RADT-2350: RADIOGRAPHIC PATHOLOGY

Cuyahoga Community College

Viewing: RADT-2350 : Radiographic Pathology

Board of Trustees:
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Academic Term:
Fall 2024

Subject Code
RADT - Radiography

Course Number:
2350

Title:
Radiographic Pathology

Catalog Description:
Study and identification of selected pathologic conditions. Manifestations of diseases of the human body and their radiographic appearance. Adjustment of techniques due to pathologic changes and best imaging procedures will be covered.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
BIO-1221 Anatomy and Physiology for Diagnostic Medical
Imaging, and RADT-1351 Image Acquisition and Evaluation, or departmental approval: admission to program.

Outcomes

Course Outcome(s):
Perform examinations and handling of patients in various stages of pathologies.

Objective(s):
1. Define common terminology associated with the study of disease.
2. Differentiate between signs and symptoms of common diseases.
3. Distinguish between diagnosis and prognosis.

Course Outcome(s):
Perform examinations and handling of patients with various bacteria and viruses.

Objective(s):
1. Define given related terminology.
2. List requirements for bacterial growth.
3. Explain the disease process.
4. Recognize the need for Standard Precautions.
5. Differentiate between congenital and acquired diseases.
6. Discuss the effects of injury on various tissues.

7. Differentiate between a virus and bacteria.
8. State the cardinal signs of inflammation.
9. Describe the healing process.

Course Outcome(s):

Describe basic etiology and manifestations of pathological conditions and their relevance to radiological procedures for any of the following systems: Skeletal, Central Nervous System, Hemopoietic, Cardiovascular, Respiratory, Digestive, Hepatobiliary, Urinary, Endocrine, Reproductive

Objective(s):

1. Define given related terminology.
2. Discuss various imaging modalities possibly used to diagnose a pathological condition.
3. Differentiate between various congenital disorders, acute, chronic, and inflammatory conditions for each system and identify them on a radiograph.
4. Specify the etiology, pathogenesis, signs and symptoms, and prognosis of each pathology for given systems.
5. Explain changes in technical factors required to produce quality images of patients with pathological conditions.
6. Examine the radiographic pathology of various diseases in all systems listed.

Course Outcome(s):

Lab Objectives: Perform computer skills essential to the function of the Radiology department including retrieving images for each of the following systems: Skeletal, Central Nervous System, Hemopoietic, Cardiovascular, Respiratory, Digestive, Hepatobiliary, Urinary, Endocrine, Reproductive.

Essential Learning Outcome Mapping:

Information Literacy: Acquire, evaluate, and use information from credible sources in order to meet information needs for a specific research purpose.

Objective(s):

1. Examine the radiographic pathology of various diseases in all systems listed.
2. Identify imaging procedures and interventional techniques appropriate for diseases commonly used for all systems listed.
3. Present and critique radiographic pathologies and their specific etiology, pathogenesis, signs and symptoms, and prognosis for all systems.

Course Outcome(s):

Describe how to perform examinations and handle patients in various states and types of trauma.

Objective(s):

1. Explain methods of handling traumatized patients.
2. Define given related terminology.
3. Differentiate between the levels of trauma.
4. Describe the types of mechanical trauma.
5. Describe types of head trauma.
6. Identify various fracture types on given radiographs and other imaging modalities.
7. Categorize burn types.

Methods of Evaluation:

1. Quizzes, including both online and/or paper based
2. Midterm/final/written examination
3. Evaluation of radiographic pathology on radiographs
4. Assessment of pathologies
5. Completion of web-based activities for the lab portion

Course Content Outline:

1. Trauma - Assist in any examination and handling of patients in various states and types of trauma.
   a. Related terminology.
   b. Levels of trauma.

