The Urinary System

Course
Medical Terminology

Unit IX
The Urinary System

Essential Question
What medical terminology is associated with the Urinary System?

TEKS
130.203 (c) (1)(A),(B),(E)
2(B)
4 (A),(B)

Prior Student Learning
None

Estimated time
2-3 hours

Rationale
Healthcare professionals must have a comprehensive medical vocabulary in order to communicate effectively with other health professionals. They should be able to use terminology of the Urinary system to discuss common conditions and diseases.

Objectives
Upon completion of this lesson, the learner should be able to:

- Define and decipher common terms associated with the urinary system
- Identify the basic anatomy of the urinary system
- Analyze unfamiliar terms using the knowledge of word roots, suffixes and prefixes gained in the course
- Research diseases which involve the urinary system
- Describe how urinalysis is used and interpreted as a diagnostic test
- Explain clinical procedures and laboratory tests as they pertain to the urinary system

Engage
Search the web for a video of a kidney transplant or another urinary surgery.

Show the video to the class and explain that they will be learning vocabulary pertaining to the urinary system.

Key Points

I. Major Parts of the Urinary system
  A. Kidney
    1. Two bean-shaped organs behind the abdominal cavity -- **(retroperitoneal)**
    2. On either side of the spine in the lumbar region
    3. Surrounded by a cushion of adipose tissue and fibrous connective tissue (protection for the kidneys)
    4. Each kidney is about the size of a fist and weighs from 4-6 pounds
    5. Cortex region
      - Cortex means “bark” as in the bark of a tree
    6. Medulla region
      Medulla means marrow
    7. Hilum
      A depression on the medial border of the kidney
  B. Ureter
    1. Two hollow muscular tubes

2. 16-18 inches long
3. Carries urine from the kidneys to the urinary bladder

C. Urinary bladder
1. A hollow, muscular sac
2. Temporary reservoir for urine
3. Trigone
   a. A triangular region at the base of the bladder
   b. The place where the ureters enter and the urethra exits

D. Urethra
1. A tube that carries urine from the urinary bladder to the outside of the body
2. Urination
   a. Process of expelling urine through the urethra
   b. Also referred to as voiding
3. Urinary meatus
   - The external opening of the urethra
4. Female urethra is about 1 ½ inches long
5. Male urethra is about 8 inches long
   a. Extends downward through the prostate gland to the meatus at the tip of the penis

II. How the kidneys produce urine

A. Renal arteries
1. Blood enters each kidney from the aorta by way of the R & L renal arteries
2. After the renal arteries enter the kidney, they branch into smaller and smaller arteries

B. Arterioles
1. The smallest arteries
2. Blood passes through the arterioles slowly and constantly

C. Renin
1. If blood pressure falls in the vessels of the kidney, the kidney produces renin
2. Renin is discharged into the blood and promotes formation of a substance that stimulates the contraction of arterioles
3. This increases blood pressure and normal blood flow in the kidneys

D. Glomeruli
1. Each arteriole in the cortex of the kidney leads into a mass of very tiny, coiled and intertwined smaller blood vessels called glomeruli (pleural)
2. Glomerulus (singular) is a collection of tiny capillaries formed I the shape of a small ball.
3. There are about 1 million glomeruli in the cortex region of each kidney

E. Filtration
    1. Urine is produced by filtration
    2. As blood passes through the glomeruli, water, salts and urea and other waste products leave the bloodstream
F. Creatinine and uric acid
    - Waste products from the bloodstream
G. Glomerular (Bowman) capsule
    1. A cup-like structure that surrounds each Glomerulus
    2. Waste products collect in the Bowman capsule
    3. The walls of the glomeruli prevent large substances (proteins and blood cells) from filtering into the capsule
        a. Protein and bloods cells normally do not appear in urine
H. Renal tubule
    1. A twisted tube attached to each Glomerular capsule
    2. As water, sugar, salts, urea and other wastes pass through the renal tubule, most of the water, all the sugar, and some salts return to the bloodstream
    3. All collecting tubules lead to the renal pelvis (a basin-like area in the central part of the kidney)
I. Reabsorption
    1. The active process of Reabsorption ensures that the body retains essential substances such as sugar, water and salts.
J. Secretion
    1. The final process in the formation of urine
    2. The waste products of metabolism become toxic if allowed to accumulate in the body
    3. The waste products (acids, drugs, potassium) leave the body in urine

III. Three steps in the formation of urine
    A. Glomerular filtration (water, sugar, wastes {urea and Creatinine}, and salts)
    B. Tubular Reabsorption (of water, sugar and some salts)
    C. Tubular secretion (of acids, potassium and drugs)

IV. Nephron
    A. Combination of a glomerulus and a renal tubule forms a unit
    B. Each kidney contains about 1 million nephrons

