

## Module no. 7 Genitourinary tract

### Learning objectives:

By the end of the chapter, non-specialist medical officers should be able to:

- Diagnose, treat and prevent urinary tract infections
- Diagnose urinary incontinence, treat adequately and prevent complications with proper referral of Urinary Incontinence
- Diagnose acute kidney injury as early as possible, identify the etiology, plan treatment including renal replacement if required
- Diagnose chronic kidney disease, identify the etiology, manage and timely referral
- Identify the clinical features of benign prostatic hypertrophy, effective manage and timely referral BPH
- [common cardiovascular diseases in the elderly; and](#)
- [Develop care plans for common age related cardiovascular diseases.](#)

### URINARY TRACT INFECTIONS

#### 1. Concept & Definition

Urinary tract infection (UTI) is an inflammatory response of the urothelium to bacterial invasion usually associated with bacteriuria and pyuria. It is a common infection in the elderly. The complications include acute and chronic kidney infections, kidney failure due to permanent damage of the kidneys and sepsis.

Recurrent urinary tract infections are defined as three (3) or more attacks of UTI in a 12-month period. It can be due to bacterial re-infection or persistence of infection.

#### 2. Magnitude and epidemiology

Epidemiology: The incidence and prevalence of UTI increases with age, the prevalence of ASB (Asymptomatic Bacteriuria) is ~5% among women between ages 20 and 40 and may be as high as 40–50% among elderly women and men.

#### 3. Risk factors effecting the condition

Modifiable Risk factors	Non-Modifiable Risk factors
Diabetes	Old age
Urinary retention	Female
Fungal infection	Immobility
Use of a urinary catheter	
Bowel incontinence	
Enlarged prostate	
Surgery of any area around the bladder	
Kidney stones	

#### 4. Diagnosis

Clinical features:

The typical signs and symptoms of a UTI include:

Upper urinary tract	Lower urinary tract
<ul style="list-style-type: none"> <li>• Fever</li> <li>• Night sweats or chills</li> <li>• Cloudy urine</li> <li>• Blood in urine</li> <li>• Strong or foul-smelling urine odor</li> <li>• Frequent or urgent need to urinate</li> <li>• Pain or burning with urination</li> </ul>	<ul style="list-style-type: none"> <li>• Strangury – intense desire to pass urine after micturition.</li> <li>• Pressure in the lower pelvis</li> <li>• Loin to groin pain</li> </ul>

Note: Elderly people with serious urinary tract infection **may not exhibit the hallmark sign of fever** because their immune system is unable to mount a response to infection due to the effects of aging.

### Laboratory Diagnosis:

#### Primary care centre

1. Urine examination is routinely done to see for pus cells, RBC's, albumin, glucose. (Note: to collect early morning mid-stream urine sample)
2. Blood glucose

#### Secondary/Tertiary care centre

1. Urine culture
2. Other Investigations: include Ultrasound and CT scan in selected patients.

### 5. Differential Diagnosis, Treatment and Management

Diagnosis	Treatment
Acute cystitis	Cephalexin, nitrofurantoin
Pyelonephritis	Ampicillin, ciprofloxacin
Prostatitis	Ampicillin, ciprofloxacin
Urethritis	Azithromycin or Doxycycline
Catheter associated UTI (CAUTI)	Avoid insertion of unnecessary catheters
Candiduria	Fluconazole
Asymptomatic bacteruria	No treatment required in elderly

#### Indications for Referral

- Fever persisting for more than 24 hours
- Fall in blood pressure
- Complicated or recurrent UTI
- Persistent Hematuria and Pneumaturia
- Voiding dysfunction
- When surgical treatment is required
- Patient developing sepsis

### 6. Communications about myths with clarifications

**You can get a UTI from holding your bladder too long, or too often?**

True. One of the best ways to prevent UTIs is urinating. Bacteria reach the bladder by traveling up the urethra. If you don't regularly flush out the bacteria it can multiply in the bladder causing an infection.

