



CanMeds Goals & Objectives- JGH

1) Table of Contents

2) Chest Rotation.....	10
Program Goals:.....	10
Rotation Objectives:	10
Medical Expert.....	10
Communicator.....	10
Collaborator	10
Leader.....	11
Health Advocate.....	11
Professional.....	11
Scholar.....	11
Quantitative Expectations (per day).....	11
Junior Resident:	11
Senior Resident:	11
Rotation Responsibilities	11
Teaching Rounds.....	11
Recommended Texts	12
Junior Resident.....	12
Senior Resident.....	12
3) CT Scan Rotation Golds – JUNIOR RESIDENT	13
Goals	13

Duties.....	13
Rotation Objectives.....	13
Medical Expert.....	13
Communicator.....	14
Collaborator.....	14
Leader.....	14
Health Advocate.....	14
Professional.....	14
Scholar.....	14
Quantitative Expectations (per day).....	15
Distribution of Cases	15
Evaluation.....	15
Recommended Texts	15
4) CT Scan Rotation Guidelines – Senior Resident.....	16
Goals	16
Duties.....	16
Rotation Objectives.....	16
Medical Expert.....	16
Communicator.....	17
Collaborator.....	17
Leader.....	17
Health Advocate.....	17
Professional.....	17
Scholar.....	17
Quantitative Expectations (per day).....	17
Distribution of Cases	17
PGY 5 year:.....	18
Evaluation.....	18
Recommended Texts	18

5) ANGIOGRAPHY AND INTERVENTIONAL RADIOLOGY ROTATION	19
Goals	19
Medical Expert.....	19
Communicator.....	19
Collaborator	19
Leader.....	20
Health Advocate.....	20
Professional.....	20
Scholar.....	20
Quantitative Expectations (per day).....	20
Procedures.....	20
Arterial.....	20
Venous Procedures	20
Non-vascular Interventions	20
Drainages & Biopsies	20
Duties of Rotation	20
Case Reporting.....	20
Conferences.....	21
Teaching Files.....	21
Obtaining of Consents.....	21
Recommended Texts	21
Interventional texts.....	21
Angiographic Texts.....	21
On CD-ROM (acquired Feb. 1999).....	21
6) Mammography Rotation Guidleins.....	22
Medical Expert	22
Junior Resident.....	22
Senior Resident.....	22
Communicator	22

Junior Resident.....	22
Senior Resident.....	22
Collaborator.....	22
Junior and Senior Resident	22
Leader	23
Junior and Senior Resident	23
Health Advocate	23
Junior and Senior Resident	23
Scholar	23
Junior and Senior Resident	23
Quantitative Expectations (per Week)	23
Junior Resident.....	23
Senior Resident.....	23
Professional.....	23
Junior and Senior Resident	23
Responsibilities	23
Junior and Senior Resident	23
Evaluation.....	24
Junior and Senior Resident	24
Reading Material (all available in JGH Library).....	24
7) MRI ROTATION OBJECTIVES	25
ROTATION OBJECTIVES:	25
Medical Expert.....	25
Communicator.....	25
Collaborator	25
Leader.....	25
Health Advocate.....	25
Professional.....	26
Scholar.....	26

Quantitative Expectations.....	26
Distribution of Cases	26
Rotation responsibilities	26
Evaluation.....	26
Suggested Resources	26
Recommended texts:	26
Additional resources: Internet.....	27
Procedural skills.....	27
Goals and Objectives of Junior Resident.....	27
Rotation Responsibilities:	27
Goals and Objectives of Senior Resident	27
Rotation responsibilities:	27
Teaching:	27
8) MUSCULOSKELETAL ROTATION - JUNIOR	29
GOALS.....	29
Responsibilities	29
Quantitative Expectations.....	29
Rotation Objectives.....	29
Medical Expert.....	29
Communicator.....	30
Collaborator	30
Leader.....	30
Health Advocate.....	30
Professional.....	30
Scholar.....	30
Evaluation.....	30
Recommended texts:	30
9) MUSCULOSKELETAL ROTATION - SENIOR.....	31
Goals	31

Responsibilities	31
Quantitative Expectations.....	31
Rotation Objectives.....	31
Medical Expert.....	31
Communicator.....	31
Collaborator	32
Leader.....	32
Health Advocate.....	32
Professional.....	32
Scholar.....	32
Evaluation.....	32
Recommended texts:	32
10) NEURORADIOLOGY ROTATION.....	33
Goals	33
General Objectives.....	33
Knowledge	33
Specific Objectives.....	33
Medical Expert.....	33
Communicator.....	33
Collaborator	34
Leader.....	34
Health Advocate.....	34
Professional.....	34
Scholar.....	34
Rotation Responsibilities	34
Clinical	34
Teaching.....	35
Rounds.....	35
Evaluation.....	35