V. Leaving the Body
    A. The renal pelvis narrows into the ureter
    B. The ureter carries the urine to the urinary bladder
    C. The bladder (a muscular sac) temporarily stores urine
    D. As bladder fills, pressure increases at the base of the bladder
    E. Individual notices a need to urinate and voluntarily relaxes the sphincter muscles so urine can be passed out of the body

VI. Urinary System root words

Root Word (Combining forms)	What it means
Albumin/o	Albumin (a protein in the blood)
Azot/o	Nitrogen
Bacteri/o	Bacteria
Cali/o, calic/o	calyx
Cyst/o	Urinary bladder
Dips/o	Thirst
Glomerul/o	Glomerulus
Kal/o	Potassium
Ket/o, Kenton/o	Ketone bodies
Lith/o	Stone
Meat/o	Meatus
Natr/o	Sodium
Nephr/o	Kidney
Noct/o	night
Olig/o	Scanty
Py/o	pus
Pyel/o	Renal pelvis
Ren/o	Kidney
Trigon/o	Trigone (region of the bladder)
Ur/o	Urine (urea)
Ureter/o	Ureter
urethra/o	urethra
Urin/o	Urine
Vesic/o	Urinary bladder

VII. Common Urinary Suffixes

Suffix	What it means
-poietin	Substance that forms
-tripsy	crushing
-uria	Urination: urine condition

VIII. Urinary Abbreviations and Acronyms

Abbreviation or acronym	What it means
ADH	Antidiuretic hormone – vasopressin
ARF	Acute renal failure
BILI	Bilirubin
BUN	Blood urea nitrogen
CAPD	Continuous ambulatory peritoneal dialysis
Cath	Catheter, catheterization
CCPD	Continuous cycling peritoneal dialysis
CKD	Chronic kidney disease
Cl	Chloride – an electrolyte excreted by the kidney
CPCL	Creatinine clearance; also seen as CrCl or CLcr
CRF	Chronic renal failure – progressive loss of kidney function
C&C	Culture and sensitivity testing
Cysto	Cystoscopic examination
ESRD	End-stage renal disease
ESWL	Extracorporeal shock wave lithotripsy
GFR	Glomerular filtration rate
HCO_3	Bicarbonate – an electrolyte conserved by the kidney
HD	Hemodialysis
IC	Interstitial cystitis – chronic inflammation of the bladder wall
K^+	Potassium
KUB	Kidney, ureter, and bladder
Na^+	sodium
PD	Peritoneal dialysis
pH	Potential hydrogen; scale to indicate degree of acidity or alkalinity
PKD	Polysystic kidney disease
PKU	Phenylketonuria
PUL	Percutaneous ultrasonic lithotripsy
RP	Retrograde pyelogram
sp gr	Specific gravity
UA	Urinalysis
UTI	Urinary tract infection
VCUG	Voiding cystourethrogram

IX. Common Urinary Vocabulary

Term	What it means
Arteriole	Small artery
Calyx or calyx	Cup-like collecting region of the renal pelvis
Catheter	Tube for injecting or removing fluids
Cortex	Outer region of an organ; the renal cortex is the outer region of the kidney (cortical means pertaining to the cortex).
Creatinine	Nitrogenous waste excreted in urine. Creatinine clearance is a measure of the efficiency of the kidneys in removing Creatinine from the blood.
Electrolyte	Chemical element that carries an electrical charge when dissolved in water. Electrolytes are necessary for functioning of muscles and nerves.
Erythropoietin (EPO)	Hormone secreted by the kidney to stimulate the production of red blood cells by bone marrow. Poietin means a substance that forms.
Filtration	Process whereby some substances, but not all, pass through a filter
Glomerular capsule	Enclosing structure surrounding each glomerulus. Also known as Bowman capsule.
Glomerulus	Plural of glomeruli. Tiny ball of capillaries in the kidney
Hilum	Depression in an organ where blood vessels and nerves enter and leave
Kidney	One of two bean-shaped organs on either side of the backbone in the lumbar region. The kidney filters nitrogenous wastes from the bloodstream.
Meatus	Opening or canal
Medulla	Inner region of an organ. The renal medulla is the inner region of the kidney.
Nephron	Combination of glomerulus and renal tubule where filtration, reabsorption, and secretion take place in the kidney
Nitrogenous waste	Substance containing nitrogen and excreted in urine
Potassium (K^+)	An electrolyte regulated by the kidney so that a proper concentration is maintained within the blood
Reabsorption	Process whereby renal tubules return materials necessary to the body back into the bloodstream
Renal artery	Blood vessel that carries blood to the kidney
Renal pelvis	Central collecting region in the kidney
Renal tubule	Microscopic tubes in the kidney where urine is formed after filtration

