Resident Core Curriculum
Body Procedures / US & Body CT

Body procedures are a competency component when the resident is assigned to the Ultrasound or Body CT services. The information below identifies the goals and objectives, together with readings that the resident is expected to meet.

General Goals: The goals include objectives required for every level of training with graduated levels of supervision and responsibility. All aspects of body imaging are incorporated into the residency procedure service, including biopsy, aspiration, and drainage. Over time, the resident will become progressively more knowledgeable about normal radiographic anatomy, physiology of body organs, and the radiological appearances of diseases. In addition, the resident will demonstrate a progressively increasing understanding of disease entities, their clinical presentations, and current modes of treatment.

Resident Daily Work Responsibilities (OVERALL BENCHMARKS/OBJECTIVES for Self-Evaluation)

1. Residents assigned to body imaging will be available for consultations by technologists, referring providers, and other health care providers, except during conference times (unless involved in a procedure), when the attending faculty or fellow will cover.
2. Resident questions will be referred to the supervising faculty covering body procedures.
3. Resident review of cases with the supervising faculty will be conducted as many times in the day as necessary to keep an efficient workflow.
4. All resident examinations will be dictated by the end of every working day.
5. Residents will check and sign his/her reports prior to final verification by supervising faculty.
6. Residents must be familiar with the operation of all imaging equipment.
7. Residents must acquire knowledge of radiation protection and ways to reduce radiation exposure to both patients and hospital personnel. The resident will be supervised to assure that safe practices are followed.
8. Residents must become proficient at detecting abnormalities demonstrated by plain films and contrast examinations and be able to generate meaningful differential diagnoses.
9. Residents will learn current methods for performing diagnostic procedures such as biopsy, aspiration/drainage, and more complex procedures.
10. Residents will acquire an understanding of the proper preparation of patients for examinations and appropriate follow-up afterward. At the start of every working day, the resident will be familiar with the patient schedule and anticipate need for any procedures. The resident will check requisitions for the next working day to evaluate for appropriateness of the requested procedure or if additional exams/protocols need to be performed. Absent clinical indication or seemingly inappropriate requests will be clarified and discussed with the referring physician.
11. Residents will do in-depth reading and study, along with a review of teaching file cases, to become knowledgeable about the normal anatomy and physiology of body organs and the radiologic appearances of diseases, and gain a general understanding of the disease entities, their clinical presentations, and certain modes of treatment.

12. Residents will serve as a secondary consultant to referring physicians regarding body imaging. This will strengthen the confidence of the resident in the very important role every radiologist must perform throughout his/her career as a consultant to referring providers.
13. Residents will become prepared to pass the core examination of the American Board of Radiology.
14. Residents will teach and share knowledge to medical students, radiologic technologists, technology students, and junior residents.
15. Residents are expected to attend 8:00 AM body procedure huddle every morning
16. Residents will participate in the preparation and presentation of imaging studies at the weekly 8:00 AM Wednesday Interesting Case Conference.
17. The Resident will participate in the presentation of interesting case discussions during daily morning huddle

Supervising Faculty Responsibilities:

1. Supervising faculty will be available at all times for any questions or consultations needed by the resident.
2. Supervising faculty will review all cases with the residents before the end of the day.
3. Supervising faculty will provide the resident with constructive feedback in any problem areas encountered during the rotation.
4. Supervising faculty will verify resident-generated reports in a timely manner and inform the resident of any major changes made.

Educational Goals and Objectives:

Patient Care and Technical Skills:
PCTS1: Consultant

- Demonstrate knowledge of the ACR practice guidelines and technical standards for body imaging and procedures
- Familiarity with available medical records and how to access them for the purposes of patient care
- Round on all inpatient drains, record output and appearance of drain site
- Act as a consultant in body radiology to the clinical services