**Emptying your bladder immediately after intercourse can help prevent UTIs?**

True. That's very important. You should always empty your bladder immediately after intercourse to help flush out any bacteria that may have entered the urethra. This is especially important if you suffer from frequent UTIs.

**Men don't get UTIs?**

Untrue. It's rare, but it's still possible. In most cases of UTIs in men, there is some other issue, such as the inability to empty the bladder due to an enlarged prostate, or the person has kidney stones. Women are more prone to UTIs because they have a shorter urethra which allows bacteria to travel to the bladder more quickly.

**7. Follow up and expected progress including referral**

Follow-up care — If symptoms resolve in healthy individuals then no need of follow up. Pregnant women are usually asked to have a repeat urine culture one to two weeks after treatment has ended to make sure the bacteria are no longer in the urine.

**8. References**

- 1) Harrisons Principle of Internal Medicine 18<sup>th</sup> edition
- 2) Davidsons Principles and Practice of Medicine 20<sup>th</sup> edition
- 3)CMDT 54<sup>th</sup> edition

**URINARY INCONTINENCE**

**1. Concept & Definition**

Urinary incontinence is defined as any involuntary urinary leakage. The prevalence of urinary incontinence (UI) increases with age

**2. Magnitude and epidemiology**

It affects 15% of women and 10% of men aged above 65 years. The primary impact of UI is on quality of life.

**3. Risk factors effecting the condition**

<b>Transient incontinence-Risk factors (DIAPPERS)</b>	<b>Chronic incontinence-Risk factors</b>
Delirium	Urge (Compelling, sudden urgency to void urine)
Infection (UTI)	Stress (Increase intra abdominal pressure)
Atrophic vaginitis	Overflow (Incomplete micturition, high volume of residual urine in bladder)

Polyuria	Functional (cognitive decline/ mobility restriction interfere with toileting skills)
Pharmaceutical (drug induced)	Mixed incontinence (Any of the above)
Endocrine (Diabetes)	
Restricted mobility	
Stool Impaction	

#### 4. Diagnosis

History and clinical examination

History	Clinical examination
<ul style="list-style-type: none"> <li>Onset of Urinary Incontinence</li> <li>Frequency</li> <li>Volume</li> <li>Timing</li> <li>Associated factors or events.</li> <li>voiding habits (voiding/incontinence diary) Assessment of mobility and mental status</li> <li>Living conditions and social environment.</li> <li>Elderly female –ask for uterine prolapse.</li> </ul>	<ul style="list-style-type: none"> <li>Abdominal Examination: Look for mass, distended bladder</li> <li>PR Examination: Prostate size &amp; consistency, Anal sphincter tone, Faecal impaction</li> <li>PV Examination (Female): Look for incontinence while coughing, Pelvic mass and laxity of pelvic floor, prolapse of Uterus</li> <li>Neurological examination: For higher functions.</li> <li>CVS: Look for signs of Heart failure</li> <li>RS: Look for signs of chronic cough</li> </ul>

#### Laboratory Diagnosis:

##### Primary care centers

- Urine examination is routinely done to see for pus cells, RBC's, albumin, casts, glucose.(Note: to collect early morning mid-stream urine sample)
- Blood test: Glucose

##### Secondary care centres/ Tertiary centres

- Urine cultures, Renal function tests
- Pelvic ultrasound: Focus on Kidney, Ureters Bladder, Prostate and genitalia and postvoid residual urine volume
- Other tests: Urodynamic testing, cystogram, cystoscopy

#### 5. Differential Diagnosis and Treatment

##### 6. Management

###### a) Non-pharmacological management

1. **Behavioral therapy:** Patient education on Bladder training, scheduled bathroom trips, limitation of fluid intake in daytime, avoiding strenuous exercise,

limiting coffee, tea, carbonated drinks and practicing relaxation techniques, Pelvic floor muscle strengthening exercises.



## 2. Medications:

**Antibiotics** : UTI is a common cause of incontinence. Treat with antibiotics.

**Anticholinergic Drugs**-Treatment of urge UI and overactive bladder is Oxybutynin

Other Agents: Dicyclomine, Imipramine

Estrogen vaginal cream, ring, or patch is used in post-menopausal women

## 3. Medical devices

### **Pessary**

This is an intra-vaginal device that supports the bladder, and useful in stress incontinence.

