UNIT TERMINAL OBJECTIVE

5-7 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with a renal or urologic problem.

COGNITIVE OBJECTIVES
At the conclusion of this unit, the paramedic student will be able to:

5-7.1 Describe the incidence, morbidity, mortality, and risk factors predisposing to urological emergencies. (C-1)
5-7.2 Discuss the anatomy and physiology of the organs and structures related to urogenital diseases. (C-1)
5-7.3 Define referred pain and visceral pain as it relates to urology. (C-1)
5-7.4 Describe the questioning technique and specific questions the paramedic should utilize when gathering a focused history in a patient with abdominal pain. (C-1)
5-7.5 Describe the technique for performing a comprehensive physical examination of a patient complaining of abdominal pain. (C-1)
5-7.6 Define acute renal failure. (C-1)
5-7.7 Discuss the pathophysiology of acute renal failure. (C-1)
5-7.8 Recognize the signs and symptoms related to acute renal failure. (C-1)
5-7.9 Describe the management for acute renal failure. (C-1)
5-7.10 Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the patient with acute renal failure. (C-3)
5-7.11 Define chronic renal failure. (C-1)
5-7.12 Discuss the pathophysiology of chronic renal failure. (C-1)
5-7.13 Recognize the signs and symptoms related to chronic renal failure. (C-1)
5-7.14 Describe the management for chronic renal failure. (C-1)
5-7.15 Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the patient with chronic renal failure. (C-3)
5-7.16 Define renal dialysis. (C-1)
5-7.17 Discuss the common complication of renal dialysis. (C-1)
5-7.18 Define renal calculi. (C-1)
5-7.19 Discuss the pathophysiology of renal calculi. (C-1)
5-7.20 Recognize the signs and symptoms related to renal calculi. (C-1)
5-7.21 Describe the management for renal calculi. (C-1)
5-7.22 Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the patient with renal calculi. (C-3)
5-7.23 Define urinary tract infection. (C-1)
5-7.24 Discuss the pathophysiology of urinary tract infection. (C-1)
5-7.25 Recognize the signs and symptoms related to urinary tract infection. (C-1)
5-7.26 Describe the management for a urinary tract infection. (C-1)
5-7.27 Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the patient with a urinary tract infection. (C-3)
5-7.28 Apply the epidemiology to develop prevention strategies for urological emergencies. (C-2)
5-7.29 Integrate pathophysiological principles to the assessment of a patient with abdominal pain. (C-3)
5-7.30 Synthesize assessment findings and patient history information to accurately differentiate between pain of a urogenital emergency and that of other origins. (C-3)
5-7.31 Develop, execute, and evaluate a treatment plan based on the field impression made in the assessment. (C-3)
AFFECTIVE OBJECTIVES
None identified for this unit.

PSYCHOMOTOR OBJECTIVES
None identified for this unit.
DECLARATIVE

I. Introduction
A. Epidemiology
   1. Incidence
   2. Mortality/ morbidity
   3. Risk factors
   4. Prevention strategies
B. Anatomy and physiology review
C. Mechanisms of injuries/ illness

II. General pathophysiology, assessment and management
A. Pathophysiology of abdominal pain
   1. Bacterial contamination
      a. Urinary tract infection
   2. Types of abdominal pain
      a. Visceral pain
         (1) Obstruction of hollow viscera (ureters, urethra, etc.)
      b. Referred pain
B. Assessment findings
   1. Scene size-up
   2. Initial assessment
      a. Airway
      b. Breathing
      c. Circulation
      d. Disability
      e. Chief complaint
   3. Focused history
      a. Onset
      b. Provoking factors
      c. Quality
      d. Region/ radiation
      e. Severity
      f. Time
      g. Previous history of same event
      h. Nausea / vomiting
      i. Change in bowel habits/ stool
         (1) Constipation
         (2) Diarrhea
      j. Weight loss
      k. Last meal
      l. Chest pain
   4. Focused physical examination
      a. Appearance
      b. Posture
      c. Level of consciousness
      d. Apparent state of health
      e. Skin color
      f. Vital signs
      g. Inspect abdomen
Medical: 5
Renal/Urology: 7

h. Auscultate abdomen
i. Percuss abdomen
j. Palpate abdomen
k. Female abdominal exam
l. Male abdominal exam