Renal vein	Blood vessel that caries blood away from the kidney and toward the heart
Rennin	Hormone secreted by the kidney; it raises blood pressure by influencing vasoconstriction.
Sodium (N^+)	An electrolyte regulated in the blood and urine by the kidneys. It is needed for proper transmission of nerve impulses, heart activity and other metabolic functions.
Trigone	Triangular area in the urinary bladder
Urea	Major nitrogenous waste excreted in urine
Ureter	One of the two tubes leading from the kidneys to the urinary bladder
Urethra	Tube leading from the urinary bladder to the outside of the body
Uric acid	Nitrogenous waste excreted in the urine
Urinary bladder	Hollow, muscular sac that holds and stores urine
Urination	Voiding; process of expelling urine; also called micturition

X. Urinary System Diseases and Pathology

Disease/Pathology	What it means
Glomerulonephritis	Inflammation of the glomeruli within the kidney
Interstitial nephritis	Inflammation of the connective tissue that lies between the renal tubules
Nephrolithiasis	Kidney stones; renal calculi
Nephritic syndrome	Nephrosis; group of clinical signs and symptoms caused by excessive protein loss in urine
Polycystic kidney disease	PKD: multiple fluid-filled sacs (cysts) within and on the kidney
Pyelonephritis	Inflammation of the lining of the renal pelvis and renal parenchyma
Renal cell carcinoma	Hypernephroma: cancerous tumor of the kidney in adulthood
Renal failure	Kidney decreases excretion of wastes as a result of impaired filtration function
Renal hypertension	High blood pressure resulting from kidney disease
Wilms tumor	Malignant tumor of the kidney occurring in childhood
Diabetes insipidus	Antidiuretic hormone is not secreted adequately, or the kidney is resistant

	to its effect
Diabetes mellitus	Insulin is not secreted adequately or not used properly in the body. Mellitus means sweet.
Diabetes	"To pass through" -- when the word diabetes is used alone, it refers to Diabetes Mellitus.

XI. Laboratory Tests
- A. BUN
  1. Blood urea nitrogen
  2. Measurement of urea levels in blood
- B. Creatinine clearance
  1. Measurement of the rate at which Creatinine is cleared from the blood by the kidney
  2. This is an important test to assess the functioning of the kidney
  3. This test is an indicator of the glomerular filtration rate (GFR), which normally is 90-120ml/minute

XII. Clinical Procedures
- A. CT Scan
  1. X-ray images show multiple cross-sectional and other views of organs and tissues
  2. Useful in diagnosis of tumors, cysts, abscesses and hydronephrosis
- B. KUB
  1. Kidneys, ureters, and bladder
  2. X-ray examination of the kidneys, ureters and bladder
  3. Shows the size and location of the kidneys in relation to other organs in the abdominopelvic region
- C. Renal angiography
  1. X-ray examination of the blood vessels of the kidney
  2. Helps diagnose areas of bleeding within a kidney and renal artery stenosis in hypertensive patients
- D. RP
  1. Retrograde pyelogram
  2. X-ray imaging of the renal pelvis and ureters after injection of contrast through a urinary catheter into the ureters from the bladder
- E. VCUG
  1. Voiding cystourethrogram
  2. X-ray record of the urinary bladder and urethra obtained while the patient is voiding
- F. Ultrasonography
  1. Imaging of urinary tract structures using high-frequency sound waves

2. The size of the kidney, tumors, polycystic kidney disease and ureteral and bladder obstruction can be diagnosed using ultrasound

G. Radioisotope scan
   1. Image of the kidney after injecting a radioactive substance into the blood stream
   2. The imaging shows the size and shape of the kidney and its functioning

H. MRI
   1. Magnetic resonance imaging
   2. Changing magnetic field produces images of the kidney and surrounding structures in three planes of the body

I. Cystoscopy
   1. Direct visualization of the urethra and urinary bladder with an endoscope
   2. A hollow metal tube is inserted into the urinary meatus and passed through the urethra into the bladder

J. Dialysis
   1. HD
      a. Hemodialysis
      b. Uses an artificial kidney machine that receives waste-filled blood from the patient bloodstream, filters it, and returns the dialyzed blood to the patient's body.
   2. PD
      a. Peritoneal dialysis
      b. A peritoneal catheter is used to introduce fluid into the abdominal cavity; chemical properties of the fluid cause wastes in the capillaries to pass out of the bloodstream and into the fluid; and, then the fluid is drained out.