## 4. Surgery

Recommended when all other measures fail

## 5. Criteria for referral to the higher center

### **Indications for Referral**

- Any incontinence apart from stress and functional needs to be evaluated at secondary hospital before starting medication
- Mismatch between symptoms and test results
- When complex testing is required like video urodynamic studies
- Voiding dysfunction
- When surgical treatment is required.

## 6. Communications about myths with clarifications

### **Drinking less liquid will cure Urinary Incontinence.**

Untrue. Limiting your liquid intake can lead to more concentrated urine, which can irritate your bladder and heighten your Urinary Incontinence and also chances of UTI.

### **Sounds or thoughts can trigger trouble**

True. It's not only coughing, laughing, or jumping up and down that can cause people to leak urine; about 3 out of 10 people with incontinence have urge incontinence, which is different from stress incontinence.

**Only older people get it**

Untrue. Although incontinence risk goes up as you age, anyone can experience symptoms at any time.

**7. Follow up and expected progress including referral**

Behavioral therapy (bladder training and pelvic muscle exercises) is effective in reducing urge and stress UI. Therefore, regular follow up is needed.

**8. References**

- 1) Harrison's Principle of Internal Medicine 18<sup>th</sup> edition
- 2) Davidsons Principles and Practice of Medicine 20<sup>th</sup> edition
- 3) CMDT 54<sup>th</sup> edition

## **ACUTE KIDNEY INJURY**

**1. Concept & Definition**

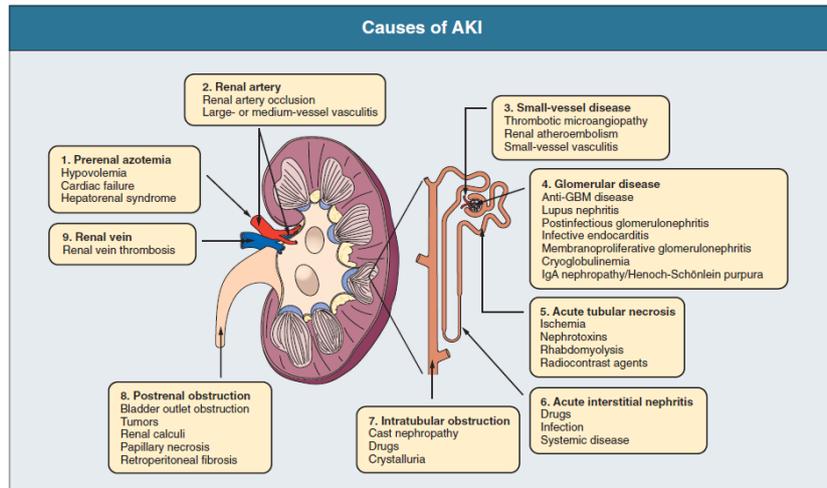
Acute kidney injury (AKI), also referred to as acute renal failure, describes the situation where there is a sudden and often reversible loss of renal function, which develops over days or weeks and is usually accompanied by a reduction in urine volume and increase in nitrogenous waste products and is usually measured by Blood urea and Serum Creatinine and associated dysregulation of fluid, electrolyte and acid base homeostasis.

**2. Magnitude and epidemiology**

The incidence of acute kidney injury (AKI) is high in the elderly, who comprise an ever-growing segment of the population. AKI is common (8-16% of hospital admissions), serious (fourfold increased hospital mortality), and many aspects of its natural history remain uncertain. AKI in the elderly is associated with an increased risk of mortality, morbidity, prolonged length of stay, and progression to chronic kidney disease.

**3. Risk factors effecting the condition**

**Causes of AKI :** Prerenal, renal, postrenal



Modifiable Risk factors	Non-Modifiable Risk factors
<ul style="list-style-type: none"> <li>• Being hospitalized, especially for a serious condition that requires intensive care</li> <li>• Blockages in the blood vessels in your arms or legs (peripheral artery disease)</li> <li>• Diabetes</li> <li>• High blood pressure</li> <li>• Heart failure</li> <li>• Liver diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Old age</li> <li>• Family history</li> </ul>

#### 4. Diagnosis

##### Clinical features:

Early recognition and intervention is important in AKI to salvage the patient.

