Assessment of Urinary System

Objectives

- Obtain complete urinary system health history.
- Perform urinary system assessment.
- Define the terms related to urinary system problems.
- Mention the diagnostic studies used for urinary system assessment.

Assessment of the Urinary System

(A) Health history

Present Health History.

- Ask the patient about any of the following symptoms; Painful urination, changes in color of urine (blood, cloudy), change in characteristics of urination (diminished, excessive), problems with frequent nighttime urination (nocturia), urgency, incontinence, and/or urinary retention.

- **Anuria** means no urination or urine output <100 ml in 24-hr. It occurs in acute kidney injury, end-stage kidney disease and bilateral ureteral obstruction.

- **Dysuria** means painful or difficult urination. It is a sign of urinary tract infection and cystitis.

- **Enuresis** means involuntary nocturnal urination. It is a symptom of lower urinary tract disorder.

- **Frequency** means increased incidence of urination.

It is a sign of acutely inflamed bladder, excess fluid intake, and intake of bladder irritants.

- **Urgency** is a sudden, compelling urge to urinate. It may occur with irritation and/or inflammation of the bladder wall and in cystitis.

- **Hematuria** means blood in the urine. It is a sign of cancer of genitourinary tract, blood incompatibility, urinary tract infection, stones in kidney or ureter and occurs with medications (anticoagulants) intake.

- **Hesitancy** means delay or difficulty in initiating urination. It occurs with partial urethral obstruction and benign prostatic hyperplasia.

- **Incontinence** means inability to voluntarily control discharge of urine.

It is a sign of neurogenic bladder, bladder infection, and injury to external sphincter.

 Nocturia means frequency of urination at night.

It is a sign of heart failure, diabetes mellitus, finding after renal transplant, excessive evening and nighttime fluid intake.

 Oliguria means diminished amount of urine in a given time (24-hr urine output of 100-400 ml).

It is a sign of severe dehydration, shock, transfusion reaction, and end-stage kidney disease.

 Suprapubic pain (related to bladder), **urethral pain** (irritation of bladder neck), **flank pain,** are signs of urinary tract infection, urinary retention, foreign body in urinary tract, urethritis, pyelonephritis, renal colic or stones.

 Polyuria is voiding a large volume of urine in a given time.

It is a sign of diabetes mellitus, diabetes insipidus, chronic kidney disease, diuretics, and excess fluid intake.

 Retention is the inability to urinate even though bladder contains excessive amount of urine.

It may occurs after pelvic surgery, childbirth, catheter removal and anesthesia; urethral stricture or obstruction and neurogenic bladder.

 Stress incontinence is an involuntary urination with increased pressure (sneezing or coughing).

It is a sign of weakness of sphincter control, lack of estrogen and urinary retention.

 Past Health History.

- Ask the patient about history of diseases that are related to renal or other urologic problems e.g. hypertension, diabetes mellitus, gout and congenital disorders, neurologic conditions (e.g., stroke, back injury) or trauma.

- Note specific urinary problems such as cancer, infections, benign prostatic hyperplasia, and calculi.

 Medications.

- Ask about medications intake including over-the counter drugs, prescription medications, and herbs, as, many drugs are known to be nephrotoxic and certain drugs may alter the quantity and character of urine output (e.g., diuretics).

- Ask about drugs that change the color of urine e.g. Macrodantin

- Ask about intake of anticoagulants that may cause hematuria.

- Ask about medications that may affect the ability of the bladder or sphincter to contract or relax normally e.g. antidepressants, calcium channel blockers, antihistamines, and drugs used for neurologic and musculoskeletal disorders.

Surgery or Other Treatments.

- Ask the patient about previous hospitalizations related to renal or previous urologic diseases.

- Inquire about the duration, severity of any problem and its treatment.

- Document past surgeries, particularly pelvic surgeries, or urinary tract instrumentation (e.g., catheterization).

- Ask the patient about any radiation or chemotherapy treatment.

Occupational and social history

- Take an occupational history because exposure to certain chemicals may be nephrotoxic. Textile workers, painters, hairdressers, and industrial workers have a high incidence of bladder tumors.

- Get a smoking history as cigarette smoking is a major risk factor for bladder cancer.

Nutritional Pattern Assessment

- Ask about the quantity and types of fluid a patient drinks.

 Dehydration may contribute to urinary tract infection, calculi formation, and kidney failure.

 Large intake of particular foods, such as dairy products or foods high in proteins, may also lead to calculi formation.

 Caffeine, alcohol, carbonated beverages, some artificial sweeteners, or spicy foods often aggravate urinary inflammatory diseases.

 Green tea and some herbal teas also cause diuresis.

Elimination pattern assessment

- Investigate bowel function. Problems with fecal incontinence may signal neurologic causes for bladder problems because of shared nerve pathways.