Reference Texts for Neuroradiology	35
11) Plain film- Emergency Radiology	36
Goals	36
Rotation Objectives.....	36
Medical Expert.....	36
Communicator.....	36
Collaborator	36
Leader.....	36
Health Advocate.....	36
Professional.....	37
Scholar.....	37
Rotation Responsibilities	37
Teaching	37
Evaluation:	37
Rotation Expectations:	37
Suggested References:	37
12) ULTRASOUND ROTATION GUIDELINES – JUNIOR RESIDENTS	38
Rotation Objectives.....	38
Medical Expert.....	38
Communicator.....	38
Collaborator	38
Leader.....	38
Health Advocate.....	38
Professional.....	38
Scholar.....	38
Quantitative Expectations (Per Day)	39
Rotation Responsibilities	39
1st week:	39
Subsequent weeks:	39

On call.....	39
Teaching.....	39
Evaluation.....	39
Resources.....	39
13) Ultrasound Rotation Guidelines – Senior Residents.....	39
Rotation Objectives.....	40
Medical Expert.....	40
Communicator.....	40
Collaborator.....	40
Leader.....	40
Health Advocate.....	40
Professional.....	40
Scholar.....	40
Quantitative Expectations (Per Day).....	40
Distribution of cases.....	40
Rotation Responsibilities.....	41
On call.....	41
Teaching.....	41
Evaluation.....	41
Resources.....	41
14) Nuclear Medicine Rotation Guidelines.....	42
Goals.....	42
Basic Science.....	42
Clinical Science.....	42
Medical Expert.....	42
Diagnostic Algorithm.....	42
Communicator.....	42
Collaborator.....	42
Leader.....	42

Health Advocate.....	43
Scholar:	43
Professional.....	43
Quantitative Expectations	43

2) Chest Rotation

Program Goals:

By the end of their training, residents should be able to detect and diagnose most intrathoracic pathologies, including those affecting lungs, airways, major vessels and mediastinal organs. The residents are expected to be familiar with all the modalities used in the investigation of chest diseases, their indications and possible contraindications.

Rotation's length: 4weeks

Rotation Objectives:

Medical Expert

At the end of the rotation, the resident should be able to:

- Recognize normal anatomy of the chest both on radiographs and CT scan.
- Identify different modalities used in the investigation of intrathoracic diseases.
- Know indications, advantages and disadvantages of different radiographic techniques (decubitus films, shoot through, lateral, etc.)
- Discern indications of different CT protocols (contrast-enhanced CT scans, high resolution CT scans, prone-supine CT scans, CT angiograms, etc).
- Recognize radiologic manifestations of most common intrathoracic pathologies, such as common infections affecting the chest, idiopathic pneumonias, sarcoidosis, airways pathologies (ex. Bronchiectasis) and mediastinal tumors (JUNIOR RESIDENT).
- Recognize radiological manifestations of rarer and uncommon infectious, inflammatory, vascular and neoplastic pathologies affecting the thorax (SENIOR RESIDENT).
- Familiarize himself/herself with transthoracic needle biopsies and drainages and their indications, complications and management of these complications (JUNIOR RESIDENT).
- Perform a procedure in a skilful and safe manner, adapting to unanticipated findings or changing clinical circumstances (SENIOR RESIDENT)

Communicator

During the rotation, the resident should be able to:

- Create organized reports describing the pertinent findings, the diagnosis and the recommendations.
- Be able to communicate effectively with patients, technologists and referring physicians.

Collaborator

During the rotation, the resident should be able to:

- Function as a consultant when interacting with other physicians.
- Establish and maintain positive relationships with requesting physicians and other colleagues
- Engage in respectful shared decision-making with physicians and other colleagues in the health care professions

Leader

During the rotation:

- -The resident should use effectively and efficiently available imaging resources and should be able to function as a team player and share these resources with his/her colleagues in radiology (cost effectiveness, etc.)

Health Advocate

During the rotation:

- The resident should demonstrate ability to be sensitive to patients' needs and be able to interact and explain to patients different modalities and procedures.

Professional

Throughout the rotation, the resident should:

- Show appropriate professional behaviours and relationships in all aspects of practice, demonstrating honesty, integrity, humility, commitment, respect, and maintenance of confidentiality.
- Exhibit understanding ethical and medico-legal requirements of radiologists.
- Demonstrate a commitment to patient safety and quality improvement.

Scholar

During the rotation, the resident should:

- -Establish personal learning goals and aim to achieve them
- -Actively participate in the teaching of medical students and non radiology residents (JUNIOR RESIDENT) and of junior radiology residents (SENIOR RESIDENT)

Quantitative Expectations (per day)

Junior Resident:

- 30 Plain films
- 4 CTs

Senior Resident:

- 50 Plain films
- 6 CTs

Rotation Responsibilities

- Interpret and review chest radiographs and/or CT scans with the attending radiologist assigned to daily chest teaching.
- Review plain chest films and CT scans of the chest,
- Provide supervision to the technologists for cases requiring a modified CT protocol (SENIOR RESIDENT)
- Report all cases supervised or reviewed with the assigned staff radiologist
- Assist +/- perform CT guided thoracic biopsies/procedures.

Teaching Rounds

- Involved in daily clinical teaching of medical students and non radiology residents.

