritis and pioneer endoscopic intervention by carrying out an excision of a urethral papilloma
  - first to be usable for simple operations such as chemical cauterization

- **First-generation: Lens system & technique**
  - 1877, Lens was introduced
  - But, image was inverted and backwards
  - To overcome this, ‘box phantom’ was created

- **First-generation: Lens system & technique**
  - early endoscopy was much more traumatic
  - Significant pain
  - not equipped to instil water, so the bladder was distended with air
  - genipectoral position, also known as the knee-chest position

- **Second-generation visualization: Bladder irrigation & Lighting**
  - 1865, Francis Cruise (Dublin)
  - added a glass window and a mirror to direct image
  - 1865, Couriard & Evermann (Russia)
  - added a second cylinder to fluid distension → improved visualization → lithotomy position

- **Second-generation visualization: Bladder irrigation & Lighting**
  - 1887, Nitze (German urologist)
  - light-bulb tips
  - Before this innovation, cystoscopes were cumbersome and exceedingly expensive because of the irrigation and cooling equipment, and thus not widely available
History of cystoscopy

- Third-generation optics
  - 1930, Heinrich Lamm (German gynecologist)
  - first assembled a bundle of optic fibers in order to carry an image

Mansour et al. The History of Technologic Advancements in Urology, 2010

History of cystoscopy

- Third-generation optics
  - 1951, Harold Hopkins (British physicist)
  - applied fiber optics to cystoscopy

The English and American companies to whom he revealed the system showed little interest in the new technology, but an astute young German businessman, Karl Storz, purchased the patent, and showcased the instruments in 1967 at the International Society of Urology in Munich

Kempf et al. BJU Int, 2009

History of cystoscopy

- Third-generation optics
  - 1970, Takayasu and Aso (Tokyo)
  - added irrigating and channels
  - 1973, Tsuchida and Sugawara
  - Built the first flexible cystoscope

Kempf et al. BJU Int, 2009

Contents

- History of cystoscopy
- Anatomy
- Indications
- Complications

Anatomy

- Genitourinary tract
  - Kidney
  - Ureter
  - Bladder
  - Urethra
  - Male: penis, testis
  - Female: uterus, ovary
- Upper urinary tract
- Lower urinary tract
- Reproductive system


Anatomy

- Urethra (male)
  - Anterior
    - Penile, bulbous
  - Posterior
    - Membranous, prostatic

**Anatomy**

- **Urethra (male)**
  - Anterior
    - Penile urethra: ~15 cm, the longest portion
  - Bulbous urethra: traverses the root of the penis

![Image](Urology and Reconstructive Pelvic Surgery (Third Edition). 2007)

- **Urethra (male)**
  - Posterior
    - Membranous urethra: 1 cm, passes through the urogenital diaphragm, surrounded by sphincter
  - Prostatic urethra: 3 cm, surrounded by the prostate gland; on its posterior wall runs the urethral crest and the prominent smooth muscle verumontanum

![Image](Wang et al. J Nucl. 2019)

- **Urethra (female)**
  - Narrow membranous canal, about 4 cm. long

![Image](Samuns: Differencebetween.com. 2018)

- **Bladder**
  - Trigone: Below interureteric ridge
  - Dome: Roof
  - Lateral: Lateral to ureteral orifice
  - Bladder neck: Internal urethral orifice
  - Ureteric orifice
  - Urachus: Mid umbilical ligament

![Image](SEER Program Coding and Staging Manual. 2014)
Indications for Cystoscopy and Findings
Se Young Choi

Anatomy
- Bladder
  - Trigone: Below inter-ureteric ridge

Anatomy
- Bladder
  - Dome: Roof

Anatomy
- Bladder
  - Lateral: Lateral to ureteral orifice

Anatomy
- Bladder
  - Bladder neck: Internal urethral orifice

Anatomy
- Bladder
  - Ureteric orifice

Anatomy
- Bladder
  - Urethral orifice: Mid umbilical ligament
Contents

- History of cystoscopy
- Anatomy
- Indications
- Complications

Indications

- Diagnostic
  - Hematuria
  - Recurrent urinary infection
  - Urinary obstruction
  - Bladder biopsy
  - Retrograde pyelogram

Carter, anesthetics-management-of-endoscopic-urologic-procedures, 2012

Indications

- Diagnostic
  - Recurrent urinary infection

<table>
<thead>
<tr>
<th>Serious</th>
<th>Consequential</th>
<th>Incidental</th>
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</thead>
<tbody>
<tr>
<td>Carcinoma</td>
<td>15</td>
<td>Inflammation</td>
</tr>
<tr>
<td>Colonic lesions</td>
<td>1</td>
<td>Various</td>
</tr>
<tr>
<td>Suture material</td>
<td>1</td>
<td>Bladder</td>
</tr>
<tr>
<td>Ureteroureterostomy</td>
<td>1</td>
<td>Diverticulum</td>
</tr>
<tr>
<td>Debris</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Total cystosopies, %</td>
<td>0.15</td>
<td>2.74</td>
</tr>
</tbody>
</table>