5. Assessment tools
   a. Hematocrit
   b. Hemoglobin
   c. Serum creatinine

C. Management/ treatment plan
1. Airway and ventilatory support
   a. Maintain an open airway
   b. High flow oxygen
2. Cardiovascular support
   a. Electrocardiogram
   b. Monitor blood pressure
3. Pharmacological interventions
   a. Consider initiating intravenous line
   b. Avoid intervention which mask signs and symptoms
4. Non-pharmacological interventions
   a. Nothing by mouth
   b. Monitor LOC
   c. Monitor vital signs
   d. Position of comfort
5. Transport considerations
   a. Persistent pain for greater than six hours requires transport
   b. Gentle but rapid transport
6. Psychological support
   a. All actions reflect a calm, caring, competent attitude
   b. Keep patient and significant others informed of your actions

III. Specific injuries/ illness
A. Acute renal failure
1. Epidemiology
   a. Incidence
   b. Mortality/ morbidity
      (1) Overall mortality 50%
   c. Risk factors
      (1) Prerenal
      (2) Postrenal
      (3) Renal
   d. Prevention strategies
      (1) Protection of cardiovascular function and volume
      (2) Reduce exposure to nephrotoxic drugs
   e. Anatomy and physiology review
   f. Pathophysiology
      (1) Function of the nephron and glomerular filtration rate
      (2) Retention of nitrogenous waste products and electrolytes
      (3) Aberrations in glucose reabsorption
      (4) Disorders of renal hypoperfusion
         (a) Hypovolemia
         (b) Low cardiac output
(c) Increased renal systemic vascular resistance ratio
(d) Diseases of renal parenchyma
   i) Renovascular obstruction
   ii) Glomerular renal microvasculature
   iii) Acute tubular necrosis
   iv) Interstitial nephritis
(e) Acute obstruction of the urinary tract
   i) Ureter
   ii) Bladder neck
   iii) Urethra
(f) Hyperkalemia
(g) Metabolic acidosis

2. Assessment findings
   a. History
      (1) Oliguria/anuria
      (2) Edema
      (3) Acidosis
   b. Physical
      (1) Altered level of consciousness
      (2) Skin
         (a) Pale
         (b) Cool
         (c) Moist
      (3) Cardiovascular
         (a) Hypotension
         (b) Tachycardia
         (c) ECG findings
      (4) Inspect abdomen
         (a) Scars
         (b) Ecchymosis
         (c) Contour
            i) Bulges
            ii) Symmetry
      (5) Auscultate
      (6) Palpate
   c. Assessment tools
      (1) Hematocrit
      (2) Urinalysis

3. Management
   a. Airway and ventilatory support
      (1) High flow oxygen
   b. Circulatory support
      (1) Positioning
      (2) Consider fluid bolus or resuscitation
      (3) Consider fluid lavage
   c. Psychological support
   d. Transport consideration

B. Chronic renal failure
   1. Epidemiology
      a. Incidence
b. Mortality/ morbidity

c. Risk factors
   (1) Diabetes mellitus
   (2) Hypertension

d. Prevention strategies

e. Anatomy and physiology review

f. Pathophysiology
   (1) Reduction of renal mass
   (2) Reduction of nephron mass
   (3) Glucose intolerance
   (4) Electrolyte imbalance
   (5) Anemia