- Assist to pulmonary service weekly rounds (when not conflicting with daily teaching rounds)

Recommended Texts

Junior Resident

- Felson's Principles of Chest Roentgenology (L.R. Goodman)
- The Requisites: Thoracic radiology (T.C. McLoud & P.M. Boisselle)
- Case review series: Thoracic Imaging (A.M. Ajlan & A. Semionov)

Senior Resident

- High resolution CT of the lung (W.R. Webb, N.L. Muller & D.P. Naiditch)
- Diagnostic Imaging: Chest (R. De Christenson)
- Thoracic Imaging. Pulmonary and cardiovascular Radiology (W. R. Webb, C. B. Higgins)

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Updated March 2017

3) CT Scan Rotation Golds – JUNIOR RESIDENT

Goals

By the end of residency training, the resident should be competent in standard diagnostic and interventional CT skills including:

- CT Neuro, ENT, Chest, abdomen, pelvis and MSK
- Specialized techniques such as CTA, Virtual colonoscopy, CT entrography.
- Advising and guiding the technologist regarding proper protocols or modifications as required.

Duties

- The resident should be available for CT from 8:00 A.M. until 5:00 P.M. except for conferences, lunch and reviewing cases with other staff.
- All CT cases should be reviewed by the resident with a staff radiologist and must be reported by the resident the same day as performed, whenever possible. Cases which have not been reviewed on the same day as done, must be reported by the resident on the same day as reviewed with staff.
- Residents are expected to supervise CT scanning after the first CT rotation.
Most CT interventions by residents are performed during the IR rotation.
The resident should take every opportunity to do reconstructions including 3D reconstructions.
- The resident should make himself/herself thoroughly familiar with all the technical aspects of CT scanning and should be able to answer all questions from technicians, staff and other residents on these matters.
- The resident should know how to protocol cases accordingly and treat contrast allergies.
- The resident should read extensively (see reading list) the standard texts in CT.
- Emergency studies done during the day must have an immediate report to be sent down to the ER. If a final report cannot be done immediately, a preliminary report must be sent. If a critical finding is identified, the referring physician must be contacted and this interaction must be recorded in the report.
- The resident is encouraged to bring interesting cases to rounds.
- The resident must ensure that all cases reserved by them have been completed, reviewed and dictated. If unable to complete reading them, residents must return the cases to the worklist.
- Teaching/supervision of elective medical students and/or off-service residents along with assigned radiologist.
- Teaching of CT technologists.

Rotation Objectives

Medical Expert

- To learn the appropriate indications for a variety of CT examinations.
- To demonstrate basic knowledge of protocols for all of the body systems mentioned above.
- To learn the normal anatomy of the above-mentioned systems.
- To develop basic image interpretation skills.

- To demonstrate knowledge of common pathologies (including trauma) and their associated CT findings.
- To learn formulation of appropriate differential diagnoses.
- To correlate CT findings with other imaging modalities (Plain films ,Ultrasound, MRI etc.)
- To learn the technique and gain experience performing CT-guided biopsy (FNA & core), paracentesis, including indications, contraindications as well as recognition and management of complications.
- To learn the basic CT physics and instrumentation related to equipment operation, image optimization and radiation dose reduction.
- To learn the indications as well as absolute and relative contra-indications of IV contrast.
- To learn identification and management of contrast reactions.
- To learn to prioritize studies based on their medical urgency.

Communicator

- To dictate well-organized reports, describing the history, relevant findings, diagnosis and recommendations.
- To demonstrate effective communication skills when dealing with patients, staff and referring clinical services.
- To communicate life-threatening findings directly to the referring physician in a timely fashion.
- To document pertinent conversations with the clinician in the report.

Collaborator

- To demonstrate good consulting skills when interacting with other physicians & health team members.
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care.

Leader

- Consider advantages and disadvantages of CT vs. other imaging modalities.
- To consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

Health Advocate

- Recognize and consider consent issues, patient comfort and other patient-related issues, when participating in or performing CT/CT-guided procedures.
- Be cognizant of radiation dose issues regarding repeat studies, accounting for age, medical status and alternate imaging possibilities.

Professional

- To demonstrate integrity, honesty and compassion.
- To practice understanding ethical and medical-legal requirements of radiologists.
- To demonstrate awareness of own limitations.

Scholar

- To set personal learning goals & objectives during rotation.
- To take a leadership role in the teaching of others, with teaching/supervision of junior residents on rotation, elective students, off-service residents.

Quantitative Expectations (per day)

- Junior Resident: 10-15 CTs

Distribution of Cases

- 40% Abdomen
- 25% Neuro
- 25% Chest
- 10% MSK

Evaluation

Assessed on a daily basis by staff assigned to CT as well as by staff evaluating performance at daily rounds.

Formal evaluation at end of 4 week rotation.

Recommended Texts

- 1) Webb WR, Brant WE, Major NM. **Fundamentals of Body CT**, 2005 - 2014
- 2) Lee JKT, Sagel SS, Stanley RJ, Heiken JP. **Computed Body Tomography with MRI Correlation**.
- 3) Federle, Jeffrey, **Diagnostic Imaging: Abdomen**, 2009
- 4) Ros PR, Morteale KJ, Pelsser VP, **CT and MRI of the abdomen and pelvis: A teaching file**, 2013
- 5) Case Review Series by Mosby
 - Genitourinary Imaging
 - Abdominal Imaging

**Revised by Dr.V.Pelsser
March 2017**

4) CT Scan Rotation Guidelines – Senior Resident

Goals

By the end of residency training, the resident should be competent in standard diagnostic and interventional CT skills including:

- CT Neuro, ENT, Chest, abdomen, pelvis and MSK
- Specialized techniques such as CTA, Virtual colonoscopy, CT entrography.
- Advising and guiding the technologist regarding proper protocols or modifications as required.