Santoni et al. Urol Int. 2018

Indications

- Diagnostic
  - Recurrent urinary infection
  - Bladder tumor

Santoni et al. Urol Int. 2018

Indications

- Diagnostic
  - Recurrent urinary infection
  - Stricture

Santoni et al. Urol Int. 2018
Indications for Cystoscopy and Findings
Se Young Choi

Indications
- Diagnostic
  - Recurrent urinary infection
  - Fistula

Indications
- Diagnostic
  - Recurrent urinary infection
  - Suture materials

Indications
- Diagnostic
  - Recurrent urinary infection
  - Ureterocele

Indications
- Diagnostic
  - Recurrent urinary infection
  - Inflammation

Indications
- Diagnostic
  - Recurrent urinary infection
  - Variant ureteral orifice

Indications
- Diagnostic
  - Recurrent urinary infection
  - Bladder diverticulum
Indications

- Diagnostic
  - Urinary obstruction
  - BPH / stricture

Indications

- Diagnostic
  - Bladder biopsy
  - Retrograde pyelogram

Indications

- Therapeutic
  - Resection of bladder tumor
  - Extraction or laser lithotripsy
  - Placement of ureteral catheter
  - Placement of Foley catheter

Indications

- Therapeutic
  - Resection of bladder tumor

Indications

- Therapeutic
  - Extraction or laser lithotripsy

Indications

- Therapeutic
  - Placement of ureteral catheter

Indications

- Therapeutic
  - Placement of ureteral catheter
Indications for Cystoscopy and Findings
Se Young Choi

Indications
- Therapeutic
  - Placement of Foley catheter

Contents
- History of cystoscopy
- Anatomy
- Indications
- Complications

Complications
- Risk
  - Infection
    - Rarely, cystoscopy can introduce germs into your urinary tract, causing an infection.
    - Risk factors for developing a urinary tract infection after cystoscopy include advanced age, smoking and unusual anatomy in your urinary tract.

Complications
- Risk
  - Bleeding
    - Cystoscopy might cause some blood in your urine.
    - Serious bleeding occurs rarely.

Complications
- Risk
  - Pain
    - After the procedure, you might experience abdominal pain and a burning sensation when you urinate.
    - These symptoms are generally mild and gradually get better after the procedure.

Complications
- Risk
  - Relieve the discomfort
    - Drink water to flush irritants out of your bladder. Try to drink 16 ounces (473 milliliters) of water each hour for the first two hours after the procedure.
    - Take an over-the-counter pain reliever.
    - Place a warm, damp washcloth on the opening to your urethra to ease pain, repeating as needed.
    - Take a warm bath, unless your doctor asks you to avoid baths.
Summary

- History of cystoscopy
  - Developed according to the advancement in scientific technology
- Anatomy
  - Urethra, bladder
- Indications
  - Diagnostic, Therapeutic
- Complications
  - Not severe

Thank you
내시경은 오늘날 여러 진료분야에서 다양하게 사용되고 있습니다. 진단 목적만이 아니라 다양한 치료에도 이용이 되는데, 복강경 수술, 로봇 수술도 내시경을 이용한 분야라고 할 수 있습니다. 의례적 내시경 하면 소화기 내시경을 떠올리게 되지만, 내시경의 시초는 방광내시경입니다. 1805년 독일의 Philipp Bozzini(1773~1809)가 Lichtleiter(light conductor)라고 명명한 내시경을 고안한 요도, 방광, 질 내부를 관찰한 것이 내시경의 효시라고 할 수 있습니다. 200년 전 처음 내시경을 고안할 때에는 촛불과 반사경, 튜브 형태의 검안경을 이용했다고 하는데, 요즘 우리가 사용하는 내시경의 구성요소는 모두 갖추고 있었습니다. 최근에는 다양한 장비들이 개발되어 이용되고 있습니다. 방광내시경실에서 이루어지는 진단과 치료가 원만하고 정확히 이루어지기 위해서는 비뇨의학과에서 사용하는 각종 기구들의 종류와 구조뿐 아니라 그 적응증과 사용법과 그 일련의 과정을 정확히 이해하고 숙지하는 것이 중요합니다. 이 시간에는 방광내시경실 업무에 중요한 내용을 살펴보고자 합니다.

건강보험심사평가원에서 집계한 2010년 한 해 동안 시행된 방광경 검사(E7730)는 61,448건이었습니다(그림 1). 방광 내시경 검사는 체중과 증가추세를 보여 2018년에는 100,754건으로 큰 폭으로 증가하였습니다. 방광 내시경 검사의 증가는 비뇨의학과 질환에 대한 전문적인 진료의 수준이 상승했다고 판단할 수 있는 근거이며, 무엇보다 안전하게 시행해야한다는 점, 환자의 권리를 도모해야 한다는 점이 중요하겠습니다.