PCTS2: Competence in Procedures

- Familiarity with the operation of imaging equipment
- Develop a knowledge of the preparation and aftercare required for more complex procedures
- Continue to improve skills for performing radiographic examinations, and tailor examinations to answer all questions being asked by the clinician; anticipate those questions that should have been asked but were not
- Demonstrate knowledge of indications for the examinations requested (when the reason for the examination is not clear, the resident will effectively communicate with the patient and referring physician until clarified)
- Familiarity with all scheduled cases for that day by developing a preliminary plan for

each case and discussing it with attending

- Know the proper preparation of patients for interventional procedures and the appropriate follow-up afterwards
- Understand biopsy patient preparation, technique, risks/potential complications, optimization for minimal procedure risk and maximum procedure success, and be able to perform the following procedures: Lung: CT guided FNA and core biopsies of lung nodules/masses; Liver: ultrasound guided core biopsy of diffuse liver disease (cirrhotics, non-cirrhotics, and transplants), and ultrasound guided FNA and core biopsy of liver lesions; Adenopathy/Masses of chest/abd/pelvis: Ultrasound and CT guided FNA and core biopsy; Thyroid: Ultrasound guided FNA (and core); Pelvis: Transvaginal ultrasound guided FNA and core biopsy
- Understand aspiration/drainage patient preparation, technique, risks/potential complications, optimization for minimal procedure risk and maximum procedure success, and be able to perform the following procedures: Abscess: CT/Ultrasound/TVUS guidance, aspiration or drainage; Paracentesis: diagnostic and therapeutic; Thoracentesis: with and without chest tube placement; Pneumothorax: CT (and US) guided chest tube placement
- Understand patient preparation, technique, optimization, risks/potential complications, and be able to participate (performance is not expected) in the following complex procedures: Aspira catheter placement for refractory ascites; Renal Cryoablation; Splenic, Renal, Pancreas transplant biopsies; Gastrostomy tube placement; PEG wire placement for guidance of endoscopic PEG tube placement
- Detect abnormalities while procedures are in progress, such as 1) disease recognition skills will continue to increase on plain radiographs and contrast studies, and 2) begin to develop a thorough knowledge of the differential diagnoses for the pathology that is found
- Continue to develop skills in body procedures under the guidance of more experienced radiologists

Medical Knowledge:

MK1: Protocol Selection and Optimization of Images

- Learn the basic physics of radiography
- Observe and learn the techniques to achieve high-quality diagnostic examinations
- Recommend the appropriate study based on the clinical scenario and understand the relative strengths of each modality
- Protocol cases, in consultation with the attending, to assure that the examination is appropriate and of sufficient quality to address the clinical concerns of the patient and referring physician
- Demonstrate the ability to recommend additional imaging studies as appropriate to better assess findings on body imaging studies
- Explain the impact of the radiology findings on patient care, including what imaging studies may/may not be appropriate

MK2: Interpretation of Examinations

- Recognize the more common abnormalities encountered
- Develop a knowledge of normal and abnormal anatomy of the gastrointestinal tract as demonstrated on contrast studies

- Develop a knowledge of the normal and abnormal anatomy of the body as demonstrated on contrast studies
- Develop a knowledge of the differential diagnoses of the more commonly encountered abnormalities
- Demonstrate the ability to recognize and describe common medical conditions depicted on body imaging studies
- Familiarity with the anatomy of the organs examined in every case
- Familiarity with imaging findings of common acute and chronic body diseases
- Identify pathology in order to interpret routine studies with accuracy appropriateness to the level of training when presenting to the attending
- Distinguish between normal and abnormal body anatomy to level of training when presenting to the attending and demonstrate improvement compared to the prior rotation
- Relate the imaging findings to the clinical condition and its pathology
- Obtain a broad understanding of body diseases, their clinical features, radiographic manifestations, and current modes of treatment
- Review all studies with the supervisor faculty attending

System-Based Practice:

SBP1: Quality Improvement

- Familiarity with departmental procedures, contrast safety, and sedation required in the performance of examinations
- Make suggestions to improve methods and systems utilized in radiology whenever appropriate

SBP2: Health Care Economics

- Demonstrate knowledge of ACR appropriateness criteria and cost effective imaging evaluation of common disorders
- Show ability to interact with referring providers regarding cost effective and streamlined evaluation for differing clinical entities

Practice-Based Learning and Improvement:

PBLI1: Patient safety: contrast agents; radiation safety; MR safety; sedation

- Aware of the basic principles of radiation protection in order to reduce as much as possible the radiation dose to the patient and reduce exposure to healthcare providers
- Understand the indications for and contraindications to use of intravenous radiographic contrast, and be able to monitor its administration
- Recognize and treat reactions to intravenous contrast
- Understand the indications and contraindications to the different types of contrast, dosages, side effects, and the differences and relative merits of single and double contrast studies.
- Develop a knowledge of the preparation and aftercare required for the common examinations
- Understand the physics of radiation protection and how to apply it to routine studies
- Become knowledgeable about the different contrast agents available, begin to recognize abnormalities that are demonstrated on plain radiographs
- List the risk factors for allergic reaction to intravenous contrast media

