NMED-1770: IMMUNOLOGY AND PATHOPHYSIOLOGY FOR SECTIONAL IMAGING

Cuyahoga Community College

Viewing: NMED-1770 : Immunology and Pathophysiology for Sectional Imaging

Board of Trustees:
2014-06-19

Academic Term:
Fall 2020

Subject Code
NMED - Nuclear Medicine Technology

Course Number:
1770

Title:
Immunology and Pathophysiology for Sectional Imaging

Catalog Description:
Introduction to pathophysiology and immunology. Emphasis is on common pathologies found in nuclear medicine, computed tomography, and magnetic resonance imaging and the appearance of these pathologies across multiple planes in various imaging protocols. Includes all commonly-imaged body systems with recognition of abnormal conditions across multiple planes and ability to make the associated imaging changes required to adequately demonstrate the patients pathology.

Credit Hour(s):
2

Lecture Hour(s):
2

Requisites

Prerequisite and Corequisite
Concurrent enrollment in NMED-1780 Sectional Anatomy for Advanced Molecular Imaging.

Outcomes

Course Outcome(s):
Explain the basic concepts of human immunity and pathophysiology.

Objective(s):
1. Identify the nature and courses of the pathologies relevant to diagnostic imaging.
2. Explain cell and antibody mediated immunity.
3. Explain the basic components and mechanisms for human immunity.

Course Outcome(s):
Differentiate between normal and abnormal anatomy appearance across varying planes for nuclear medicine, computed tomography, and magnetic resonance imaging images.

Objective(s):
1. Describe the effect of contrast agents on visualizing pathology.
2. Identify changes in anatomical sizes and shapes of structures that can indicate pathology.
3. Identify abnormalities created by contrast imaging agents or poor imaging techniques.
4. Display understanding of the signal characteristics displayed by abnormal tissues during various pulse sequences and imaging modes in illustrating pathological processes.

Course Outcome(s):

Identify common pathologies found in various imaging protocols of nuclear medicine, computed tomography, and magnetic resonance imaging, inclusive of all commonly-imaged body systems.

Objective(s):

1. Describe anatomical directions and positions.
2. Identify body cavities.
3. Identify anatomy and common pathologies recorded on multiplanar images of the head, sinuses, eye and vascular structures, brain, neck, thorax, abdomen, pelvis, spine, upper extremities, and lower extremities.

Methods of Evaluation:

1. participation
2. quizzes
3. worksheets
4. exams
5. case studies

Course Content Outline:

1. Immunity and disease pathology
    a. History and overview
    b. T cell receptors
    c. B cell receptors
    d. Effector Responses: Cell and Antibody Mediated Immunity
        i. Monocolonal antibodies
        ii. Human-anti-mouse-antibody response (HAMA)
    e. Hypersensitivity and Chronic Inflammation
    f. Infectious Diseases
    g. Immunodeficiency Disorders
    h. Cancer
2. Head Pathology
    a. Brain
        i. Vascular disorders
        ii. Congenital and hereditary disorders
        iii. White matter disorders
        iv. Trauma
        v. Other (i.e., aging, metabolic, idiopathic, iatrogenic, phakomatoses, etc.)
    b. Neoplastic disorders
    c. Infections and inflammatory disorders
    d. Eye and orbital contents
    e. Sinuses, pharynx (nasal and oral), and larynx
        i. Temporal bone and TMJ
        ii. Tumor and tumor-like disorders
        iii. Bell palsy
        iv. Vascular middle ear anomalies
        v. Fractures
        vi. Dislocated TMJ
3. Neck Pathology
    a. Masses
        i. Nasopharyngeal space
        ii. Parapharyngeal space
        iii. Parotid space
        iv. Retropharyngeal space
        v. Oropharyngeal space
        vi. Masticator space
        vii. Buccinator space
        viii. Carotid space
        ix. Laryngeal

        x. Angiofibroma
        xi. Hemangioma
        xii. Hygroma
        xiii. Thyroid
        xiv. Glomus jugulare
    b. Metastases
    c. Cysts
    d. Sialolithiasis
    e. Brachial Plexus
        i. Masses
        ii. Malignancy
        iii. Response to therapy
        iv. Trauma
4. The Spine Pathology
    a. Spine and spinal cord
    b. Tumor and tumor-like disorders
    c. Inflammatory disorders
    d. Vascular disorders
    e. Trauma
    f. Degenerative spine
    g. Other (e.g., congenital anomalies, demyelinating disorders, etc.)
5. Thorax
    a. Mediastinum
        i. Thyroid masses
        ii. Thymoma
        iii. Duplication cysts
        iv. Lymph node enlargement
        v. Lymphoma
        vi. Teratoma
        vii. Neurogenic
        viii. Pancoast tumors
        ix. Aneurysms
        x. Esophageal tumors
    b. Chest wall
        i. Malignant processes
        ii. Inflammatory lesions
    c. Respiratory system
    d. Cardiac and aorta
        i. Aneurysm
        ii. Dissection
        iii. Coarctation
        iv. Thrombus
        v. Infarction
        vi. Hypertrophic cardiomyopathy
        vii. Pericardial disease
        viii. Intracardiac masses
        ix. Valvular heart disease
        x. Congenital heart conditions
    e. Breast
        i. Dysplasia
        ii. Cysts
        iii. Benign tumors
        iv. Inflammatory conditions
        v. Carcinomas
        vi. Postsurgery or radiation
        vii. Implant rupture
6. Abdomen Pathology