[그림 1] 건강보험심사평가원 집계 2010-2018 방광내시경 검사(E7730) 시행 건수
방광내시경의 적응증

방광내시경검사(cystourethroscopy)는 하부요로 질환의 진단과 치료에 가장 중요하고 가장 흔하게 사용되는 술기입니다. 하부요로의 해부학적인 형태와 육안적 병소를 확인할 수 있기 때문에 혈뇨의 원인을 밝히는 데 유용하며, 요세포검사(urate cytopscopy)와 조직검사(biopsy)에 필요한 검체를 얻을 수 있습니다. 또한 상부요로에 대한 검사나 치료도 방광내시경을 이용하여 시행할 수 있습니다.

방광내시경의 적응증(indication)
(1) 육안적 또는 현미경적 혈뇨
(2) 요도 또는 방광 내 종양: 진단 및 재발 추적
(3) 반복적인 요로감염
(4) 베토뇨증
(5) 결방뇨증
(6) 요도협착
(7) 하부요로손상
(8) 요도 또는 방광 내 이물 또는 결석
(9) 상부 요로에 대한 검사 준비: 역행성 신우 조영술(RGP, Retrograde pyelography)
(10) 이미 삽입된 요관 부목(Ureteral stent, double-J stent) 제거

방광내시경 전후 환자와의 커뮤니케이션

방광내시경 검사는 안전한 검사지만 비침습적인 시술은 아니므로 시술 전후 환자와의 커뮤니케이션이 중요합니다. 방광내시경 검사를 하기 전, 환자와의 대화를 통해 검사의 목표와 방법을 이해하고 동의를 얻는 것이 중요합니다. 환자와의 대화는 신체적, 정신적, 그리고 감정적 충분한 이지를 제공하는 데 도움이 됩니다. 검사 전후 환자와의 커뮤니케이션은 다음의 사항을 포함할 수 있습니다.

방광내시경 환자에게 주지 시켜야 할 사항
(1) 충분한 수분 섭취가 필요합니다.
(2) 약간의 요도 출혈과 혈뇨는 있을 수 있습니다. 주의가 필요합니다.
(3) 오래된 목욕과 사워는 가능합니다.
(4) 약물이 없는 경우에는 시술 전 1일 정도 전에 이물을 제거합니다.
(5) 배뇨이상이 있으며, 요법이 필요시에 의뢰할 수 있습니다.
[ 다음과 같은 사항은 응급한 상황일 수 있습니다.]
- 검사 후 극심한 통증이 있거나 다량의 출혈이 있는 경우
- 38℃ 이상 열이 나거나 오한이 있는 경우
- 하복부 병변감과 압통을 동반한 배뇨 곤란

• 방광내시경 장비

방광내시경은 골骼이 가는 여부에 따라 경성 방광내시경(Rigid cystoscope)과 연성 방광내시경(Flexible cystoscope)으로 구분할 수 있습니다. 경성 방광내시경은 관류액이 빠르게 유입되어 시야가 좋고, Guidewire나 Forceps 같은 보조기구들을 삽입할 수 있는 통로가 짧고 직선에 가까워 조작이 편리한 장점이 있습니다. 연성 방광내시경은 환자의 통증이나 불편감이 덜하며 렌즈 방향을 180-220° 정도 까지 자유롭게 굴고 시킬 수 있어 방광 내부를 빠짐없이 관찰할 수 있습니다.

[표 1] 방광내시경 장비의 구성

<table>
<thead>
<tr>
<th></th>
<th>Sheath+ Obturator</th>
<th>Telescope과 sheath를 결합시키는 부속입니다. Catheter나 Guidewire, 다양한 Forceps 등을 삽입할 수 있는 통로가 마련되어 있습니다. 끝에 각도를 조절할 수 있는 Albarran lever가 있는 제품도 있습니다.</th>
</tr>
</thead>
<tbody>
<tr>
<td>경성방광내시경</td>
<td>Bridge</td>
<td>Telescope의 각도를 시야를 결정합니다. 0°, 12°, 30°, 70°, 120° 등의 각도를 가진 제품이 있습니다.</td>
</tr>
<tr>
<td>연성방광내시경</td>
<td>Optical scope</td>
<td>별도의 카메라와 광원 장치가 필요한 제품입니다.</td>
</tr>
<tr>
<td></td>
<td>Digital scope</td>
<td>내시경에 카메라가 내장되어 있는 형태로 화질이 좋은 편이나 매우 고가 장비입니다.</td>
</tr>
</tbody>
</table>

[그림 2] Rigid cystoscope의 Albarran deflecting bridge (Olympus) 손잡이 레버를 조작하면 끝부분의 각도(좌측 하단 확대)가 조절 가능하며 Guidewire 등을 원하는 방향으로 조작할 수 있습니다.
방광내시경 전 준비 사항 - 환자

방광내시경 전 가장 중요한 사항은 환자의 확인입니다. 방광내시경을 시행하는 환자가 맞는지, 어떤 이유로 방광내시경을 시행하는지 확인해야 합니다. 또한 방광내시경 점사는 다른 검사에 영향을 줄 수 있으므로 다른 검사를 먼저 시행하고 가급적 마지막에 시행하는 것이 좋습니다. 예를 들어 방광내시경은 혈뇨를 유발시킬 수 있어 소변검사에 오류를 일으킬 수 있고, 남자 환자의 경우 혈중 PSA 수치를 상승시킬 수 있습니다. 그러나 소변검사나 혈뇨를 먼저 하고 방광내시경을 시행하는 것이 바람직합니다. 종양 등의 방광내 병변이 의심되는 환자는 영상의학 결과를 확인하고 방광내시경을 확인하는 것이 검사의 정확도와 효율을 높일 수 있으므로 영상의학 검사 일정이 있다면, 담당 의사선생님과 방광내시경 일정을 상의하는 것도 좋습니다.

