



TRINITY
MEDICAL SCIENCES
UNIVERSITY

SCHOOL OF MEDICINE

RADI 600 Radiology

Elective Description

The purpose of this elective is to familiarize the student with the basic observation and language skills necessary for interpretation of imaging studies. The student will become familiar with appropriate methods for common medical conditions and with basic procedures and anatomy and indications for imaging studies.

Credit: 2-4 semester credits

Prerequisites: SURG 500

Elective Background: Students will find radiology a diverse field that includes different imaging services: plain films, CT, MRI, ultrasound, fluoroscopy, vascular intervention, PET and nuclear imaging.

Elective Structure. Students will rotate in elected clinical settings to fulfill course requirements. Radiology preceptors will specify site requirements and see that students are provided with an appropriate level of clinical and didactic experiences. In order to successfully complete the clinical experience, all students must fulfill requirements specified by their preceptor. In fulfilling these requirements, students will gain an appreciation for appropriate utilization of a variety of diagnostic and treatment modalities. Required reading assignments are provided.

Entrustable Professional Activities

As a fourth-year student, the focus of skills development are those tasks important for entering residency training:

- Gather a history and perform a physical exam
- Prioritize a differential diagnosis following a clinical encounter
- Recommend and interpret common diagnostic and screening tests
- Enter and discuss orders and prescriptions
- Document a clinical encounter in the patient record
- Provide an oral presentation of a clinical encounter
- Form clinical questions and retrieve evidence to advance patient care
- Give or receive a patient handover to transition care responsibility
- Collaborate as a member of an inter-professional team
- Recognize a patient requiring urgent or emergent care and initiate evaluation and management
- Obtain informed consent for tests and/or procedures
- Perform general procedures of a physician
- Identify systems failures and contribute to a culture of safety and improvement

General Course Objectives

Medical Knowledge

- Demonstrate basic interpretation skills in evaluating images of the chest, breast, abdomen, and musculoskeletal system, and appreciate the importance of history and clinical data in the proper interpretation of imaging exams
- Describe how to use the radiographic findings to develop a differential diagnosis and outline subsequent diagnostic work-up for common medical problems such as bone trauma, chest pain, shortness of breath, abdominal pain and masses
- Review appropriate ordering of imaging, and understand the limitations of imaging, as well as the indications, contraindications, clinical impact and cost of imaging procedures
- Understand the principles of nuclear medicine, including the use of clinical positron emission tomography (PET)

Patient Care

- Understand the basic principles of safety and radiation protection for patients and health care practitioners

Detailed Learning Objectives

There are many areas of imaging. Here are objectives common areas students may encounter.

Musculoskeletal Imaging

- Recognize radiographic soft tissue clues for fractures of the wrist and elbow
- Understand basic concepts of MR imaging for cartilage injury, fracture, and edema
- Distinguish anterior from posterior dislocation of the hip on a pelvic radiograph
- Describe the radiographic findings seen in AVN of the hip
- Define a burst fracture of the spine and recognize it on AP and lateral films of the thoracic spine
- Describe standard views used to image the shoulder in trauma
- Identify the lines used to evaluate the cervical spine in acute trauma setting
- Understand the role of radiographs, CT, radionuclide bone scans, and MRI in evaluating patients with musculoskeletal problems

Abdominal Imaging

A. Identify the following structures on a KUB (plain film of the abdomen):

- Psoas muscle
- Spleen
- Stomach
- Colon
- Liver
- Small bowel
- Bladder
- Renal outline
- Rectum

B. Identify the following abnormal conditions on a flat and upright film of the abdomen:

- Small bowel obstruction
- Appendicolith
- Sigmoid volvulus
- Colonic obstruction
- Pneumoperitoneum
- Misplaced tubes and lines
- Splenomegaly
- Ruptured abdominal aortic aneurysm
- Pneumatosis of the bowel wall
- Ileus

- Renal calculus
- C. Identify the following normal structures on a CT scan of the abdomen and pelvis:
- Liver
 - Spleen
 - Adrenal glands
 - Pancreas
 - Kidneys
 - Superior mesenteric artery and vein
 - Splenic vein
 - Portal vein
 - Aorta
 - IVC
 - Iliac artery and vein
 - Small bowel
 - Colon
 - Duodenum
 - Stomach
 - Psoas muscle
 - Gallbladder
 - Urinary bladder
 - Ureters
- D. Identify the following abnormalities on an abdominal pelvic CT:
- Ascites
 - Spleen and liver lacerations
 - Ruptured aortic aneurysm
 - Small bowel obstruction
 - Renal calculi
 - Liver metastasis
 - Intrahepatic biliary dilation
 - Toxic megacolon
 - Intestinal perforation
- E. Describe the imaging workup of abdominal pain, masses, and trauma.
- F. Describe the imaging options for the evaluation of: inflammatory bowel disease, jaundice, hepatic neoplasms, biliary disease, hematuria, urological neoplasms, and renal failure.
- G. Describe the findings of ruptured abdominal aortic aneurysm on KUB and CT.