K. Lithotripsy
   1. Urinary tract stones are crushed
   2. Uses shock waves directed toward the stone from the outside of the body

L. Renal angioplasty
   1. Dilation of narrowed areas in renal arteries
   2. A balloon attached to a catheter is inserted into the artery and then inflated to enlarge the vessel diameter
   3. Afterward, stents may be inserted to keep the vessel open
   4. A stent is a metal meshed tube

M. Renal biopsy
   1. Removal of kidney tissue for microscopic exam
   2. May be performed through the skin or during surgery

N. Renal transplantation

1. Surgical transfer of a kidney from a donor to a recipient
2. Renal failure patients may receive a kidney from a living donor or from a cadaver
3. Best results occur when the donor is closely related to the recipient

O. Renal catheterization
1. Passage of a flexible, tubular instrument through the urethra into the urinary bladder
2. Usually used for short-term drainage of urine
3. Foley catheter: an indwelling catheter held in place by a balloon inflated with liquid

Activity

I. Make flash cards of urinary system terms and practice putting the terms together with prefixes and suffixes to make new terms
II. Complete Urinary System Terms Worksheet
III. Complete the Urologic Case Studies
IV. Review media terms with the students using review games such as the "Fly Swatter Game" or the "Flash Card Drill" (see the Medical Terminology Activity Lesson Plan - http://texashste.com/documents/curriculum/principles/medical_terminology_activities.pdf)
V. Research and report on diseases and disorders from the Urinary system

Assessment

Successful completion of the activities

Materials

Medical Terminology book
List of Urinary terms
Index cards
Markers
Urologic case studies
Urologic case studies - Key
Urinary terminology worksheet
Urinary terminology-Key

Accommodations for Learning Differences

For reinforcement, the student will practice terms using flash cards of the urinary system.

For enrichment, the student will research and report on a disease or disorder of the urinary system.

National and State Education Standards

National Healthcare Foundation Standards and Accountability Criteria
Foundation Standard 2: Communications
2.21 Use roots, prefixes, and suffixes to communicate information

2.22 Use medical abbreviations to communicate information

TEKS

130.203 (c) (1) The student recognizes the terminology related to the health science industry. The student is expected to:

- (A) identify abbreviations, acronyms, and symbols
- (B) identify the basic structure of medical words
- (E) recall directional terms and anatomical planes related to the body structure

130.203 (c) (2) (B) employ increasingly precise language to communicate

130.203 (c) (4) The student interprets medical abbreviations. The student is expected to:

- (A) distinguish medical abbreviations used throughout the health science industry; and
- (B) translate medical abbreviations in simulated technical material such as physician progress notes, radiological reports, and laboratory reports.

Texas College and Career Readiness Standards

English and Language Arts

Understand new vocabulary and concepts and use them accurately in reading, speaking, and writing.

1. Identify new words and concepts acquired through study of their relationships to other words and concepts.
2. Apply knowledge of roots and affixes to infer the meanings of new words.
3. Use reference guides to confirm the meanings of new words or concepts.

Cross-Disciplinary Standards,

I. Key Cognitive Skills D. Academic Behavior: 1. Self-monitor learning needs and seek assistance when needed; 3. Strive for accuracy and precision; 4. Persevere to complete and master task. E. Work habits: 1. Work independently; 2. Work collaboratively

II. Foundation Skills A. 2. Use a variety of strategies to understand the meaning of new words. 4. Identify the key information and supporting details.

URINARY SYSTEM TERMINOLOGY-Worksheet

Please write the meaning of the terms in the right column.

Term	Meaning
pyel/o	**Renal Pelvis**
pyelocystitis	
pyelostomy	
pyelotomy	
pyelonephritis	
pyelolithotomy	
pyelectasis	
pyelography	
pyeloplasty	
pyelitis	
pyelocystostomosis	
pyelonephrosis	
pyelopathy	
pyeloplication	
pyeloscopy	
retrograde pyelogram	
IVP	
ren/o	
renography	
renal failure = ARF / CRF	
Rennin	
renogastric	
renogram	
renopathy	
renal calculi	
renal biopsy	
renal failure	
renal scan	
glomerul/o	
glomerular	
glomerulitis	
glomerulonephritis	
glomerulopathy	
glomerulosclerosis	
nephr/o	**Kidney**
hydrohematonephrosis	
hydronephrosis/nephrohydrosis	
nephralgia	
nephrectomize	
nephrectomy	
nephric	

nephridium	
nephritis	
nephroabdominal	
nephrocalcinosis	
nephrocardiac	
nephrocele	
nephrocolic	
nephrocolopexy	
nephrocoloptosis	
nephrocystanastomosis	
nephrocystitis	
nephrocystosis	
nephrogenetic	
nephrography	
nephrology	
nephroma	
nephromalacia	
nephromegaly	
nephron	
nephropathy	
nephropexy	
nephroptosis	
nephropyeloplasty	
nephropyosis	
nephrorrhagia	
nephrorrhaphy	
nephrosclerosis	
nephrosis	
nephrostomy	
nephrotomography	
nephrotoxin	
nephrotropic	
meat/o	**Meatus (passage)**
meatal	
meatorrhaphy	
meatoscope	
meatoscopy	
meatotome	
meatotomy	
cyst- cyst/o	**Bladder, Sac**
cystalgia/cystodynia	
cystectomy	
cystitis	
cystoadenoma	
cystocele	