Duties

- The resident should be available for CT from 8:00 A.M. until 5:00 P.M. except for conferences, lunch and reviewing cases with other staff.
- All CT cases should be reviewed by the resident with a staff radiologist and must be reported by the resident the same day as performed, whenever possible. Cases which have not been reviewed on the same day as done, must be reported by the resident on the same day as reviewed with staff.
- Residents are expected to supervise CT scanning after the first CT rotation.
- Most CT interventions by residents are performed during the IR rotation.
- The resident should take every opportunity to do reconstructions including 3D reconstructions.
- The resident should make himself/herself thoroughly familiar with all the technical aspects of CT scanning and should be able to answer all questions from technicians, staff and other residents on these matters.
- The resident should know how to protocol cases accordingly and treat contrast allergies.
- The resident should read extensively (see reading list) the standard texts in CT.
- Emergency studies done during the day must have an immediate report to be sent down to the ER. If a final report cannot be done immediately, a preliminary report must be sent. If a critical finding is identified, the referring physician must be contacted and this interaction must be recorded in the report.
- The resident is encouraged to bring interesting cases to rounds.
- The resident must ensure that all cases reserved by them have been completed, reviewed and dictated. If unable to complete reading them, residents must return the cases to the worklist.
- Teaching/supervision of elective medical students and/or off-service residents along with assigned radiologist.
- Teaching of CT technologists.

Rotation Objectives

Medical Expert

- To learn the appropriate indications for a variety of CT examinations.
- To demonstrate basic knowledge of protocols for all of the body systems mentioned above.
- To learn the normal anatomy of the above-mentioned systems.
- To develop basic image interpretation skills.
- To demonstrate knowledge of common pathologies (including trauma) and their associated CT findings.
- To learn formulation of appropriate differential diagnoses.

- To correlate CT findings with other imaging modalities (Plain films ,Ultrasound, MRI etc.)
- To learn the technique and gain experience performing CT-guided biopsy (FNA & core), paracentesis, including indications, contraindications as well as recognition and management of complications.
- To learn the basic CT physics and instrumentation related to equipment operation, image optimization and radiation dose reduction.
- To learn the indications as well as absolute and relative contra-indications of IV contrast.
- To learn identification and management of contrast reactions.
- To learn to prioritize studies based on their medical urgency.

Communicator

- To dictate well-organized reports, describing the history, relevant findings, diagnosis and recommendations.
- To demonstrate effective communication skills when dealing with patients, staff and referring clinical services.
- To communicate life-threatening findings directly to the referring physician in a timely fashion.
- To document pertinent conversations with the clinician in the report.

Collaborator

- To demonstrate good consulting skills when interacting with other physicians & health team members.
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care.

Leader

- Consider advantages and disadvantages of CT vs. other imaging modalities.
- To consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

Health Advocate

- Recognize and consider consent issues, patient comfort and other patient-related issues, when participating in or performing CT/CT-guided procedures.
- Be cognizant of radiation dose issues regarding repeat studies, accounting for age, medical status and alternate imaging possibilities.

Professional

- To demonstrate integrity, honesty and compassion.
- To practice understanding ethical and medical-legal requirements of radiologists.
- To demonstrate awareness of own limitations.

Scholar

- To set personal learning goals & objectives during rotation.
- To take a leadership role in the teaching of others, with teaching/supervision of junior residents on rotation, elective students, off-service residents.

Quantitative Expectations (per day)

- Senior Resident: 20-30 CTs

Distribution of Cases

- 40% Abdomen
- 25% Neuro
- 25% Chest
- 10% MSK

PGY 5 year:

- To be competent in objectives listed above.
- To function as a junior consultant in the CT department

Evaluation

Assessed on a daily basis by staff assigned to CT as well as by staff evaluating performance at daily rounds.

Formal evaluation at end of 4 week rotation.

Recommended Texts

1) Webb WR, Brant WE, Major NM. **Fundamentals of Body CT**, 2005 - 2014

2) Lee JKT, Sagel SS, Stanley RJ, Heiken JP. **Computed Body Tomography with MRI Correlation**.

3) Federle, Jeffrey, **Diagnostic Imaging: Abdomen**, 2009

4) Ros PR, Mortele KJ, Pelsser VP, **CT and MRI of the abdomen and pelvis: A teaching file**, 2013

5) **Case Review Series by Mosby**

Genitourinary Imaging

Abdominal Imaging

Revised by Dr.V.Pelsser

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5) ANGIOGRAPHY AND INTERVENTIONAL RADIOLOGY ROTATION

Goals

Medical Expert

It is expected that residents who have completed the rotation will be able to do simple angiography on their own. Such procedures as simple femoral arteriograms, and straight forward abdominal aortograms with lower limb runoff. Simple selective angiography is not a minimum requirement. However, it is hoped that most residents will be capable of doing celiac, SMA and selective renal angiography. Residents should be capable of placing PICC lines independently and placing filters with minimal supervision. Residents should know contrast volumes and rates and in general, types of catheters and guide wires which are in common use. Residents should be familiar with the significant anatomy and be able to identify gross pathology.