a. Liver
    i. Hemangioma
    ii. Cysts
    iii. Abscesses
    iv. Hepatocellular carcinoma
    v. Hepatic metastes
    vi. Venous thrombosis
    vii. Homochromatosis
    viii. Transplant
    ix. Gallbladder and ductal anomolies
b. Pancreas
    i. Pseudocyst
    ii. Cystic fibrosis
    iii. Pancreatitis
    iv. trans;lants
    v. Adenocarcinoma
    vi. Islet cell tumors
    vii. Lymphoma
    viii. Metastases
    ix. Ductal anomalies
c. Kidneys
    i. Polycystic kidney disease
    ii. Renal cell carcinoma
    iii. Transitional cell carcinoma
    iv. Metastatic disease
    v. Wilm"s tumor
    vi. Nephroblastoma
    vii. Infarction
    viii. Infection
    ix. Transplant
d. Adrenals
    i. Adenoma
    ii. Metastasis
    iii. Pheochromocytoma
    iv. Neuroblastoma
    v. Hemorrhage
e. Spleen and lymphatics
    i. Infections
    ii. Benign focal lesions
    iii. Hodgkin and non-Hodgkin lymphoma
f. Gastrointestianl (GI) tract
    i. Colon polyps
    ii. Tumors
    iii. Congenital anomolies
g. Vascular disorders
    i. Renal artery stenosis

7. Pelvis Pathology
a. Female reproductive organs(uterus, ovaries, vagina and associated structures)
    i. Neoplastic disorders
    ii. Inflammatory disorders
    iii. Endometriosis
    iv. Ovarian cysts
    v. Other
    vi. Congenital anomalies and hereditary disorders
    vii. Traumatic disorders
b. Male reproductive organs (prostate, seminal vesicles and associated structures)

i. Neoplastic disorders
ii. Inflammatory disorders
iii. Other

c. Bladder
i. Neoplastic disorders
ii. Inflammatory disorders
iii. Other

8. Musculoskeletal Pathology
a. Skeletal system
i. Tramatic injury
ii. Bone fracture union
iii. Bone neoplasms and tumor-like lesions
iv. Inflammatory disorders
v. Other
vi. Soft tissues
1. Neoplastic disorders
2. Inflammatory disorders
vii. Joints
1. Fibrocartilage disorders
2. Ligament and tendon tears
3. Rotator cuff tear
4. Inflammatory disorders
5. Meniscal disorders
a. Meniscal tears
b. Menicsal cysts
c. Discoid lateral meniscus
viii. Other
1. Trauma
2. Congential anomalies and hereditary disorders
3. Bone marrow abnormalities

9. General Vascular Disorders/Pathology
a. Atherosclerosis
b. Postradiaton injury
c. Dissections
d. Aneurysms
e. Graft patency
f. Venous mapping
g. Vena caval tumor invasion

.

Resources

Bolus, N., & Glasgow, K.W., (Eds.). (2018) *Review of Nuclear Medicine Technology (5th Ed.)*, Reston, VA: Society of Nuclear Medicine and Molecular Imaging.

Bushong, S.C., & Clarke, G. (2015) *Magnetic Resonance Imaging: Physical and Biological Principles (4th ed.)*, St. Louis, MO: Elsevier.

Damjanov, I. (2017) *Pathology for the Health Professions*, Elsevier Saunders.

DeMaio, D.N. (2018) *Mosby's Exam Review for Computed Tomography (3rd ed.)*, St. Louis, MO: Elsevier.

Jones, D.W., Hogg, P., & Seeram, E. (Eds.). (2013) *Practical SPECT/CT in Nuclear Medicine*, London: Springer-Verlag.

Lee, K.H. (2015) *Basic Science of Nuclear Medicine: Bare Bone Essential*, Reston, VA: Society of Nuclear Medicine and Molecular Imaging.

Mettler, F., & Guiberteau, M. . (2019) *Essentials of Nuclear Medicine and Molecular Imaging (7th ed.)*, Philadelphia, PA: Elsevier.

Patton, K.T., & Thibodeau, G.A. (2016) *Structure and Function of the Body (15th ed.)*, St. Louis, MO: Elsevier.

Seeram, E. (2016) *Computed Tomography: Physical Principles, Clinical Applications, and Quality Control (4th ed.)*, St. Louis, MO: Elsevier.

Top of page
Key: 3244