환자는 적절한 검사복을 입고 테이블에 눕게 됩니다. 방광내시경 실에 환자가 늘리는 table이 진찰대나 수술대(OP table)와 비교되는 점은 배뇨후쇄석위(lithotomy position)를 유지할 수 있다는 점과 관류액(irrigating fluid)배수를 위한 장치가 있다는 점입니다. intraoperative fluoroscopy(X-ray 활영)이 가능한 table을 사용하기도 합니다. 경성 방광내시경(Rigid cystoscope)은쇄석위(lithotomy position)가 필수지만 연성 방광내시경(flexible endoscope)은 양와위(supine position)라도
가능합니다. Lithotomy position을 유지할 때 다리를 받치는 거치대(Cystoscopy stirrups)는 외부생식기나 항문 주위를 포함한 open procedure가 가능하도록 변형된 것을 사용하게 됩니다. Lithotomy position은 모든 환자에서 부끄러운 자세이므로 환자의 존엄(dignity)을 보호되고 존중되어야 하고 필요 없더라도 노출을 시켜서는 안됩니다. 발의를 시키고 자세를 바꾸거나, 피부 소독 등 환자의 몸에 치라나 조직이 가해질 때에는 편안한 여로를 직접적으로 안내하는 것이 좋습니다(“발의합니다”, “다리를 올립니다”, “요도 주변 소독하니 차갑습니다” 등). 시술 전 환자가 조급이라고 더 편안함을 느낄 수 있도록 배려해야 합니다.

방광내시경은 남자환자나 여자환자 모두에게 통증을 유발합니다. 환자가 긴장을 풀고 허리와 무릎의 힘을 빼고 입을 벌리고 천천히 복식호흡을 하는 것이 통증 완화에 큰 도움이 됩니다. 남자환자의 경우 lidocaine gel 등 국소마취제가 함유된 윤활제를 요도에 삽입하고 화분을 부드럽게 마사지하면서 통증을 정감시킬 수 있고, 여자 환자의 경우 국소마취제를 거즈 등에 적셔 요도 구 주변에 밀착시켜 요도구 주변 조직의 통증을 완화 시킬 수 있습니다.

• 방광내시경 전 준비 사항 - 기구

방광내시경은 “Clean contaminated procedure”입니다. 이것은 외부로부터는 무균 상태를 유지해야 하지만 환자의 내재적인 세균은 시술 중 연관될 수 있다는 뜻입니다. 그러므로 외부로부터의 수많은 미생물로부터 안전하기 위해 기구의 소독, 내시경실의 환경 관리, 환자의 피부 소독 및 드레프(drape)가 중요합니다. 점막을 파괴하는 조직검사 등을 시행하지 않는 동상적인 방광내시경은 준위험기구(Semisensitive instrument)에 해당되며 멸균 또는 높은 수준의 소독(High level disinfection)이 필요합니다. 자세한 대한비뇨내시경로봇학회(Korean Society of Endourology and Robotics, K-SER)의 방광내시경 소독지침은 Uronurse - cystoroom manual (uronurse.or.kr)에도 게시되어 있습니다. 보건복지부 고시 제2017-101호 "의료기관 사용 기구 및 물품 소독 지침"에도 의료기구의 소독 지침이 간략히 정리되어 있습니다.

요도구 주변 피부소독은 베타(simp)이나 클로르헥시딘을 주로 사용합니다. 클론산클로르헥시딘은 저구가 적고 시술 후 환자 몸에 남은 소독제를 닦아내기 편리하며 많이 사용하였지만 2019년 10월 18일부터는 식약처 협약사항에서 제외되어 간편의 방광내시경실에서 환자 피부소독에는 사용하지 않는 것이 좋겠습니다. (글루콘산클로르헥시딘 0.5% 제제, 효능·효과 항- 손 및 피부의 소독(보건위생중사자 및 수술 시 수술자의 손 소독, 수술부위 피부의 소독은 제외. 의약품안전평가과-5672(2019.8.30.))

