The Child With Genitourinary Dysfunction

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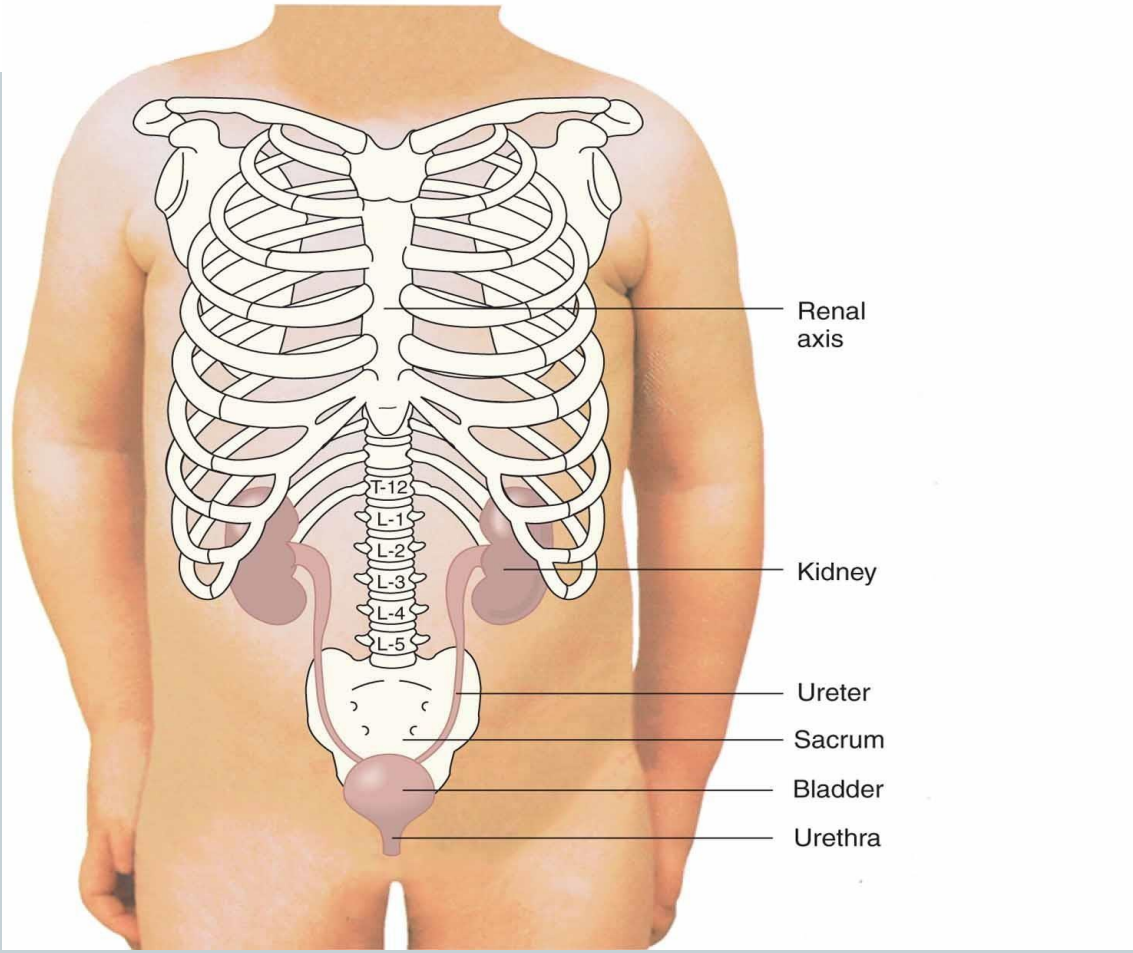
Objectives:

- Explain anatomy and physiology of renal system
- Identify develop status of renal system for child
- Explain common renal disorders
- Clarify clinical manifestation for each genitourinary disorder
- Formulate nursing plan of care for the child with a genitourinary disorder