Residents should be thoroughly familiar with indications and contra-indications and should know what type of pre-medication, antibiotic or analgesic is needed and be comfortable administering conscious sedation with knowledge of treatment of oversedation. Relevant clinical information should be known and limiting factors should be recognized and measures taken to correct the limitations. (Such things as contrast reactions, impaired renal function, bleeding problems.). As far as interventional procedures, residents are expected to be able to perform basic procedures, such as pleural and ascites drainages. However, they should be thoroughly familiar with the types of procedures that are available so that they may consult with their clinical colleagues and be in a position to suggest which types of interventional procedures are appropriate. Residents should be in a position to obtain informed consent from all patients for all of the above procedures, being able to inform the patients of potential complications and benefits. They should also be familiar with follow-up procedures on these patients.

Communicator

- Residents are expected to develop a systematic, complete but concise reporting style, covering all potentially clinically significant data.
- Residents must develop skills in discussing procedures with patients, understanding their concerns, and being sensitive to their right to information, balancing risks and benefits tailored to the individual patient needs.
- Residents must recognize the importance of effective communication with technical staff, nurses and secretarial staff so that clear messages are delivered in order that the correct treatment and follow up be arranged.
- Complications encountered during procedures must be immediately communicated to referring clinicians who should be aware of the problem and collaborate in decision-making to deal with the problem.

Collaborator

- Residents must demonstrate good consulting skills when interacting with other physicians and health team members.
- Residents must learn to interact appropriately with other radiology staff, demonstrating the importance of the team approach to patient care.
- Residents must learn and demonstrate the direct approach to teamwork in an emergency situation recognizing when direct immediate contact with relevant clinical colleagues is needed.
- Residents should be prepared to participate in interdisciplinary teaching rounds and research projects involving other specialties.

Leader

- Residents should demonstrate awareness of indications and contraindications to various angiographic and interventional procedures.
- Residents should consider the necessity and appropriateness of using costly equipment over less costly equipment to accomplish the required goal.
- Residents must consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

Health Advocate

- Residents must recognize and consider consent, patient comfort and other patient related issues when performing interventional acts, taking into account individual patient status and needs, also considering radiation exposure risk.
- Residents can play a critical role in advising patients of the role of smoking in vascular disease.

Professional

- Residents must demonstrate integrity, honesty, reliability and compassion.
- Residents must understand and practice the ethical and medico-legal requirements of interventional radiology.
- Residents must recognize their own limitations and always keep in mind that the patient is paramount.

Scholar

- Residents should set personal learning goals and objectives.
- Residents should be capable of teaching others (junior residents, medical students, nurses and technicians).
- Residents must learn the importance of reading texts and journals as well as online learning sites and realize the necessity of a lifelong commitment to learning.
- Residents should be prepared to participate in any ongoing or new research projects.

Quantitative Expectations (per day)

Procedures

Arterial

- Angiography 5-10 per month
- Vascular puncture 5 per month

Venous Procedures

- PICC Lines - 30
- IVC Filters 3
- Tunnelled Catheters 4

Non-vascular Interventions

- Nephrostomy tube (5)
- Biliary Drainage (5)
- Percutaneous Gastrostomy(5)

Drainages & Biopsies

- abscess, catheter drainage or ascites, pleural fluid, cholecystostomy (10-15)

Duties of Rotation

Case Reporting

- Residents are expected to review and report all cases they are involved with.

Conferences

- Residents are expected to attend all departmental conferences unless occupied doing procedures.
- Although angiography conference is generally given by staff, residents should be prepared to present certain topics as required.

Teaching Files

The resident is required to enter all interesting cases of teaching value into the angiogram teaching file together with all relevant clinical information and where possible, give references. The entire teaching file should be reviewed by the resident at all free moments and where he or she feels that corrections or additions are indicated, this should be done.

Obtaining of Consents

During the rotations, all consents for angiography and interventional procedures should be obtained by the interventional radiology resident who will be performing the procedure. This means that a thorough knowledge of the procedure be known, as well as potential complications and all significant data be noted.

Recommended Texts

There is no one single text that is all inclusive. At least three interventional texts are available which are worthwhile.

Interventional texts

- Valji K., Vascular and Interventional Radiology. WB Saunders 2006. ISBN 0721606210
- Kaufman J., Vascular and Interventional Radiology: Requisite Series. Mosby 2003. ISBN 0815143699
- Baum S. Pentecost M. Abrams' Angiography: Interventional Radiology 2nd edition, Lippincott William and Wilkins. 2006 ISBN 0781740894

Angiographic Texts

- Kadir S., Atlas of Normal and Variant Angiographic Anatomy W.B. Saunders 1991 ISBN: 072162894X
- Kadir S., Diagnostic Angiography. WB Saunders 1986. ISBN 0721610552 (**Must Read**)
- Baum S. Abrams' Angiography 4th edition (3 volumes). WB Saunders 1996. ISBN 0316082260
- Reuter S., Redman H., Cho K. et al. GastroIntestinal Angiography. WB Saunders 1986. ISBN 0721619479 Reference Text.