cystoenterocele	
cystography	
cystojejunostomy	
cystolith	
cystolithectomy	
cystolithiasis	
cystoma	
cystometrography	
cystopexy	
cystoplasty	
cystoplegia	
cystoptosis	
cystorrhagia	
cystorrhaphy	
cystorrhea	
cystoscope	
cystoscopy	
cystotomy	
cystoureteritis	
cystoureterogram	
cystourethrograhy	
cystourethrography	
vesic/o	**Bladder**
vesicotomy	
vesicocele	
vesicoclysis	
vesicofixation	
urethr/o	**Urethra**
urethrorrhaphy	
urethrostomy	
urethrotrigonitis	
urethrodynia/urethralgia	
urethratresia	
urethrectomy	
urethrography/urethrograph	
urethrometer	
urethrorrhea	
urethroscopy/urethroscope	
urethrospasm	
urethropexy	
urethroplasty	
urethrotomy	
urethritis	
TUR	

ureter/o	Ureter
ureteral	
ureteralgia	
ureterectasis	
ureterocolostomy	
ureterocystoscope	
ureterography	
ureterohydronephrosis	
ureteroplasty	
ureteronephrectomy	
ureteropyelitis	
ureteropyelonephrostomy	
ureteropyeloplasty	
ureteropyosis	
ureterolithiasis	
ureteritis	
ureterolithotomy	
ureterocele	
ureterolysis	
ureterectomy	
ureterotomy	
ureterorrhagia	
lith- lith/o	**Stone**
lithocystotomy	
lithogenesis	
lithology	
litholysis	
lithonephritis	
lithotome	
lithotomy	
lithotripsy	
lithectomy	
nephrolithiasis	
nephrolithotomy	
lithoclast	
azot/o	**Urea, Nitrogen**
azoturia	
albumin/o- albumin	
albuminaturia	
albuminuria	
ur- ur/o, urin/o	**Urea, Urine**
urodynia	
urography	
urologist	

urology / urinology	Study of the urinary system, study of urine
uroscopy	
glycosuria	
dysuria	
nocturia	
anuria	
oliguria	
pyuria	
polyuria	
hematuria	
uremia / urinemia	
diuretic	
diuresis	
enuresis	
urinal	
urinalysis	
urinary	
urinate	
urination	
urinometer	
urinoma	
BUN	
OTHER TERMS:	
micturate	
incontinent	
distention	
retention	
stricture	
atony	
bougie	
flank	
orifice	
reflux	
trigone	
catheter	
filtrate	
meatus	
sphincter	
fulguration	
retroperitoneal	
polycystic kidney	
specific gravity	
cortex / medulla	
pelvis	
pyramid	

BPH	
ATN	

Laboratory Tests and Clinical Procedures

Test/Procedure	Definition
PSA test	
Semen analysis	
Castration	
Circumcision	
Digital rectal examination (DRE)	
Photoselective vaporization of the prostate (Green Light PVP)	
Transurethral resection of the prostate (TURP)	
Vasectomy	

URINARY SYSTEM TERMINOLOGY- Key

Term	Meaning
pyel/o	**Renal Pelvis**
pyelocystitis	Inflammation of the renal pelvis and bladder
pyelostomy	Creation of an opening into the renal pelvis
pyelotomy	Incision of the renal pelvis
pyelonephritis	Inflammation of the kidney and renal pelvis
pyelolithotomy	Removal of a stone from the pelvis of the kidney through an incision
pyelectasis	Dilation of the renal pelvis
pyelography	A radiograph of the ureter and renal pelvis
pyeloplasty	Surgical repair of the pelvis of the kidney
pyelitis	Inflammation of the pelvis of the kidney
pyelocystostomosis	Surgical establishment of communication between the Kidney and bladder
pyelonephrosis	Any disease of the pelvis of the kidney
pyelopathy	Disease of the renal pelvis
pyeloplication	Shortening of the wall of the dilated renal pelvis
pyeloscopy	Examination of the renal pelvis
retrograde pyelogram	Endoscope is used to visualize the renal pelvis and ureter
IVP	A pyelogram in which a radiopaque material is given intravenously
ren/o	**Kidney**
renography	Radiography of the kidney; recording of the kidney
renal failure = ARF / CRF	Acute rise in the serum creatinine level of 25% or more (Can last days or weeks before resolving) Chronic (end-stage) renal disease
Rennin	Enzyme produced by the kidney that stimulates vasoconstriction and secretion of aldosterone
renogastric	Pertaining to the kidneys and stomach
renogram	Record of the rate of removal of an intravenously injected dose of radioactive iodine from the blood of the kidneys
renopathy	Disease condition of the kidney
renal calculi	A stone in the kidney
renal biopsy	Obtaining renal tissue for analysis
renal failure	Acute rise in the serum creatinine level of 25% or more
renal scan	A method of determining renal function, size and shape. A radioactive substance that concentrates in the kidneys
glomerul/o	**Glomerulus**
glomerular	Pertaining to the glomerulus
glomerulitis	Inflammation of the glomeruli
glomerulonephritis	Nephritits in which the lesions involve primarily the glomeruli
glomerulopathy	Any disease of the renal glomeruli
glomerulosclerosis	Fibrosis of renal glomeruli associated with protein loss in