- Ask about presence of constipation and fecal impaction, as they can partially obstruct the urethra, causing inadequate bladder emptying, and infection.

Family History

- Identify any history in the family of urinary disease, stones, kidney disease (acute kidney failure AKF and chronic kidney failure CKF , and cancer of the kidney and urethra and prostate and bladder.

(B) Physical Examination

Inspection

- Assess for changes in the following:

Skin: Pallor, changes in turgor, bruises and/or texture.

Mouth: Stomatitis, ammonia breath odor.

Face and extremities: Generalized edema or peripheral edema.

Abdomen: Striae, abdominal contour.

Midline mass in lower abdomen may indicate urinary retention.

Unilateral mass is indicating enlargement of one or both kidneys from large tumor or polycystic kidney.

Weight: Weight gain secondary to edema; weight loss and muscle wasting in kidney failure

General state of health: Fatigue, lethargy, and diminished alertness.

Palpation

- To palpate the right kidney; place your left hand behind and support the patient‘s right side between the rib cage and the iliac crest. Elevate the right flank with the left hand.

- Use your right hand to palpate deeply for the right kidney. The lower pole of the right kidney may be felt as a smooth, rounded

mass that descends on inspiration. If the kidney is palpable, note its size, and tenderness.

Kidney enlargement is suggestive of neoplasm or other serious renal pathologic conditions.

- The urinary bladder is normally not palpable unless it is distended with urine. If the bladder is full, it may be felt as a smooth, round, firm organ and is sensitive to palpation.

Percussion

- Tenderness in the flank area may be detected by fist percussion.

Normally a firm blow in the flank area should not elicit pain.

If tenderness and pain are present, it may indicate a kidney infection or polycystic kidney disease.

- A bladder is not normally percussible until it contains 150 ml of urine.

If the bladder is full, dullness is heard above the symphysis pubis and may be percussed as high as the umbilicus.

Auscultation:

The bell of the stethoscope may be used to auscultate the abdominal aorta and renal arteries for a bruit, which indicates impaired blood flow to the kidneys.

- Use the diaphragm of the stethoscope to auscultate the bowels, since they may also affect the urinary system.

Diagnostic Studies Of Urinary System

 Urinalysis: Measures specific components, such as electrolytes, glucose, protein, ketons, creatinine, minerals and specific gravity.

Normal specific gravity: 1.003-1.030.

- Try to obtain first urinated morning specimen.

- Ensure specimen is examined within 1 hr of urinating.

 Creatinine clearance: Needs collecting 24-hr urine specimen. Discard first urination when test is started. Save urine from all subsequent urinations for 24 hr. Instruct patient to urinate at end of 24 hr and add specimen to collection.

 Urine culture: It confirms suspected urinary tract infection and identifies causative organisms. Use sterile container for collection of urine. Touch only outside of container. Cleanse urethra before voiding.

Blood test:

 Blood urea nitrogen (BUN): Normal value: 6-20 mg/dl.

- When interpreting BUN, be aware that non-renal factors may cause increase (e.g., rapid cell destruction from infections, fever, GI bleeding, trauma, athletic activity and excessive muscle breakdown, corticosteroid therapy).

 Creatinine: Normal value: 0.6-1.3 mg/dl.

 BUN/creatinine ratio:

 An increased ratio may be due to conditions that decrease blood flow to kidneys (e.g., heart failure, dehydration), GI bleeding, or increased dietary protein.

 A decreased ratio may occur with liver disease (due to decreased urea formation) and malnutrition.

Normal value: 12:1 to 20:1.

 Potassium: Normal value: 3.5-5.0 mEq/L.

 Calcium (total) Normal value: 8.6-10.2 mg/dl.

 Kidneys, ureters, bladder (KUB): X-ray examination of abdomen and pelvis delineates size, shape, and position of kidneys. Radiopaque stones and foreign bodies can be seen.

- **Intravenous pyelogram (IVP):** Visualizes urinary tract after IV injection of contrast media to evaluate presence, position, size, and shape of kidneys, ureters, and bladder. Cysts, tumors, lesions, and obstructions cause a distortion in normal appearance of these structures.

- **Renal arteriogram** (angiogram)visualizes renal blood vessels. Can assist in diagnosing renal artery stenosis.

- **Renal ultrasound**

- **Computed tomography (CT) scan:** Provides excellent visualization of kidneys' size, tumors, abscesses, suprarenal masses (e.g., adrenal tumors, pheochromocytomas), and obstructions can be detected.

- **Magnetic resonance imaging (MRI)**

- **Magnetic resonance angiography**

- **Cystoscopy:** Inspects interior of bladder with a tubular lighted scope.

- **Renal Scan:** Evaluates anatomic structures, perfusion, and function of kidneys. Radioactive isotopes are injected IV.

- **Renal Biopsy** Obtains renal tissue for examination to determine type of kidney disease or to follow progress of kidney disease.