On CD-ROM (acquired Feb. 1999)

- -Baum S. Abrams' Angiography 4th edition on CD-ROM. Featuring the contents of Abrams' Angiography. Includes "Interventional Radiology" (1st edition) by Dr. Stanley Baum and Dr. Michael Pentecost. ISBN 0781714796
- -Dickey, KW et al.
- ACR Learning File "Vascular and Interventional"

Dr. E. Camlioglu, Dr. R. Satin & Dr. Constantin

March 2017

6) Mammography Rotation Guidelines

The resident should interpret as many mammograms as possible during the rotation and make good use of available teaching files including the ACR teaching files.

Medical Expert

Junior Resident

- Be familiar with the pathologic processes and various clinical manifestations associated with breast disease.
- Gain experience in detecting abnormalities on mammography by seeing at least 7 cases a day.
- Know how a mammogram is performed including technical pitfalls.
- Understand the limitations of mammography.
- Be able to perform breast imaging guided procedures including ultrasound-guided and stereotactic core biopsies.
- Know the BIRADS classification.

Senior Resident

- Be familiar with the pathologic processes and various clinical manifestations associated with breast disease.
- Gain experience in detecting abnormalities on mammography by seeing at least 15 cases a day.
- Know how to further investigate a mammographic abnormality appropriately (Including those referred from outside institutions with incomplete work up).
- Know how a mammogram is performed including technical pitfalls.
- Understand the limitations of mammography.
- Be able to perform ultrasound of the breast.
- Be able to perform breast imaging guided procedures including ultrasound-guided and stereotactic biopsy, and needle localization.
- Know the BIRADS classification.

Communicator

Junior Resident

- Produce concise and meaningful reports to referring physicians.
- Communicate findings and recommendations to patients and families.
- Explain procedures to patients including consent form, risk and benefits.

Senior Resident

- Produce concise and meaningful reports to referring physicians.
- Communicate findings and recommendations to patients and families.
- Explain procedures to patients including consent form, risk and benefits.
- Be able to discuss mammographic findings with the surgeons in the breast clinic as well as suggest further imaging workup and integrate clinical findings.

Collaborator

Junior and Senior Resident

- To understand the roles of the other members of the health care team and interact appropriately with them (clinicians, nurses, technicians, administrative and support personnel).

Leader

Junior and Senior Resident

- Manage time appropriately with the objective of optimizing the daily schedule and decrease patients wait time.
- Be aware of available imaging resources and use them efficiently when planning further work up.
- Dictate and sign reports in a timely fashion.

Health Advocate

Junior and Senior Resident

- Recognize the role of radiation dose when recommending further imaging.
- Identify the next best step in the work-up of a patient.
- Be familiar with the Quebec Breast Screening Program (PQDCS).

Scholar

Junior and Senior Resident

- Develop knowledge of the various breast pathologies and their radiological correlate.
- Set personal learning goals and objectives.
- Understand the new technologies for screening and diagnostic mammography
- Teach elective students basic principles of breast imaging.

Quantitative Expectations (per Week)

Junior Resident

- Mammograms: 25
- Ultrasound: 15
- Ultrasound-guided biopsies: 5
- Stereotactic biopsies: 5

Senior Resident

- Mammograms: 35
- Ultrasound: 20
- Ultrasound-guided biopsies: 10
- Stereotactic biopsies: 10

Professional

Junior and Senior Resident

- Demonstrate integrity, honesty and compassion.
- Demonstrate impeccable work ethics.
- Demonstrate awareness of own limitations.
- Demonstrate ethical behavior when interacting with patients.

Responsibilities

Junior and Senior Resident

- To perform physical examination of the breasts and to correlate these findings with the radiologic findings.
- To assess the technical adequacy of a mammogram and the need for repeat views.
- To be familiar with the typical imaging appearance of in situ and invasive breast carcinoma, as well as unusual forms of carcinoma; together with non malignant breast conditions (e.g. fibroadenoma, oil cyst, plasma cell mastitis, etc.).

- To indicate what further studies may be necessary including additional views, follow-up examinations, ultrasound, MRI and biopsy.
- To read mammograms and special views that are then reviewed with the attending radiologist.
- To review and correlate pathology results with mammograms and/or ultrasounds and recommend appropriate management.
- To report mammon and ultrasound cases and assign a BIRADS category at the end of the report.
- Review MRIs done with the attending radiologist (for senior residents only).

Evaluation

Junior and Senior Resident

- Evaluations done by at least 1 attending radiologist at the end of a 4 week rotation.

Reading Material (all available in JGH Library)

- | | |
|--|-----------|
| 1- BIRADS Atlas , Fifth Edition, ACR, 2013 | must read |
| 2- Breast Imaging Companion, Third Edition, Gilda Cardenosa, 2007 | must read |
| 3- Breast Imaging: The Requisites, Third Edition, Debra Ikeda. 2016 | must read |
| 4- Breast Ultrasound, A. Thomas Stabvros, 2003 | must read |
| 5- Breast MRI: Diagnosis and Intervention, Laura Liberman, 2005 | must read |

Percutaneous Breast Biopsy

Edited by Steve H. Parker, MD & Wm. E. Jobe, MD

Raven Press, 1993

Updated in March 2017

Dr. Francesca Proulx MD CM, FRCPC, dABR

7) MRI ROTATION OBJECTIVES

Total: 2 periods

PGY4/5: 4 weeks per period

MR Rotation encompasses Abdominal, Pelvic, Neuro, Thoracic and MSK.