	the urine
nephr/o	**Kidney**
hydrohematonephrosis	Bloody urine distending the pelvis of the kidney
hydronephrosis/nephrohydrosis	Stretching of the renal pelvis as a result of obstruction to urinary outflow
nephralgia	Renal pain
nephrectomize	To remove, surgically, one or both kidneys
nephrectomy	Surgical removal of a kidney
nephric	Pertaining to the kidneys
nephridium	A segmented excretory tubule present in many invertebrates
nephritis	Inflammation of the kidneys
nephroabdominal	Concerning the kidneys and abdomen
nephrocalcinosis	Calcinosis of the kidney
nephrocardiac	Concerning the kidneys and heart
nephrocele	Renal hernia
nephrocolic	Renal colic; concerning the kidney and the colon
nephrocolopexy	Surgical suspension of the kidney
nephrocoloptosis	Excision of the renal capsule
nephrocystanastomosis	Surgical formation of an artificial connection between the kidney and the bladder
nephrocystitis	Inflammation of the kidneys and the bladder
nephrocystosis	Formation of renal cysts
nephrogenetic	Arising in or from the renal organs
nephrography	Radiology of the kidneys
nephrology	The branch of medical science concerned with the structure and function of the kidneys
nephroma	Renal tumor
nephromalacia	Abnormal renal softness or softening
nephromegaly	Enlargement of the kidney
nephron	Glomerulus and renal tubule where filtration, reabsorbtion, & secretion take place
nephropathy	Inflammatory, degenerative & sclerotic lesions of the kidney
nephropexy	Surgical fixation of a floating kidney
nephroptosis	Downward displacement of the kidney
nephropyeloplasty	Repair of the kidney
nephropyosis	Purulence of a kidney
nephrorrhagia	Bleeding of the kidney
nephrorrhaphy	Surgical procedure of suturing the kidney
nephrosclerosis	Hardening of the connective tissues of the kidney
nephrosis	Degenerative changes in the kidneys
nephrostomy	The formation of an artificial fistula into the renal pelvis
nephrotomography	Tomography of the kidney after intravenous injection of radiopaque contrast medium

nephrotoxin	Toxic substance that damages kidney tissues
nephrotropic	Affecting the kidneys
meat/o	**Meatus (passage)**
meatal	Pertaining to the flesh
meatorrhaphy	Suture of the severed end of the urethra to the glans penis
meatoscope	A speculum for examining a meatus
meatoscopy	Instrumental examination of a meatus
meatotome	Knife with probe or guarded point for enlarging a meatus by direct incision
meatotomy	Incision of urinary meatus to enlarge the opening
cyst- cyst/o	**Bladder, Sac**
cystalgia/cystodynia	Pain in the bladder
cystectomy	Removal of a cyst or bladder
cystitis	Bladder inflammation usually from urinary tract infection
cystoadenoma	Tumor containing cystic and adenomatous elements
cystocele	A bladder hernia that protrudes into the vagina
cystoenterocele	Hernia of the bladder wall
cystography	Radiograph of cyst into which a contrast medium has been instilled
cystojejunostomy	Joining of an adjacent cyst to the jejunum
cystolith	Vesical calculus
cystolithectomy	Excision of a stone from the bladder
cystolithiasis	Formation of stones in the bladder
cystoma	A cystic tumor
cystometrography	Graphic record of bladder pressure at filling stages
cystopexy	Surgical fixation of the bladder to abdominal wall
cystoplasty	Plastic operation on the bladder
cystoplegia	Bladder paralysis
cystoptosis	Prolapse into the urethra of vesical mucous membrane
cystorrhagia	Bleeding of the bladder
cystorrhaphy	Surgical suture of the bladder
cystorrhea	Discharge of mucus from urinary bladder
cystoscope	An instrument for interior examination of the bladder and ureter
cystoscopy	Examination of bladder with a cystoscope
cystotomy	Incision of the bladder
cystoureteritis	Inflammation of the ureter and urinary bladder
cystoureterogram	A radiograph of the bladder and ureter obtained after instillation of a contrast medium
cystoureterogram	Radiograph of bladder and ureter obtained after instillation of a contrast medium
cystourethrography	Radiography of the bladder and urethra
cystourethrography	Radiography of bladder and urethra by using radiopaque contrast medium