c. Glasgow coma scale.
d. Types of mechanical, thermal, chemical, electrical, and radiation trauma.
e. Types of head trauma.
f. Fat-pad sign.
g. Fracture healing process.
h. Identify various fracture types on given radiographs, and other imaging modalities.
    i. Simple or closed.
    ii. Compound or open.
    iii. Comminuted.
    iv. Non-comminuted or complete.
    v. Oblique.
    vi. Transverse.
    vii. Impacted.
    viii. Compression.
    ix. Avulsion.
    x. Spiral.
    xi. Greenstick or incomplete.
    xii. Pathologic.
    xiii. Pott's or Bi-malleolar vs. Tri-malleolar.
    xiv. Colle's vs. Smith's.
    xv. Salter Harris I-IV.
    xvi. Dislocation.
    xvii. Subluxation.
    xviii. Bennett vs. Boxer's.
    xix. Monteggia vs. Galeazzi.
    xx. Buckle.
    xxi. Jones.
    xxii. Stress.
    xxiii. Jefferson vs. Hangman's.
    xxiv. Skull fractures.

i. Strain vs. Sprain.
j. Avascular necrosis.
k. Hypothermia and hyperthermia.
l. Plumbism.
m. Categorize burn types.
n. Methods of handling traumatized patients.

2. Bacteria - Assist in examinations and handling of patients with various bacteria and viruses.
    a. Related terminology.
    b. Bacterial growth.
    c. Transmission, preventive precautions, and organism responsible infections.
    d. Chain of infection.
    e. Disease process.
    f. Virulence.
    g. Congenital and acquired diseases.
    h. Effects of injury on various tissues.
    i. Virus and bacteria size, classifications and characteristics.
    j. Fungi categories.
    k. Parasites and ascariasis.
    l. Signs of inflammation.
    m. The healing process.
    n. Standard precautions.
    o. MRSA and C. Diff.
3. Skeletal system.
    a. Anatomy of the skeletal system.
    b. Different types of joints in the body.
    c. Osteoblasts vs osteoclasts.

   d. Rickets.
   e. Osteoarthritis.
   f. Spondylolysis.
   g. Spondyloisthesis.
   h. Osgood Schlatter's disease.
   i. Legg-Clave Perthes disease.
   j. Congenital skeletal conditions.
      i. Osteopetrosis.
      ii. Osteogenesis imperfecta.
      iii. Achondroplasia.
      iv. Congenital hip dysplasia.
   k. Inflammatory skeletal conditions.
      i. Rheumatoid arthritis.
      ii. Gout.
      iii. Neuropathic arthritis.
      iv. Ankylosing Spondylitis.
      v. Osteomyelitis.
   l. Metabolic conditions.
      i. Osteoporosis.
      ii. Osteomalacia.
      iii. Paget's disease.
   m. Skeletal tumors.
      i. Osteochondroma.
      ii. Giant cell tumors.
      iii. Simple bone cysts.
      iv. Osteogenic sarcoma.
      v. Chondrosarcoma.
      vi. Ewing's sarcoma.
4. Central nervous system (CNS).
   a. CNS anatomy.
   b. Meninges.
   c. Spina bifida.
   d. Coupe and contra coupe injuries.
   e. Various skull fractures.
   f. Chiari malformation.
   g. Cerebral Palsy.
   h. Bell's palsy.
   i. Brachial plexus injury (BPI.)
   j. Herniated nucleus pulposus (HNP).
   k. Brain abscess.
   l. Hydrocephalus.
   m. Meningitis.
   n. Encephalitis.
   o. Thrombus.
   p. Embolism.
   q. Aneurysm types.
   r. Degenerative diseases of CNS.
   s. Cerebral vascular accidents.
      i. Treatments.
      ii. Prognosis.
   t. Epilepsy.
   u. Dementia and Alzheimer's.
   v. Amyotropic lateral sclerosis (ALS).
   w. Parkinson's disease (PD).
   x. Multiple sclerosis.
   y. Different types of strokes.

z. Gliomas.
aa. Meningioma.