Goals: By the end of residency training, the resident should be familiar with the indications for Neuro, Thoracic, MSK, abdominal and pelvic MR imaging and be able to protocol, detect and diagnose common pathologies of the above systems.

ROTATION OBJECTIVES:

Medical Expert

- Know the contraindications to MR imaging and know where to consult the source documents for questions that arise regarding potential contraindications.
- Know the appropriate techniques of dealing with contrast reaction and patient resuscitation in the MRI suite environment.
- Know the most frequent indications for standard MR imaging.
- Be familiar with basic sequences and their clinical applications.
- Be familiar with basic imaging artifacts and understand how they can be avoided.
- Recognize normal anatomy in the various imaging planes using the various sequences.
- Recognize pathology and be able to discuss the signal and enhancement characteristics of commonly seen pathologies of the above-mentioned systems.
- Know how to use reconstruction software for reading out MRA and MRV studies.

Communicator

- To dictate well organized reports describing relevant findings, diagnosis and recommendations.
- To demonstrate effective communication skills when dealing with patients, staff and referring clinical services.
- Communicate results in a timely manner, when necessarily by contacting the referring clinician for communication of urgent and critical results.

Collaborator

- To demonstrate good consulting skills when interacting with other physicians & health team members.
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care.

Leader

- To demonstrate awareness of the indications for MR examinations.
- Consider advantages and disadvantages of MRI versus other imaging modalities.
- To consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

Health Advocate

- Recognize and consider consent issues, patient comfort and other patient-related issues, when supervising body MR examinations.

Professional

- To demonstrate integrity, honesty and compassion.
- To practice understanding ethical and medical-legal requirements of radiologists.
- To demonstrate awareness of own limitations.
- Read and report all assigned cases in a timely manner.

Scholar

- To set up personal learning goals and objectives during rotation.
- To take a leadership role in the teaching of others, with teaching/supervision of junior residents on rotations, elective students and off-service residents.
- Manage the cases and share them with residents doing subspecialty rotations (neuro, msk, etc)

Quantitative Expectations

- ~ 15 MRIs for seniors
- 10 MRIs for juniors (R2-R3)

Distribution of Cases

- Neuro: 55%
- Abdomen-pelvis: 20%
- MSK: 25%

Rotation responsibilities

- **In first 1-2 weeks:** Focus on learning the basic sequences for MR imaging as well as understanding the most common indications and contraindications to MR imaging. Review cases with the staff assigned to the rotation on a daily basis and the staff to which a case is assigned.
- **Subsequent weeks resident responsibilities include:**
 - Interview patient, review patient charts, lab data, previous imaging history, in order to provide appropriate information for the involved technologists and study interpretation.
 - Provide supervision/guidance to the technologist for cases requiring a modified MR scanning protocol.
 - Report all cases he/she has been involved with (supervising or reviewing). All cases need to be read out in conjunction with the assigned staff radiologist.
 - Administer antispasmodics and sedatives to patients parenterally as needed.
 - Protocol MRI examinations
 - Senior residents should review breast MRI exams performed on Thursday with the assigned staff radiologist
- **Teaching:**
 - The resident is encouraged to bring interesting cases to resident rounds.
 - Supervision/teaching of elective medical students or off-service residents, along with assigned radiologist.
 - Teaching of MR technologists and students, as appropriate
 - Add interesting cases to the MRI log book for future teaching purposes.

Evaluation

- Assessed on a daily basis by staff assigned to MRI, as well as during education rounds.
- Formal ITER at end of 4-week rotation.

Suggested Resources

Recommended texts:

- Body MRI by Evan Siegelman
- MRI Principles by Donald Mitchell

- Magnetic Resonance Imaging of the Brain and Spine Atlas, Scott W.
- Diagnostic Neuroradiology by Anne G. Osborn, Julian Maack
- Magnetic Resonance Imaging in Orthopedics & Sports Medicine, Second Edition, By David Stoller, M.D.
- MRI, Arthroscopy and Surgical Anatomy of the Joints, by David Stoller, M.D.
- Musculoskeletal MRI, by Helmes, N.M., Anderson, M.W., Kaplan, P., and Dussault, R.

Additional resources: Internet

- Medical journals
- CT and MRI of the abdomen and pelvis: A teaching file
- Abloros, Koenraad Mortelet, Sylvester Lee, Vincent Pelsser

Procedural skills

Arthrogram portion of MR arthrogram study

Goals and Objectives of Junior Resident

The main objective of the rotation by a junior resident is to get an introduction to MR imaging of the CNS, musculoskeletal system and some training in abdominal and pelvic imaging. Breast imaging can be done by more senior residents.