vesic/o	Bladder
vesicotomy	Incision of the bladder
vesicocele	Hernia of bladder into vagina
vesicoclysis	Injection of fluid into the bladder
vesicofixation	Attachment of the uterus to the bladder or the bladder to the abdominal wall
urethr/o	**Urethra**
urethrorrhaphy	Suture of the urethra
urethrostomy	The formation of a permanent fistula opening
urethrotrigonitis	Inflammation of the urethra and the trigone of the bladder
urethrodynia/urethralgia	Pain in the urethra
urethratresia	Occlusion or imperforation of the urethra
urethrectomy	Surgical excision of urethra
urethrography/urethrograph	Radiography of urethra
urethrometer	Instrument to measure diameter of urethra
urethrorrhea	Abnormal discharge from urethra
urethroscopy/urethroscope	Examination of the mucous membrane of urethra
urethrospasm	Spasmodic stricture of the urethra
urethropexy	Surgical fixation of urethra
urethroplasty	Reparative surgery of urethra
urethrotomy	Incision of urethral stricture
urethritis	Inflammation of urethra
TUR	Transurethral resection
ureter/o	**Ureter**
ureteral	Concerning the ureter
ureteralgia	Pain in the ureter
ureterectasis	Dilation of the ureter
ureterocolostomy	Implantation of the ureter into the colon
ureterocystoscope	Cystoscope combined with a ureteral catheter
ureterography	Radiography of the ureter after injection of a radioactive substance
ureterohydronephrosis	Dilation of the ureter & pelvis of the kidney resulting from obstruction
ureteroplasty	Plastic surgery of the ureter
ureteronephrectomy	Kidney and ureter removal
ureteropyelitis	Inflammation of pelvis of the kidney and a ureter
ureteropyelonephrostomy	Removal of the renal pelvis and ureter
ureteropyeloplasty	Plastic surgery of the ureter & renal pelvis
ureteropyosis	Suppurative inflammation within a ureter
ureterolithiasis	Development of a stone in the ureter
ureteritis	Inflammation of the ureter
ureterolithotomy	Surgical incision for removal of a stone from ureter
ureterocele	Cystlike dilation of ureter
ureterolysis	Rupture of a ureter
ureterectomy	Excision of a ureter

ureterotomy	Incision or surgery of the ureter
ureterorrhagia	Hemorrhage from the ureter
lith- lith/o	**Stone**
lithocystotomy	Incision of the bladder to remove a kidney stone
lithogenesis	Formation of calculi
lithology	Science dealing with calculi
litholysis	Dissolving of stones
lithonephritis	Inflammation of the kidney because of a stone
lithotome	Instrument for performing lithotomy
lithotomy	Incision especially of the bladder for removal of a stone
lithotripsy	Use of shock wave or sound waves to crush the stone
lithectomy	Surgical removal of a calculus
nephrolithiasis	The presence of calculi (stone) in the kidney
nephrolithotomy	Renal incision for removal of a kidney stone
lithoclast	Forceps for breaking up large calculi
azot/o	**Urea, nitrogen**
azoturia	Increase in nitrogenous compounds
albumin/o- albumin	To provide collide osmotic pressure. Prevent plasma loss
albuminaturia	Presence of albuminates in urine
albuminuria	Amounts of serum protein
ur- ur/o, urin/o	**Uria, urine**
urodynia	Pain associated with urination
urography	Radiograph of the urinary tract after the introduction of a contrast medium
urologist	A physician who specializes in the practice of urology
urology / urinology	**Study of the urinary system, study of urine**
uroscopy	Examination of the urine
glycosuria	Abnormal amount of glucose in the urine
dysuria	Painful or difficult urination
nocturia	Frequent urination at night (after bedtime)
anuria	Absence of urine
oliguria	Low urine output (less than 400ml/day)
pyuria	Pus in the urine
polyuria	Excessive discharge of urine
hematuria	Blood in the urine
uremia / urinemia	In patients with renal failure
diuretic	Increasing urine secretion
diuresis	The secretion an passage of large amount of urine
enuresis	Involuntary discharge of urine
urinal	Container into which one urinates
urinalysis	Analysis of the urine
urinary	Secreting or containing urine
urinate	Pass urine from the bladder
urination	Release of urine from the body
urinometer	A device for determining the specific gravity of urine

urinoma	A cyst containing urine
BUN	Blood, urea, nitrogen
OTHER TERMS:	
micturate	To pass urine from the bladder
incontinent	Loss of self-control
distention	The state of being distended
retention	The act of keeping possession or holding in place
stricture	Narrowing or constriction of lumen of a tube
atony	Lack of normal tone of strength
bougie	A slender, flexible instrument for exploring and dilating the organs
flank	Part of the body between the ribs
orifice	The mouth, entrance, or outlet of any anatomical structure
reflux	A return or backwards flow
trigone	A triangular space between two openings
catheter	A tube passed into the body for evacuating fluids
filtrate	The fluid has been passed through a filter
meatus	Passage or opening
sphincter	Circular muscle constricting an orifice
fulguration	Destruction of tissue using high frequency electric sparks
retroperitoneal	Behind the peritoneum and outside the peritoneal cavity
polycystic kidney	Multiple cysts on or in the kidney
specific gravity	Ratio of weight of substance compared to equal volume of water
cortex / medulla	Outer layer of organ as distinguished from inner, or medulla
pelvis	Any basin-shaped structure or cavity
pyramid	Any part of the body resembling a pyramid; cone-shaped structures making up the medulla of the kidney
BPH	Benign prostatic hypertrophy
ATN	Acute tubular necrosis