History	Clinical examination
<ul style="list-style-type: none"> <li>• Type and duration of symptoms</li> <li>• Estimation of volume of urine</li> <li>• History of UTI, Renal stone</li> <li>• History of NSAIDs, antihypertensives(ACEI, ARB)</li> <li>• Aminoglycosides use</li> <li>• Radio contrast dye use</li> </ul>	<ul style="list-style-type: none"> <li>• Signs of sepsis</li> <li>• Volume status- dehydration, oedema</li> <li>• Signs of CCF</li> <li>• Signs of hepatic failure</li> <li>• Skin and pulmonary manifestation of primary systemic disease</li> <li>• Mass in the flank or a distended bladder</li> </ul>

#### Laboratory Diagnosis:

##### Primary care centre

- 1 Urine examination is routinely done to see for pus cells, RBC's, albumin, casts, glucose.(Note: to collect early morning mid-stream urine sample)
- 2 Blood glucose level

## Secondary/Tertiary care centre

- 1 Urine culture
- 2 Renal function tests, Blood Urea, Serum Creatinine, Electrolytes, Albumin, complete blood count, sputum (infections).
- 3 Other Investigations: include Ultrasound and CT scan in selected patients.

## 5. Differential Diagnosis

- Blood clots in the veins and arteries in and around the kidneys
- Cholesterol deposits that block blood flow in the kidneys
- Glomerulonephritis, inflammation of the tiny filters in the kidneys (glomeruli)
- Hemolytic uremic syndrome, a condition that results from premature destruction of red blood cells
- Infections
- Lupus, an immune system disorder causing glomerulonephritis
- Medications, such as certain chemotherapy drugs, antibiotics, dyes used during imaging tests

## 6. Management

### General Measures

- Regardless of the nature of an insult, haemodynamic stabilization with optimization of the cardiac output and blood pressure is the key in prevention of AKI. This maintains the renal perfusion and avoids further insult.
- Maintain fluid and Electrolyte balance
- Avoid nephrotoxic agents (e.g., ACE inhibitors, ARBs, NSAIDs, aminoglycosides)
- Identify and treat the underlying cause  
Initiation of renal replacement therapy when indicated.

### Indications for referral:

- Since AKI is treatable condition in most of the cases, early identification, appropriate investigations and treatment with fluid correction and antibiotics may be done. If no adequate response they have to be referred to higher centres.
- Requiring renal replacement therapy

## 7. Communications about myths with clarifications

### All types of acute kidney diseases are irreversible

Untrue. Acute kidney injury is potentially reversible if detected early & treated adequately.

### Once dialysis in kidney disease starts then it is life long

Untrue. No. In acute kidney injury patient's dialysis can be stopped after recovery of renal functions either partially or completely.

## 8. Follow up and expected progress including referral

In spite of complete cure for the acute kidney injury there needs to be periodical nephrologist visit once in a year. Any symptoms of complication/acute kidney injury even after treatment completion should be referred immediately.

## 9. References

- 1) Harrison's Principle of Internal Medicine 18<sup>th</sup> edition
- 2) Davidson's Principles and Practice of Medicine 20<sup>th</sup> edition
- 3) CDMT 54<sup>th</sup> edition

## CHRONIC KIDNEY DISEASE

### 1. Concept & Definition

Chronic kidney disease (CKD), previously termed chronic renal failure, refers to an irreversible deterioration in renal function that usually develops over a period of years. Initially, it manifests only as a biochemical abnormality but, eventually, loss of the excretory, metabolic and endocrine functions of the kidney leads to the clinical symptoms and signs of renal failure, collectively referred to as uraemia. Diabetic Nephropathy, Glomerulonephritis and Hypertension associated CKD are common causes of CKD

### 2. Magnitude and epidemiology

Prevalence of CKD is increasing along with increase in life expectancy and prevalence of life style diseases. In India, 6.3% prevalence of CKD stage 3 has been reported. Also, diabetes and hypertension today account for 40–60% cases of CKD.