2. Assessment findings

   a. History
      (1) Anorexia
      (2) Nausea
      (3) Vomiting
      (4) Anxiety
      (5) Seizure activity

   b. Physical
      (1) Altered level of consciousness
         (a) Delirium
      (2) Skin
         (a) Pale
         (b) Cool
         (c) Moist
         (d) Jaundice
         (e) Uremic frost
      (3) Cardiovascular
         (a) Hypotension
         (b) Tachycardia
         (c) ECG findings
         (d) Pericarditis rub
         (e) Edema
      (4) Lungs
         (a) Pulmonary edema
      (5) Neurological
         (a) Seizure
         (b) Muscle twitching
      (6) Inspect abdomen
         (a) Scars
         (b) Ecchymosis
         (c) Contour
         (d) Bulges
      (7) Symmetry
      (8) Auscultate
      (9) Percuss
      (10) Palpate

   c. Assessment tools
      (1) Hematocrit
(2) Urinalysis

3. Management
   a. Airway and ventilatory support
      (1) High flow oxygen
   b. Circulatory support
      (1) Positioning
      (2) Consider fluid bolus or resuscitation
      (3) Consider fluid lavage
   c. Pharmacological
      (1) Vasopressor
   d. Non-pharmacological
      (1) Renal dialysis
         (a) Definition
            i) Process of diffusing blood across a semi-permeable membrane to remove substances that normally the kidney would eliminate
            ii) May restore electrolyte and acid base imbalances
         (b) Complications
            i) Vascular-access related - most common
               a) Bleeding from dialysis puncture site
               b) Thrill in access has been lost
               c) Infection
            ii) Non-vascular access related
               a) Hypotension
               b) Shortness of breath
               c) Chest pain
               d) Neurologic abnormalities
   e. Psychological support
   f. Transport considerations
      (1) Appropriate mode
      (2) Appropriate facility

C. Renal calculi
1. Epidemiology
   a. Incidence
   b. Mortality/ morbidity
   c. Risk factors
      (1) Absent sensory/ motor impulses
      (2) Medications
         (a) Anesthetics
         (b) Opiates
         (c) Psychotropic
      (3) Postoperative
   d. Prevention strategies
   e. Anatomy and physiology review
   f. Pathophysiology
      (1) Urinary stones
         (a) Calcium salts
         (b) Uric acid
         (c) Cystine
         (d) Struvite
2. Assessment findings
   a. History
      (1) Quality of pain
      (2) Onset of pain
      (3) Location of pain
      (4) Dysuria
      (5) Hematuria
      (6) Nocturia
      (7) Frequent urination
      (8) History of same condition
   b. Physical
      (1) Restless
      (2) Skin
         (a) Pale
         (b) Cool
         (c) Moist
      (3) Vital signs
         (a) Vary considerably
      (4) Abdominal exam
         (a) Inspect
            i) Contour
               a) Bulges
               b) Symmetry
            (b) Auscultate
            (c) Palpate

3. Management
   a. Airway and ventilatory support
   b. Circulatory support
      (1) Positioning
   c. Pharmacological
      (1) Consider pain management
   d. Non-pharmacological
      (1) Pain management
   e. Transport considerations
      (1) Appropriate mode
      (2) Appropriate facility

D. Urinary tract infection
   1. Epidemiology
      a. Incidence
      b. Mortality/ morbidity
      c. Risk factors
         (1) Nerve disruption
         (2) Diabetes
      d. Prevention strategies
      e. Anatomy and physiology review
      f. Pathophysiology
         (1) Lower tract infection
            (a) Urethritis
            (b) Cystitis
            (c) Prostatitis
(2) Upper tract infection
   (a) Pyelonephritis
   (b) Intrarenal and perinephric abscesses
(3) Pathogenic microorganisms

2. Assessment findings
   a. History
      (1) Quality of pain
      (2) Onset of pain
      (3) Location of pain
      (4) Dysuria
      (5) Urgency to urinate
      (6) Strong urine odor
      (7) History of same condition
   b. Physical
      (1) Restless
      (2) Skin
         (a) Pale
         (b) Cool
         (c) Moist
         (d) Warm
      (3) Fever
      (4) Vital signs
         (a) Vary considerably
      (5) Abdominal exam
         (a) Inspect
            i) Contour
               a) Bulges
               b) Symmetry
         (b) Auscultate
         (c) Palpate

3. Management
   a. Airway and ventilatory support
   b. Circulatory support
      (1) Positioning
   c. Pharmacological
      (1) Consider pain management
   d. Non-pharmacological
      (1) Pain management
   e. Transport considerations
      (1) Appropriate mode
      (2) Appropriate facility

IV. Integration