방광내시경을 시행하는 동안, 방광은 내부의 시야를 밝히기 위한 관류액을 지속적으로 관류 시킵니다. 일반적으로 무균 생리식염수를 사용하며 지속적인 관류(continuous irrigation)는 혈액과 조직의 잔류물을(tissue debris)을 초상시야에서 제거할 수 있습니다. 연속적인 관류는 1L / 3L airtight plastic bag에 들어 있는 것을 사용하며 Closed-unit tubing(외부로 노출된 곳이 없는 튜브)을 사용해야 합니다. 관류액 양을 조절하는 Pumping unit을 사용하기도 하고 관류 속도와 압력은 pump, 압력조절기 또는 콤프에 의해 조절됩니다. 통상적으로 환자의 치골 상부부터 60cm 높이 정도가 적당한 관류액의 높이입니다. 관류액의 온도는 너무 차갑지 않게 보관해야 하며 일부 술자들은 층이 정도의 온장히에 보관한 관류액을 선호하기도 합니다. 따뜻한 관류액은 지혈 기전을 지연시킬 수 있어 시술 중 출혈이 지속될 수 있고, 차가운 관류액은 시술 중 bladder spasm이나 hypothermia가 발생할 수 있습니다. 관류액의 온도에 대한 줄 지켜야하는 가이드라인은 없고 상황에 따라, 시술자의 선호도에 따라 준비하게 됩니다.

• 방광내시경 검사 종료 시 유의 사항

방광내시경 검사가 종료된 후에도 환자가 퇴실할 때까지 주의를 기울여야 합니다. 환자의 안전과 검사 여부를 확인해야 합니다. 방광내시경을 시행 받는 환자는 상대적으로 고령의 환자인 경우가 많으나 관류액으로 방광이 가득 찼다면 자가 배뇨 가능여부도 반드시 체크하고 배뇨가 불가능한 상황이면 탐사 의사에게 알리고 도움을 시켜야합니다. 검사 종료 후 환자의 긴장이 감자가 풀려 어지러움 등을 호소할 수 있으므로 테이블에서 내려올 수 있는지, 자리로 보행과 환복이 가능할지 확인해야 합니다.
환자의 체액이 묻은 기구나 장소는 즉시 원내 감염관리 지침에 따라 처리해야합니다. 무엇보다 “나”를 보호하는 것도 매우 중요합니다. 방광내시경실에서 가장 높은 빈도로 노출될 위험이 있는 체액은 소변, 또는 소변이 섞인 관류액입니다. 극소량이라도 체액이 섞여 있을 가능성이 높으므로 체액 매개 감염성 질환은 환자인지 사전에 확인하는 것이 중요합니다. 또한 노출 이후 조치보다는 사전 예방이 중요하므로 가능한 개인 보호 용구를 착용하고, 개인 위생관리에 주의를 기울여야 합니다. 혈액이나 체액과 접촉한 장갑과 피부는 물과 비누로 씻고, 점막은 충분한 양의 물로 씻어냅니다. 방광내시경실 내에서 음식물을 먹거나, 화장을 고치거나 콘택트렌즈를 교환하는 등의 행위는 감염원에 노출될 수 있는 행동임을 유념해야 합니다. 방광내시경실은 원칙적으로 의료진과 환자 외에는 출입을 통제해야 하고 수술실과 같은 정도의 환경관리가 필요합니다. 현실적으로 가능한 한도 내에서 환경관리에 최선을 다해야 합니다. 눈에 띄는 오염물을 즉시 청소하고 환자에게 구비된 소독제로 소독합니다. 오염된 물품은 가급적 방광내시경실에 두지 않습니다. 환자에게 깨끗한 환경을 제공하고 의료진과 환자에게 잠재적 감염 위험 노출을 최소화하기 위한 환경관리는 매우 중요합니다.

맺음말

진료과의 전문성이 발전할수록 고유의 의료행위가 증가하게 됩니다. 비뇨의학과의 대표적인 시술은 방광내시경이라고 할 수 있습니다. 방광내시경실에서는 내시경뿐만 아니라 요도와 방광에 간단한 처치를 시행할 수도 있습니다. 이에 대한 사전 지식과 준비를 해야만 다양한 검사와 시술이 원만하게 이루어 질 수 있습니다. 앞으로 방광내시경의 시행은 점점 보편화되고 많은 학습에 도움이 되는 시대입니다. 근무처마다 현실적으로 많은 제약과 어려움이 있지만, 전문적인 지식은 업무 효율을 높이고 전반적인 의료의 질 향상으로 이어질 수 있습니다. 본 강좌를 통해 방광내시경실 업무에 대한 이해와 자부심을 일신할 수 있기를 바랍니다.

참고자료

Education for Men’s Health

Moderator:
Dong Sup Lee (Catholic University),
Min-Gu Park (Inje University)

Management of Late onset hypogonadism
Sun Tae Ahn (Korea University)

Management of erectile dysfunction
Hyun Cheol Jeong (Hallym University)

Management of Male infertility
Dong Soo Kim (Kyung Hee University)
The recent clinical guidelines indicated that clinical diagnosis of testosterone deficiency (TD) is only made when patients have low total testosterone levels combined with symptoms and/or signs. It is well known that the symptoms and signs of TD are nonspecific and modified by age, comorbid illness, severity and duration of TD, variations in androgen sensitivity, and previous T therapy. Unfortunately clinical questionnaires indicating hypo-gonadal symptoms is not recommended anymore for the assessment of TD. If so, when should we consider to begin testosterone replacement treatment (TRT)?