### 3. Risk factors effecting the condition

Modifiable Risk factors	Non-Modifiable Risk factors
Diabetes	Old age
Hypertension	Family history
Obesity	
Smoking	
Heart problems	
History of acute injury	

### 4. Diagnosis

#### Clinical features:

CKD is initially without specific symptoms and is generally only detected as an increase in serum creatinine or protein in the urine, incidentally.

Upper urinary tract	Lower urinary tract
<p>As the kidney function decreases, the patient presents with</p> <ul style="list-style-type: none"> <li>• Oliguria</li> <li>• Volume overload</li> <li>• Hypertension</li> <li>• Anaemia</li> <li>• Electrolyte disturbances</li> </ul>	<ul style="list-style-type: none"> <li>• Strangury – intense desire to pass urine after micturition.</li> <li>• Pressure in the lower pelvis</li> <li>• Loin to groin pain</li> </ul>

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Edema</li></ul> |  |
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## Laboratory investigations

### Primary care centre

Urine examination is routinely done to see for pus cells, RBC's, albumin, casts, glucose.(Note: to collect early morning mid-stream urine sample)

### Secondary care centre/Tertiary care centres

Blood Urea, Serum Creatinine, Serum Albumin, Ultrasound, RFT, Serum Electrolytes and CT scan in selected cases.

## 5. Differential Diagnosis and Treatment

- Diabetic nephropathy
- Hypertensive nephrosclerosis
- Ischemic nephropathy
- Obstructive uropathy
- Nephrotic syndrome
- Glomerulonephritis

## 6. Management

### Prevention

- Strict control of DM and hypertension
- Avoidance of injudicious use of NSAIDS
- Optimal fluid management

### Conservative therapy for CKD:

- Diet modification: reduction of protein (0.6 gm/kg body weight), reduction of salt and fluid intake
- Diuretics
- Calcium supplements with calcitriol
- Correction of Anemia

### Indications for Referral:

- Proteinuria with hematuria
- Refractory hypertension
- Fluid overload not responding to diuretics
- Shortness of breath with acidotic breathing
- Recurrent hypoglycemias
- Moderately anemic
- Suspected renal artery stenosis
- Patient requiring renal replacement therapy

## 7. Communications about myths with clarifications

**If you are at risk for kidney disease, there is nothing you can do about it.**

Untrue. Not everyone who is at risk will get kidney disease. You can help protect your kidneys. Eat healthy, get regular exercise, control blood pressure and blood sugar, keep a healthy weight, quit smoking, and don't overuse pain medications like ibuprofen.

### **The only treatment for kidney disease is dialysis**

Not everyone with kidney disease needs dialysis. Dialysis or a kidney transplant is only needed if your kidney disease gets worse and progresses to kidney failure.

### **8. Follow up and expected progress including referral**

Even though chronic kidney disease has no cure. Treatment usually consists of measures to help control signs and symptoms, reduce complications, and slow progression of the disease. Refer to the higher centre if you cannot manage the symptoms.

### **9. References**

- 1) Harrison's Principle of Internal Medicine 18<sup>th</sup> edition
- 2) Davidson's Principles and Practice of Medicine 20<sup>th</sup> edition
- 3) CMTD 54<sup>th</sup> edition

## **BENIGN PROSTATIC HYPERTROPHY**

### **1. Concept & Definition**

Benign prostatic hypertrophy (BPH) is benign (non-cancerous) enlargement of prostate which occurs after 50 years, usually between 60 and 70 years. The enlarged prostate impinges on the urethra and increase resistance to flow of urine from the bladder and cause the urinary symptoms.

### **2. Magnitude and epidemiology**

BPH is a common and progressive disease of aging men and the prevalence of BPH increases with age. Around 50% of men above 65 years of age (more than 80% among men 70-79 years of age) suffer some symptoms of BPH. Over the coming years, however, an increasing number of patients may report prostatic problems as the world's population is aging.