5. Hemopoietic system.
   a. Blood cell types.
   b. Lymph system.
   c. Blood pressure.
   d. Arteriosclerosis vs atherosclerosis.
   e. Acquired immune deficiency syndrome (AIDS) vs. Human. immunodeficiency virus (HIV).
   f. Multiple myeloma.
   g. Leukemia.
   h. Blood dycrasias.
   i. Anemia.
   j. Hemophilia.
   k. Hodgkin's lymphoma vs. Non-hodgkins lymphoma.
   l. Infarct and ischemia.
6. Cardiovascular system.
   a. Cardiovascular anatomy.
   b. Primary and secondary hypertension.
   c. Cardiomegaly.
   d. Dextrocardia.
   e. Situs inversus.
   f. Congenital disorders.
      i. Patent Ductus Arteriosus.
      ii. Coarctation of the aorta.
      iii. Atrial septal defect (ASD).
      iv. Ventricular septal defect (VSD).
      v. Tetralogy of Fallot.
   g. Congestive heart failure.
   h. Degenerative disorders.
      i. Atherosclerosis vs arteriosclerosis.
      ii. Coronary artery disease (CAD).
   i. Aneurysms.
   j. Thrombosis.
   k. Embolism.
   l. Edema.
7. Respiratory system.
   a. Respiratory anatomy.
   b. Bullae and blebs.
   c. Infiltrates.
   d. Congenital disorders.
      i. Cystic fibrosis.
      ii. Hyaline membrane disease.
   e. Acute disorders.
      i. Croup.
      ii. Adult respiratory distress syndrome.
      iii. Pulmonary edema.
      iv. Atelectasis.
      v. Pneumothorax.
   f. Inflammatory disorders.
      i. Pneumonias.
      ii. Pneumocystis carinii.
      iii. Bronchiectasis.
      iv. Asthma.
      v. Pulmonary tuberculosis (TB).
      vi. Chronic obstructive pulmonary disease (COPD).
      vii. Emphysema.
      viii. Bronchiolitis obliterans.
      ix. COVID.

x. Pneumonconiosis.
xi. Histoplasmosis.
xii. Empyema.
xiii. Pleural effusion.
xiv. Pulmonary edema.
xv. Pulmonary embolism.

g. Neoplastic disorders.
i. Bronchogenic carcinoma.
ii. Metastases.

h. Lines and tubes.
i. Endotracheal tube.
ii. Chest tube.
iii. Central venous pressure line.
1. Swan-Ganz.
2. Hickman.
3. Port-A-Cath.

8. Digestive.
a. Gastrointestinal anatomy.
b. Abdominal regions and quadrants.

c. Congenital disorders.
i. Esophageal atresia.
ii. Tracheoesophageal fistula.
iii. Hypertrophic pyloric stenosis (HPS).
iv. Malrotation.
v. Hirshprung's disease.
vi. Diverticula vs diverticulosis.

d. Inflammatory disorders.
i. Varices.
ii. Gastroesophageal reflux (GERD).
iii. Ulcers.
iv. Gastroenteritis.
v. Regional enteritis (Crohn's disease).
vi. Ulcerative colitis.
vii. Appendicitis.
viii. Peritonitis.

e. Degenerative disorders.
i. Herniations.
ii. Umbilical and inguinal.

f. Mechanical obstructions.
i. Paralytic ileus.
ii. Small bowel obstructions.
iii. Large bowel obstructions.
iv. Volvulus.
v. Intussusception.
vi. Ascites.

g. Neurogenic disorders.
i. Achalasia.
ii. Esophageal diverticula.
iii. Zenker's.

h. Neoplastic disorders.
i. Colon cancer.
ii. Tumor of stomach.
iii. Tumors of esophagus.
iv. Polyps.

i. Lines and tubes.
i. Nasogastric tube.
ii. Gastric lavage.
iii. Dobhoff/Corpak.