Before we consider TRT, we should make note of any patient reported symptoms, particularly those known as TD associated symptoms and conduct a physical examination to assess patients for signs related to low testosterone. Of course, many men with TD have normal physical examination findings. However, physical examination improved diagnostic yields for differentiating other primary or secondary hypogonadism.

The treatment goal for patients on TRT is symptomatic improvement with minimal side effects. Most guidelines recommend lifestyle modifications, including weight loss and optimizing management of comorbidities, as first-line treatment. When patients who are > 65 years who complaints symptoms or conditions suggestive of testosterone deficiency and consistently and unequivocally low morning testosterone, it is suggested that clinicians offer TRT. Before offering drug treatment, clinician should explicit discussion of the potential risk and benefits on an individualized basis.

Although all guidelines aim for a mid-normal T range with pharmacotherapy, a few subtle differences should be noted, including American Urological Association (AUA), 450–600 ng/dL (15.6 – 20.8 nmol/L); British Society for Sexual Medicine (BSSM), 433–865 ng/dL (15–30nmol/L); Canadian Medical Association Journal (CMAJ) 404–505 ng/dL (14–17.5 nmol/L); and Endocrine Society (ES) 350–600 ng/dL (14.1–24.5 nmol/L). While some patients may continue to experience symptom/sign relief after this time point, the majority of men have meaningful improvements within the first three months of therapy. Most of current guidelines recommend checking therapeutic effect and testosterone level at 3 and 6 months and 12 months and then annually thereafter.

However, improvement in libido generally occurs within 6 weeks of treatment, whereas other benefits usually take up to 12 months. Thus, the effects of TRT are very diverse. Thus, the effects of TRT are very diverse. Thus, the
duration of treatment required for the improvement in subjective symptoms varies according to each symptom. In the event that patients do not experience symptomatic relief after reaching the specified target testosterone levels or remain testosterone deficient in the setting of symptom/sign improvement, there is consensus that TRT should be stopped. In summary, clinicians should monitor men receiving TRT using a standardized plan that includes: evaluating symptoms, adverse effects, and compliance; measuring serum T and hematocrit concentrations; and evaluating prostate cancer risk during the first year after initiating T therapy.

References

Management of erectile dysfunction

Hyun Cheol Jeong
Hallym University

Definition

- Erectile Dysfunction: the persistent inability to attain and maintain an erection sufficient to permit satisfactory sexual performance.
- Penile erection is a complex phenomenon which implies a delicate and co-ordinated equilibrium among the neurological, vascular and the tissue compartments.
- Erectile Dysfunction may affect physical and psychosocial health and may have a significant impact on the quality of life (QOL) of sufferers and their partners.

Causes of ED

Table 1: Commonly and Common Causes of Erectile Dysfunction

<table>
<thead>
<tr>
<th>Cause of ED</th>
<th>Common Causes</th>
<th>Psychopharmacology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological</td>
<td>Depression, anxiety, stress, alcohol abuse, drug use</td>
<td>Low-dose oral agents, intracavernosal injection, vacuum erection device, nerve stimulation, surgical intervention</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Spinal cord injury, diabetic neuropathy, multiple sclerosis</td>
<td>Intracavernosal injection, oral agents, vacuum erection device, nerve stimulation, surgical intervention</td>
</tr>
<tr>
<td>Vascular</td>
<td>Atherosclerosis, diabetes, high blood pressure, high cholesterol</td>
<td>Oral agents, vacuum erection device, nerve stimulation, surgical intervention</td>
</tr>
<tr>
<td>Drug-induced</td>
<td>Medications (e.g., antihypertensives, antidepressants)</td>
<td>Oral agents, vacuum erection device, nerve stimulation, surgical intervention</td>
</tr>
</tbody>
</table>

Diagnostic evaluation

1. Sexual history
   - sexual orientation, previous and current sexual relationships, current emotional status, onset and duration of the erectile problem, and previous consultations and treatments

2. Physical examination
   - physical examination focused on the genitourinary, endocrine, vascular and neurological systems

3. Lab testing
   - Patients may need a fasting blood glucose or HbA1c and lipid profile if they have not recently been assessed. Hormonal tests include an early morning total testosterone.
Diagnostic evaluation

4. Cardiovascular system and sexual activity: the patient at risk

<table>
<thead>
<tr>
<th>Low-risk category</th>
<th>Intermediate-risk category</th>
<th>High-risk category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (over 40)</td>
<td>1-5 risk factors for CVD</td>
<td>High-risk arrhythmia</td>
</tr>
<tr>
<td>Male, stable stage</td>
<td>Male, stable stage</td>
<td>Unstable or refractory angina</td>
</tr>
<tr>
<td>Uncontrolled diabetes</td>
<td>Uncontrolled diabetes</td>
<td>Uncontrolled hypertension</td>
</tr>
<tr>
<td>Prediabetic or coronary artery disease</td>
<td>Prediabetic or coronary artery disease</td>
<td>Hyperlipidemia or hypercholesterolemia</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Hyperlipidemia or hypercholesterolemia</td>
<td>Multifocal disease</td>
</tr>
<tr>
<td>Multifocal disease</td>
<td>Multifocal disease</td>
<td>Moderate-to-severe valvular disease</td>
</tr>
</tbody>
</table>