Laboratory Tests and Clinical Procedures

Test/Procedure	Definition
PSA test	Measurement of levels of prostate-specific antigen in the blood
Semen analysis	Microscopic examination of ejaculated fluid
Castration	Surgical excision of testicles or ovaries
Circumcision	Surgical procedure to remove the prepuce of the penis
Digital rectal examination (DRE)	Finger palpation through the anal canal and rectum to examine the prostate gland
Photoselective vaporization of the prostate (Green Light PVP)	Removal of tissue to treat benign prostatic hyperplasia using a green light laser (laser TURP)
Transurethral resection of the prostate	Excision of benign prostatic hyperplasia using a

(TURP)	resectoscope through the urethra
Vasectomy	Bilateral surgical removal of a part of the vas deferens

Urologic Case Study #1

Fifty-six year-old women came to the clinic with a chief complaint of painless hematuria and clots. Although she was not a good historian, she denied any history of urolithiasis, pyuria, or previous hematuria. Nocturia had been present about 4 years. Endoscopy showed a carcinoma located about 2cm from the right ureteral orifice. There was no sign of metastasis. A partial cystectomy was carried out and the lesion cleared. A bilateral pelvic lymphadenectomy showed no positive nodes.

1. Which of the following was a previous symptom?
    a. Excessive urination at night
    b. Blood in the urine
    c. Pus in the urine
    d. Sugar in the urine
2. The term urologic refers to which system of the body?
    a. Digestive
    b. Respiratory
    c. Endocrine
    d. Excretory
3. The patient's chief complaint was:
    a. Small amount of urine
    b. Pain on urination
    c. Pus in the urine
    d. Blood in the urine
4. What diagnostic procedure was done?
    a. Lithotripsy
    b. Urinalysis
    c. Cystoscopy
    d. Renal angiography
5. What was the patient's diagnosis:
    a. Malignant tumor of the bladder
    b. Tumor in the proximal ureter
    c. Lymph nodes affected by the tumor
    d. Metastatic tumor of the ureter
6. What treatment was done?
    a. Ureteroileostomy
    b. Removal of tumor and subtotal removal of the bladder
    c. No treatment was necessary
    d. Removal of right ureter

Case Study #2

An eighteen-year old female athlete presents to the clinic with complaints of fever, dysuria, and shaking chills. Her urinalysis is shown below.

Test	UA Results	Normal
Color	Amber yellow	Amber yellow
Specific gravity	1.040	1.003-1.030
pH	8.4	4.6-8.0
Protein	Negative	Negative
Glucose	Negative	Negative
Ketones	Negative	Negative
Bili	Negative	Negative
WBC	>100	0
Bacteria	Bacilli (rods)	0
Sediment	WBC casts	none

What is the probable diagnosis?

a. Diabetes mellitus with glycosuria
b. Glomerulonephritis with staphylococcal infection
c. Nephritic syndrome with albuminuria
d. Urinary tract infection with pyelonephritis

Case Study #3

Test	Normal	UA Results
Color	Amber yellow	**Smoky-red (blood in urine):** renal calculi; tumor; kidney disease; cystitis; urinary obstruction
Appearance	Clear	**Cloudy (pyuria):** urinary tract infection
Specific gravity	1.003-1.030	**High:** renal calculi; diabetes mellitus **Low:** diabetes insipidus
pH	4.6-8.0	Alkaline: UTI
Protein	None or small amount	Proteinuria: nephritis; renal failure
Glucose	None	Glycosuria: diabetes mellitus
Ketones	None	Ketonuria; diabetes mellitus
Bilirubin	None	Bilirubinuria: hepatitis or gallbladder disease
Sediment	none	**Casts:** nephritis; renal disease

Name the appropriate test for detecting or evaluating each of the following:

1. Sugar in urine: _____
2. Level of bile pigment in urine: _____
3. Hematuria: _____
4. Albumin in urine: _____
5. Structures in the shape of renal tubules in urine: _____
6. Chemical reaction of urine: _____
7. Dilution or concentration of urine: _____
8. Acetones in urine: _____
9. Pus in urine: _____

KEY

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Name the appropriate test for detecting or evaluating each of the following:

1. Sugar in urine: **glucose**
2. Level of bile pigment in urine: **bilirubin**
3. Hematuria: **color**
4. Albumin in urine: **protein**
5. Structures in the shape of renal tubules in urine: **sediment**
6. Chemical reaction of urine: **pH**
7. Dilution or concentration of urine: **specific gravity**
8. Acetones in urine: **ketones**
9. Pus in urine: **appearance**