    iv. Miller-Abbott.
    v. Cantor tube.
  j. Obesity.
9. Hepatobiliary.
  a. Hepatobiliary system anatomy.
  b. Contrast studies.
  c. Inflammatory disorders.
    i. Alcohol-induced liver disease.
    ii. Non-alcoholic fatty liver disease (NAFLD).
    iii. Cirrhosis.
    iv. Ascites.
    v. Hepatitis.
    vi. Cholelithiasis.
    vii. Cholecystitis.
    viii. Pancreatitis.
  d. Metabolic disorders.
    i. Jaundice.
  e. Neoplastic disorders.
    i. Hepatocellular carcinoma (hepatoma).
    ii. Metastatic liver disease.
    iii. Carcinoma of the pancreas.
10. Urinary system.
  a. Urinary system anatomy.
  b. Congenital disorders.
    i. Agenesis kidney.
    ii. Horseshoe kidney.
    iii. Supernumerary kidney.
    iv. Ectopic kidney.
    v. Nephroptosis.
    vi. Double ureters.
    vii. Polycystic kidney (PKD).
    viii. Ureterocele.
    ix. Diverticula.
  c. Inflammatory disorders.
    i. Urinary tract infections (UTI).
    ii. Renal cysts.
    iii. Pyelonephritis.
    iv. Glomerulonephritis.
    v. Tuberculosis.
    vi. Cystitis.
  d. Degenerative and Metabolic disorders.
    i. Renal failure.
    ii. Calcifications and calculi.
    iii. Hydronephrosis.
    iv. Reflux.
  e. Neoplastic disorders.
    i. Renal carcinoma.
    ii. Nephroblastoma.
    iii. Bladder carcinoma.
11. Endocrine system.
  a. Gigantism.
  b. Acromegaly.
  c. Dwarfism.
  d. Hyper and hypothyroidism.
  e. Myxedema.
  f. Grave's disease.
  g. Cushing's syndrome.
  h. Goiters.

i. Diabetes mellitus.
j. Function of the following glands:
    i. Pituitary.
    ii. Thyroid.
    iii. Parathyroid.
    iv. Adrenal.
    v. Pancreas.
    vi. Ovaries.
    vii. Testes.

12. Reproductive system.
    a. Female and male anatomy.

    b. Female disorders.
        i. Bicornuate uterus.
        ii. Endometriosis.
        iii. Ovarian cysts.
        iv. Polycystic ovarian syndrome (PCOS).
        v. Ectopic pregnancy.
        vi. Teratoma.
        vii. Leiomyoma.
        viii. Ovarian tumor.
        ix. Adenocarcinoma.
        x. Cervical carcinoma.
    c. Breast disorders.
        i. Mastitis.
        ii. Fibrocystic disease.
        iii. Fibroadenoma.
        iv. Breast cancer.
        v. Gynecomastia.
    d. Male disorders.
        i. Testicular carcinoma.
        ii. Prostate cancer.
        iii. Benign prostatic hypertrophy (BPH).
        iv. Cryptorchidism.
        v. Testicular torsion.
        vi. Hydroceles.
    e. Procedures.
        i. Hysterosalpingogram (HSG).
        ii. Mammography.

Resources

Crowley, Leonard V. *An introduction to human disease: pathology and pathophysiology correlations*. 11th ed. (Sudbury, MA) Jones and Bartlett, 2022.

Eisenberg, Ronald & Nancy Johnson. *Comprehensive Radiographic Pathology*. 7th ed. St. Louis, Mo.: Mosby / Elsevier, 2021.

Mace, James & Nina Kowalczyk. *Radiographic Pathology for Technologists*. 8th ed. St. Louis: Mosby, 2022.

Linn-Watson, TerriAnn. *Radiographic Pathology*. 2nd. Philadelphia: W.B. Saunders, 2014.

Resources Other

1. Aunt Minnie's http://www.auntminnie.com
2. Mayo Clinic http://mayoclinic.org
3. American Society of Radiologic Technologists http://ASRT.org
4. youtube http://youtube.com

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