EAAI guideline 2012 male sexual dysfunction

Indications for specific diagnostic tests

- Primary ED (not caused by organic disease or psychogenic disorder).
- Young patients with a history of pelvic or perineal trauma, who could benefit from potentially curative revascularisation surgery or angioplasty.
- Patients with penile deformities which might require surgical correction (e.g., Peyronie’s disease, congenital penile curvature).
- Patients with complex psychiatric or psychosexual disorders.
- Patients with complex endocrine disorders.
- Medico-legal reasons (e.g., implantation of penile prosthesis to document end stage ED, sexual abuse).

Specific diagnostic tests

- Nocturnal Penile Tumescence and Rigidity (NTPR) using Rigiscan®

Specific diagnostic tests

- Vascular studies
  - Intracavernous vasoactive drug injection
  - Penile Dynamic Duplex Ultrasoundography
  - A peak systolic blood flow > 30 cm/s end-diastolic velocity of < 3 cm/s resistance index > 0.8 are generally considered normal

Specific diagnostic tests

- Penile Dynamic Infusion Cavernosometry and Cavernosography
  - only in patients who are being considered for vascular reconstructive surgery

Specific diagnostic tests

- Internal pudendal arteriography
- Neurological studies (e.g., bulbocavernosus reflex latency, nerve conduction studies)
- Endocrinological studies
- Specialised psychodiagnostic evaluation
  - Whenever clinically indicated, patients with psychiatric disorders should be referred to a psychiatrist who is particularly interested in sexual health
Management of erectile dysfunction
Hyun Cheol Jeong

Current treatments of ED

- 1st line
- 2nd line
- 3rd line

Overall clinical efficacy of the 1st & 2nd line therapy: 70%
Taken before sexual intercourse
Could not restore pathological changes

Overall clinical efficacy of the 3rd line therapy: 95%
Expensive
Complications

1st line treatment of ED

- Choice or preference between the different PDE5Is
- To date, no data are available from double- or triple-blind multicentre studies comparing the efficacy and/or patient preference for sildenafil, tadalafil, vardenafil, and avanafil.
- Choice of drug will depend on the frequency of intercourse (occasion use or regular therapy, three to four times weekly) and the patient’s personal experience.
- Results of another clinical trial revealed that tadalafil 5 mg once daily may improve the erectile function outcomes among men who had a partial response to on-demand PDE5I therapy.

1st line treatment of ED

- Summary of pharmacokinetic data for the PDE5Is in Korea

<table>
<thead>
<tr>
<th>Parameter</th>
<th>T1/2 (h)</th>
<th>Cmax (ng/ml)</th>
<th>AUC (ng-h/ml)</th>
<th>Bioavailability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sildenafil</td>
<td>1.5-3</td>
<td>210-750</td>
<td>3.5-10</td>
<td>41</td>
</tr>
<tr>
<td>Tadalafil</td>
<td>1-3.5</td>
<td>170-260</td>
<td>11-19</td>
<td>62</td>
</tr>
<tr>
<td>Vardenafil</td>
<td>2.5-4</td>
<td>180-360</td>
<td>22-38</td>
<td>54</td>
</tr>
<tr>
<td>Amax</td>
<td>0.5-2</td>
<td>2-8</td>
<td>7-26</td>
<td>35</td>
</tr>
</tbody>
</table>

PDE5 phosphodiesterase type 5, T1/2: time to maximum plasma concentration, Cmax: terminal half-life, AUC: maximum plasma concentration, Bio.: not available.

1st line treatment of ED

- Vacuum erection devices
- Vacuum erection devices (VEDs) provide passive engorgement of the corpora cavernosa, together with a constriction ring placed at the base of the penis to retain blood within the corpora.
- Published data report that efficacy, in terms of erections satisfactory for intercourse, is as high as 90%, regardless of the cause of ED and satisfaction rates range between 27% and 54% [5,106].

3rd line treatment of ED

- penile prosthesis insertion
- The surgical implantation of a penile prosthesis may be considered in patients who do not respond to pharmacotherapy or who prefer a permanent solution to their problem.
- The two currently available classes of penile implants include inflatable (2- and 3-piece) and malleable devices.

2nd line treatment of ED

- Intracavernosal injection
- Alprostadil (Caverject®/VIA, Edex/Viaflex®) was the first and only drug approved for intracavernosal treatment of ED.
- The erection appears after five to fifteen minutes and lasts a few minutes to the dose injected. An office-training programme is required for the patient to learn the correct injection process.
- Efficacy rates for intracavernosal alprostadil of > 70% have been found in general ED populations, as well as in patients in subgroups (e.g. diabetes or CVD).
- Complications
  - include penile pain (96% of patients reported pain only after 11% of total injections), prolonged erections (5%), priapism (1%), and fibrosis (2%).