### **3. Objectives of the Modules**

After reading this section we should be able to:-

- i) Identify the clinical features of BPH
- ii) Early diagnosis and management of BPH
- iii) Rule out prostatic cancer

### **4. Risk factors effecting the condition**

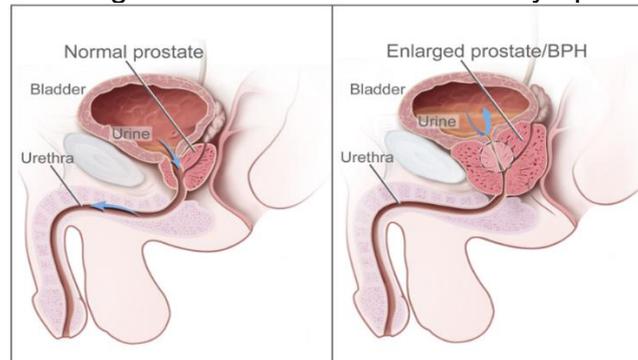
<b>Modifiable Risk factors</b>	<b>Non-Modifiable Risk factors</b>
Diabetes	Old age
Diet	Male
Obesity	Family history
Hypertension	

Smoking	
Enlarged prostate	

## 5. Diagnosis

### CLINICAL FEATURES:

It usually involves median and lateral lobes or one of them. It involves adenomatous zone of the prostate. Median lobe enlarges into the bladder and lateral zone narrows the urethra causing obstruction and hence the symptoms.



<b>Obstructive symptoms-</b>	<b>Irritative symptoms-</b>	<b>Other symptoms</b>
i)Weakness of urinary stream ii)Hesitancy (delay in starting urination) iii)Terminal dribbling iv)Intermittency (interruption of the urinary stream) v)Sensation of incomplete bladder emptying vi)Straining to urinate	i)Urinary urgency (intense desire to pass urine) ii)Frequency (passage of urine many times in day or night)iii)Nocturia iv)Incontinence (leakage of urine involuntarily at times)	i)Hematuria ii)Urinary tract infection iii)Urinary retention iv)Bladder calculi v)Kidney failure in severe obstruction

### Laboratory and clinical examination

Primary care centre

1. Digital rectal examination (if trained), Urinalysis

Secondary care centre/Tertiary care centres

2. Digital rectal examination, Prostate-specific antigen (PSA) test , Ultrasonography and renal function test (RFT), uroflowmetry, cystoscopy.

### Management

#### A) Non medical therapy

Voiding position – Voiding in the sitting position decreases voiding time, post voidal residual volume and increases voiding pressure.

#### B) Medical treatment

Alpha-blockers- prazosin (short acting), terazocin (long acting), selective alpha (Tamsulosin),

5-alpha Reductase Inhibitor: Finasteride.

#### C) Surgical management

- Transurethral resection of the prostate (**TURP**), wherever indicated in higher centers.

## **Indications for Referral**

- 1 Acute retention of urine
- 2 Hematuria

## **6. Communications about myths with clarifications**

### **BPH can lower the chances of developing prostate cancer.**

Untrue. BPH plays no role in the likelihood of prostate cancer development. The two conditions are completely unrelated. Treatment of BPH does not lower the risk of developing prostate cancer.

### **The bigger the prostate, the worse the symptoms**

Untrue. The size of the prostate does not affect the severity of symptoms. Men with a slight enlargement can experience extreme symptoms, while others can experience minor symptoms with a prostate that's incredibly enlarged.

### **Too much or too little sex causes BPH**

Untrue. There is no evidence to support the notion that any amount of sex affects the chances of developing BPH.

## **7. Follow up and expected progress including referral**

Follow up of the patient if on catheter and prevent catheter related urinary tract infection.

## **8. References**

- 1) Harrison's Principle of Internal Medicine 18<sup>th</sup> edition
- 2) Davidson's Principles and Practice of Medicine 20<sup>th</sup> edition
- 3) CMTD 54<sup>th</sup> edition