- State the proper assessment and treatment for allergic reactions to contrast media

PBLI2: Self-Directed Learning

- Show evidence of independent study using textbooks from reading list
- Demonstrate appropriate follow up of interesting cases
- Research interesting cases as directed by faculty
- Identify, rectify, and learn from personal errors
- Incorporate feedback into improved performance
- Efficiently use electronic and print sources to access information
- Demonstrate evidence of independent reading and learning through use of printed and electronic resources
- Follow up on abnormal or interesting cases through personal communication with the referring physician or patient medical records
- Understand the clinical management of the conditions encountered

Professionalism:

PROF1: Professional Values and Ethics

- Demonstrate respect for patients, families, and all members of the healthcare team and be able to discuss significant radiology findings
- Respect patient confidentiality at all times
- Present oneself as a professional in appearance and communication
- Demonstrate a responsible work ethic with regard to work assignments
- Observe ethical principles when recommending further work-up
- Promptness and availability at work are required of every resident

Interpersonal and Communication Skills:

ICS1: Effective Communication with Patients, Families, and Care Givers

- Appropriately obtain informed consent
- Obtain consent for more complex procedures and answer all questions the patient may have
- Explain the nature of the examination or findings in an examination to patients and their families when needed
- Communicate with the patient at all times during the examination to ensure that patient remains comfortable
- Adequately explain each examination to the patient in order to ensure that the patient feels comfortable and to provide patient care that is compassionate, appropriate, and effective

ICS2: Effective Communication with Members of the Health Care Team

- Communicate effectively with all members of the health care team (technologists, medical students, fellows, residents, allied health providers, support staff, and attending physicians/radiologists)
- Call results to the referring physicians and show ability to interact with referring physicians
- Interact with referring providers when reviewing cases involving radiographs and body

imaging studies and show ability to provide preliminary readings, follow up with attending radiologists, formulate a plan of complex cases, and communicate any changes to referring providers

- Able and willing to participate in clinical conferences in which imaging studies are used to guide patient care/evaluations and be able to demonstrate understanding of how imaging relates to the clinical care of the patient
- Produce concise reports that include all relevant information
- Communicate effectively the results of studies to referring providers whenever needed (for emergent studies, this will be accomplished in a timely manner)
- Effectively convey the findings of examinations through accurate dictation of reports
- Use the PACS, voice recognition systems, and hospital information systems to become proficient in dictating reports of significant radiographic findings in a concise and clear manner
- Dictate and correct reports in a timely fashion to avoid delay in patient disposition
- Use appropriate language in communicating to referring providers through reports or consultations so proper management decisions can be made
- Thorough dictations will be made with indications, techniques, findings, and conclusions
- Competent in using PACS, voice recognition systems, and the hospital patient information systems in the daily accomplishment of the workload and instruct others in their use
- Assist with supervision and teaching of medical and radiology technologist students

Monitoring and Assessment of Resident Performance

The resident's progress will be monitored by the faculty on the service. At the end of each rotation, the resident will receive a consensus evaluation of performance from the faculty on service. Deficiencies or substandard performance will be discussed personally and privately with the resident and will be brought to the attention of the Residency Program Director by the attending radiologist. Resident performance is also evaluated through direct observation, case logs, multi-source professional evaluations, structured case discussion, review of patient outcomes, and other performance evaluation methods as determined by the program.

Reading List for All Years

1. Image-Guided Interventions: Expert Radiology Series (Expert Consult - Online and Print), 2e Hardcover – September 23, 2013 by Matthew A. Mauro MD FACR (Author), Kieran P.J. Murphy MB, FRCPC, FSIR (Author), Kenneth R. Thomson MD FRANZCR (Author), Anthony C. Venbrux MD (Author), & 1 more

2. Roy L Gordon, Robert K Kerlan, Mark W Wilson, and Jeanne M Laberge. *Interventional Radiology Essentials*. Lippincott Williams & Wilkins, 1st Edition, 2000.

3. John A Kaufman and Michael J Lee. *Vascular and Interventional Radiology: The Requisites*. Mosby, 1st Edition, 2003.

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