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3rd line treatment of ED: penile prosthesis insertion

- Most patients prefer the 3-piece inflatable devices due to the more "natural" erections obtained. Likewise, 3-piece inflatable devices provide the best rigidity and the best flaccidity because they will fill every part of the corporal bodies.

- However, the 2-piece inflatable prosthesis can be a viable option among patients who are deemed at high-risk of complications with reservoir placements.

- Malleable prostheses result in a firm penis, which may be manually placed in an erect or flaccid state.
3rd line treatment of ED: penile prosthesis insertion

- Complications
  - The two main complications of penile prosthesis implantation are mechanical failure and infection.
  - Several technical modifications of the most commonly used 3-piece prosthesis (AMS, 700CX, Coloplast Alpha) resulted in mechanical failure rates of < 5% after five years of follow-up.
  - Careful surgical techniques with proper antibiotic prophylaxis against Gram-positive and Gram-negative bacteria reduces infection rates to 2-3% with primary implantation in low-risk patients and in high volume centres.
  - Infection requires removal of the prosthesis and antibiotic administration.
  - The majority of revisions are secondary to mechanical failure and combined erosion or infection. 93% of cases are successfully revisited, providing additional penile prosthesis.

New treatment?

ESWT? : Clinical applications

- Urinary Stones
- Orthopedics
- Cardiology
- Wound Healing
- Plastic Surgery
- Neurology

Shockwave therapy application

DM induced rat model

Animal data in Seoul St. Mary’s hospital

- 300 shocks per site
- 0.1 mJ/mm²
- Frequency of 120/minute
- 3 times a week for 2 weeks
- Total 3,600 shocks / rat
**ICP measurement**
Animal data in Seoul St. Mary's hospital

**Results of Immunohistochemistry, Western blot analysis**
Animal data in Seoul St. Mary's hospital

**ED1000 Double Blind Study**

**ED1000 Double Blind Placebo Controlled**

**ED1000 - How Long Do the Effect Lasts?**

**Stem cell injection**

> Many preclinical studies have done

Plos One. 2015; 10(4):e012428
Management of erectile dysfunction
Hyun Cheol Jeong

Clinical result

- Treatment of diabetic impotence with umbilical cord blood stem cell intracavernosal transplant: preliminary report of 7 cases

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Preoperative</th>
<th>3 Months Postoperative</th>
<th>6 Months Postoperative</th>
<th>12 Months Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure</td>
<td>x1</td>
<td>x2</td>
<td>x3</td>
<td>x4</td>
</tr>
<tr>
<td>Procedure</td>
<td>y1</td>
<td>y2</td>
<td>y3</td>
<td>y4</td>
</tr>
</tbody>
</table>

Conclusion

- Diagnosis
  - Personal history and exact physical exam is important
  - Specific diagnostic tests should be considered in some cases

- Current treatment
  - Prosthesis implantation has one of the highest satisfaction rates (92-1609) among the treatment options for ED based on appropriate consultation
  - But it's invasive, expensive, and irreversible.

- Future Treatment
  - ESWT
  - Stem cell
  - ESWT + stem cell
  - But additional studies are needed

Thank You For Your Attention ~ *
WHO defines infertility as the inability to conceive after at least 12 months of regular, unprotected sexual intercourse. Among the many diverse reasons for infertility, the male factor can contribute up to 50% of the cases. Congenital, acquired, and idiopathic factors have been shown to cause impairment in spermatogenesis and a thorough evaluation of the patient to identify correctable conditions and reverse problematic lifestyles is essential. Medical history, physical examination, semen analysis, imaging studies, hormones studies should be carefully analyzed and novel studies including genetic testing, advanced sperm function testing with identification of sperm DNA fragmentation, reactive oxygen species provide a more comprehensive assessment of overall fertility status. Empirical treatment, surgical treatment to correct varicoceles and obstructive azoospermia, and assisted reproduction techniques can now help many couples with infertility to succeed in having biological children. Today we will review the current assessment and management methods of male infertility.
2022 ANNUAL MEETING OF
THE KOREAN UROLOGICAL ASSOCIATION

2022 KUA Urologic Nurse Forum

인쇄일	2022년 9월 30일
발행일	2022년 10월 7일
발행인	이상돈

발행처	대한비뇨의학회
서울특별시 용산구 서빙고로 67 103동 1102호
(용산동5가, 용산파크타워오피스텔)
Tel: 02-573-8190, Fax: 02-573-8192
E-mail: urology@urology.or.kr
Homepage: www.urology.or.kr

편집제작	(주)더 위드인
서울시 영등포구 양산로 43 (양평동3가 16)
양평동우림이비지센타2차 1005호
Tel: 02-6959-5333, Fax: 070-8677-6333
E-mail: with@thewithin.co.kr