Review: Anatomy Urinary System

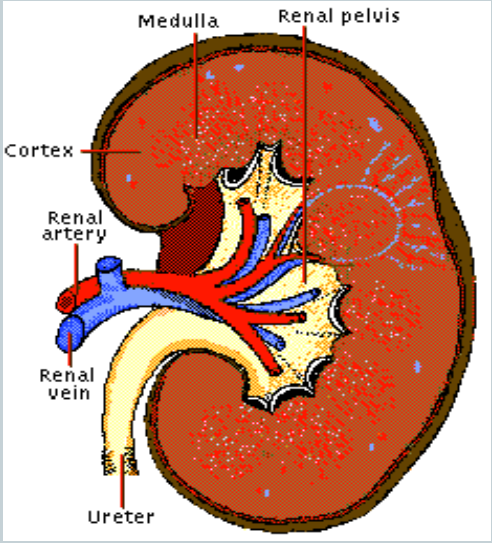


Comprised of:

- Kidneys
- Ureters
- Bladder
- Urethra

Review: Function of the Kidney

- Regulates total body water
- Regulates blood pressure
- Regulates acid-base status
- Regulates electrolytes, calcium and phosphorus
- Converts Vitamin D to the active hormone (calcitriol)
- Produces Erythropoietin (EPO)
- Removes nitrogenous wastes
- Drug metabolism and removal



Urinary Output

- Urinary output per kilogram of body weight decreases as child ages because the kidneys become more efficient
  - Infants: 2-3 mL/kg/hr
  - Toddler/Preschooler: 2 mL/kg/hr
  - School Age: 1-2 mL/kg/hr
  - Adolescent: 0.5-1 mL/kg/hr

1 gram diaper weight = 1 mL of urine

Bladder

- Bladder capacity increases with age
- 15 to 50 mL at birth
- 700 mL in adolescence

ounces

Urinary tract infection UTI

- May involve the urethra, bladder (lower urinary tract) and/or the ureters, renal pelvis, and renal parenchyma (upper urinary tract).
- It is not easy to localize the infection
- The peak incidence of UTI not caused by structural anomalies occurs between 2- 6 years of age
- Females have 10-30 times higher risk than males, except during the neonatal period

Etiology:

- Escherichia Coli, (E-Coli), Pseudomonas, Klabsiella, Staphylococcus aureus, Haemophilus and Coagulase negative Staphylococcus.

Several factors contribute to the development of UTI in childhood:

- Anatomical and physical factors:

1. Short urethra in the female
2. Urethra being close at the end of micturition may return contaminated bacteria to the bladder
3. Urine stasis, encourage growth of bacteria; urine has to be completely emptied from the bladder to flush away bacteria before it multiplies (since the temp of 37°C is very suitable)
1. Stasis can occur from anatomic abnormality such as dysfunction of voiding mechanism (reflux) or extrinsic ureter or bladder compression as in constipation

Diagnostic evaluation:

- Urine culture determine the type of bacteria (early morning specimen)
- The following tests are to be done after infection subsides to identify anatomic abnormality contributing to UTI and existing kidney changes after recurrent infections:

  a. Voiding cysto-urethrogram

  b. IVP intra venous pyelogram

  c. Ultra sonography

TABLE 31–3 Normal Freshly Voided Urinalysis Results

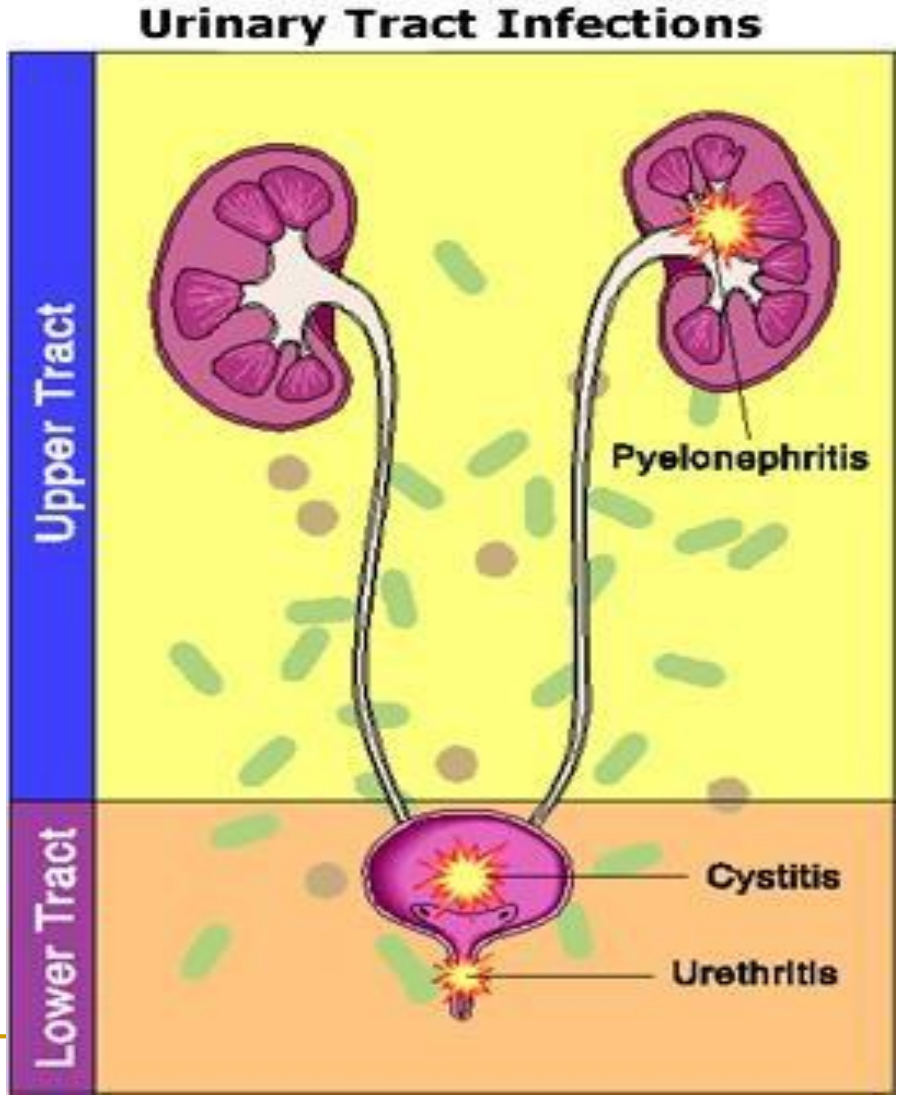
MACROSCOPIC EXAMINATION	NORMAL RESULTS
Color	Pale yellow, clear
Odor	Ammonia-like smell
Specific gravity	≤1.010 in well hydrated child
pH	4.5–8
Protein	Negative; <150 mg/24 hr
Glucose	<130 mg/24 hr
Ketones	Negative
Bilirubin	Negative
MICROSCOPIC EXAMINATION	
Red blood cells	0–5 per high-powered field (HPF)
White blood cells	<2 per HPF
Casts (hyaline)	1 per every 10–20 low-powered fields (LPF)
Crystals	None

Data from Liao, J. C., & Churchill, B. M. (2001). Pediatric urine testing. Pediatric Clinics of North America, *48(6), 1425–1440.*

Genitourinary Tract: clinical manifestation

- Cystitis (infection of bladder):
  - low grade fever (LGF)
  - Mild abdominal pain
  - Enuresis (preschooler)

- Pyelonephritis (kidneys):
- Symptoms are more acute
  - High fever
  - Flank or abdominal pain
  - Vomiting
  - Malaise



Clinical manifestations depends on the age of the child

- New born:
  - Fever or hypothermia
  - Sepsis
- Children <2 years of age:
  - Failure to thrive - Feeding problems
  - Vomiting - Diarrhea
  - Abdominal distension. - Jaundice
  - Frequent or infrequent voiding - strong smelling urine - Abnormal stream
  - Irritability
  - Persistent rash

Children > 2 years of age:

- Day time incontinence in a toilet trained child
- Hematuria

Feve

Enuresis

- Abdominal painDysuria

Strong foul smelling urine.

Urine frequency

Adolescents:

1. Lower tract infection:

Painful urination

Small amount of urine

Hematuria

Fever usually absent

٢. Upper tract infection

Fever -

Chills -

- Flank pain

Urine: cloudy, Thick with strands of mucus + pus and unpleasant fishy smell even when fresh

Therapeutic management:

Treatment:

1. Antibiotics
2. Antimicrobial drugs

1. If anatomical defects are present surgical correction is done to Prevent recurrence
5. Follow up study

Prevention of UTI:

- Hygiene
- Avoid tight clothing - use cotton underwear
- Encourage and educate total emptying of the bladder and not to hold urine for prolonged time
- Encourage frequent emptying especially before long trips
- Encourage generous fluid intake
- Acidify urine with drinking juices such as apple juice and a diet high in animal protein.

THANK YOU