Breast Imaging

- Discuss current recommendations of the American College of Radiology (ACR), National Cancer Institute (NCI), and American Cancer Society (ACS) for mammography screening for various age groups
- Describe the role of ultrasound and MR in the evaluation of breast masses
- Describe the indications for ordering screening and diagnostic mammograms and understand the difference

Cardiothoracic Imaging

- Identify a pneumothorax on an upright chest radiograph and list several causes of this condition
- Identify a pneumothorax on a supine chest radiograph
- Identify pneumomediastinum on a chest radiograph and list several causes of this condition
- Identify and list several possible causes of collapse of the lung

- Identify lobar consolidation on a chest radiograph and CT scan and list several causes of this condition
- Differentiate complete opacification of a hemithorax as pleural effusion, lung collapse, or lung consolidation/mass based on the position of the mediastinum
- Recognize the development of an enlarging pleural fluid collection on a chest radiograph of a patient with pneumonia and suggest the diagnosis of empyema and role of chest CT scanning
- Identify the findings of left heart failure on a chest radiograph
- Define, identify, and describe the significance of the silhouette sign and the air bronchogram sign on a chest radiograph
- Identify a malpositioned chest tube, feeding/nasogastric tube, endotracheal tube, pacemaker leads, pulmonary artery catheter, and central venous catheter on a chest radiograph, and state the desired location for each
- Identify an abnormal mediastinum on a frontal chest radiograph and discuss the diagnosis of aortic disease or injury
- For cardiac MRI:
 - Identify appropriate indications for cardiac MRI
 - Describe differential diagnosis of abnormal delayed myocardial contrast enhancement
- For cardiac CT:
 - Identify appropriate indications for cardiac CT and thoracic Ct angiography
 - Review radiation doses and their implications with cardiac CT

REQUIRED TEXTBOOKS and Other Resource Material

Smith WL, TA Farrel. 2014. Radiology 101: The Basics and Fundamentals of Imaging, 2nd edition. Wolters Kluwer, Lippincott Williams & Willams.

Additional Resources:

These sites have excellent resources for students to review.

<http://www.med-ed.virginia.edu/courses/rad/> - University of Virginia has provided excellent electronic tutorials on several radiology topics. Chest imaging is an especially helpful module.

<http://rad.usuhs.edu/medpix/index.html> - Medpix is an excellent source for cases. It is recommended that you submit your case presentations for web publishing.

<http://www.rsna.org/> - Radiology Society of North America. One of major radiology professional organizations. Publishers of *Radiology*, aka "The Gray Journal" (<http://radiology.rsnaajnl.org/>) and *Radiographics* (<http://radiographics.rsnaajnl.org/>). Online subscription and hardcopy available via NMCS medical library.

<http://www.arrs.org/> -American Roentgen Ray Society. Another major general radiology professional organization. Publishers of American Journal of Radiology, aka "The Yellow Journal" (<http://www.ajronline.org/>). Online subscription and hardcopy available via NMCS medical library.

<http://www.acr.org/> - American College of Radiology. Professional organization of radiologists. Provides an excellent 'Case of the Day'.

<http://www.auntminnie.com/> - Aunt Minnie.com offers reference information, Case of the Day, and other useful radiology information for interns, residents, and medical students. Also has medical student and resident 'forums' where you can pertinent issues. Free membership.

<http://www.radiologyeducation.com/> - Mostly updated links to numerous radiology websites

Evaluation

The evaluation will include the entrustable professional activities. The clerkship preceptor will evaluate those relevant to this clerkship experience.

GRADES

This elective is graded Satisfactory/Unsatisfactory.

POLICIES

ACADEMIC DISHONESTY

The University holds its students to the highest standards of intellectual integrity. Therefore, the attempt of any student to pass any examination by improper means, present work which the student has not performed or aid and abet a student in any dishonest act may result in disciplinary action including immediate dismissal. Any student witnessing or observing a perceived violation of academic dishonesty is required to report it as outlined in the Guidelines. Students failing to report an observed violation may also receive disciplinary action.

ATTENDANCE POLICIES

Attendance of lectures and laboratories is based on the University's stated attendance policy. Refer to the Student handbook for more information.

CONDUCT

The University expects all students to be responsible individuals who possess the highest standards of integrity, honesty and personal conduct. These traits are prerequisites to independent learning, professional development, the successful performance of academic and clinical assignments, and the conduct of one's personal life. Accordingly, students are expected to adhere to a standard of behavior consistent with the University's high standards at all times off and on campus. Compliance with institutional rules and regulations, in addition to city, state and federal laws, is expected.

COPYRIGHT POLICY

Trinity Medical Sciences University must respect and observe the right and privileges of copyright holders, obey the United States Copyright Act and preserve the integrity of its internal network systems. All students must sign the technology and software use policy. A copy of this policy may be obtained from the Information and Technology Department.

DRESS CODE

All students are expected to maintain the highest standards of professional appearance at all times. During years one and two and while on campus. Medical students are required to wear scrubs or white coats with appropriate dress. Appropriate dress for clinical students includes business slacks with open-collar shirt for men, and business slacks or skirt with professional shirt or sweater for women.

Trinity School of Medicine Faculty Contact Information

Marc Zubrow, MD mzubrow@trinityschoolofmedicine.org