Rotation Responsibilities:

- Focus on learning the basic sequences for MR imaging as well as understanding the most common indications and contraindications to MR imaging. Review cases with the staff assigned to the rotation on a daily basis and the staff to which a case is assigned.
- Learn basic sequences for MR imaging and basic understanding of the physics applied to MRI.
- Review 10 MRIs per day with the staff assigned to MRI
- The resident is encouraged to bring interesting cases to resident rounds.
- Supervision/teaching of elective medical students or off-service residents, along with assigned radiologist.
- Add interesting cases to the MRI log book for future teaching purposes.

Goals and Objectives of Senior Resident

Rotation responsibilities:

- **In first 1-2 weeks:** Focus on learning the basic sequences for MR imaging as well as understanding the most common indications and contraindications to MR imaging. Review cases with the staff assigned to the rotation on a daily basis and the staff to which a case is assigned.
- **Subsequent weeks resident responsibilities include:**
 - Interview patient, review patient charts, lab data, previous imaging history, in order to provide appropriate information for the involved technologists and study interpretation.
 - Provide supervision/guidance to the technologist for cases requiring a modified MR scanning protocol.
 - Report all cases he/she has been involved with (supervising or reviewing). All cases need to be read out in conjunction with the assigned staff radiologist.
 - Administer antispasmodics and sedatives to patients parenterally as needed.
 - Protocol MRI examinations
 - Senior residents should review breast MRI exams performed on Thursday with the assigned staff radiologist

Teaching:

- The resident is encouraged to bring interesting cases to resident rounds.

- Supervision/teaching of elective medical students or off-service residents, along with assigned radiologist.
- Teaching of MR technologists and students, as appropriate
- Add interesting cases to the MRI log book for future teaching purposes.

Updated March 2017

Dr. Mandalenakis

8) MUSCULOSKELETAL ROTATION - JUNIOR

GOALS

By the end of the musculoskeletal (MSK) imaging rotation, the **junior** resident should have a working knowledge of the following diagnostic and interventional modalities:

- Plain film radiography
- CT
- MRI
- Basic fluoroscopic techniques

Responsibilities

- The rotation begins at 8:00 A.M. until the work is completed. The resident is encouraged to arrive **before** 8 am to reserve cases under their name on the work list.
- The resident is expected to read a high volume of emergency room, in-patient and out patient musculoskeletal related plain films.
- In addition, CTs and MRIs should be read promptly by the resident and reviewed by the attending staff on the same day.
- The resident should also be involved in all fluoroscopic and bone or soft tissue biopsy procedures.
- The resident will take on an active role in teaching of elective medical students and/or off service residents.
- The resident must make sure that their reports are signed off **daily**.

Quantitative Expectations

The junior resident should be reading a minimum of:

- 100-150 x-rays per week
- 5-7 CTs per week (separate from spine CTs which are read as part of the neuroradiology rotation)
- 8-10 MRIs per week
- 4 arthrograms per week

Rotation Objectives

Medical Expert

- Understanding of pathophysiology of soft tissue, joint, and osseous abnormalities
- Giving a reasonable interpretation of findings demonstrated by all imaging modalities
- Learn detailed anatomy of the musculoskeletal system
- To formulate appropriate differential diagnosis
- Perform procedures under supervision utilizing US, CT or fluoroscopic guidance to diagnose or treat musculoskeletal related pathologies
- Become involved in appropriately protocoling MRI and CT scans and ask questions when needed

Communicator

- To dictate well-organized reports, describing relevant findings, diagnosis and recommendations
- To demonstrate effective communication skills when dealing with patients, staff and referring clinical services
- To communicate life-threatening findings directly to the referring physician in a timely fashion
- To document pertinent conversations with the clinician in the report

Collaborator

- To demonstrate good consulting skills when interacting with other physicians & health team members
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care

Leader

- To guide clinicians regarding which modality is more appropriate for work-up of any particular pathology
- Demonstrate efficient use of health care resources

Health Advocate

- Recognize, consider, and manage consent issues, patient comfort and other patient-related issues, when participating or recommending imaging procedures
- Recognize and consider radiation doses when recommending, approving and performing diagnostic or interventional cases
- To demonstrate knowledge and awareness of radiation protection as well as appropriate handling of bodily fluids

Professional

- Demonstrate integrity, honesty and compassion
- Ability to show sensitivity and care to the patient and the patient's family
- Practice understanding of ethical and medical-legal requirements of radiologists
- Demonstrate awareness of one's own limitations

Scholar

- Set personal learning goals & objectives during rotation(s)
- Take a leadership role in learning from others, with teaching/supervising of junior residents as well as elective students and off-service residents
- Create teaching files for use by future trainees if needed

Evaluation

- Discussed with the resident at the end of the rotation and formulated by all staff radiologists assigned to review with the resident

Recommended texts:

- Musculoskeletal Imaging: The Requisites by B.J. Manaster
- Arthritis in Black and White by Anne Brower and Donald Flemming
- Orthopedic imaging by Adam Greenspan
- Musculoskeletal MRI: Kaplan, Dussault, Helms, Anderson, Major

9) MUSCULOSKELETAL ROTATION - SENIOR

Goals

By the end of the musculoskeletal (MSK) imaging rotation, the **senior** resident should be competent in standard diagnostic and interventional skills. They should independently analyze and report:

- Plain film radiography
- CT
- MRI
- Basic fluoroscopic techniques

Responsibilities

- The rotation begins at 8:00 A.M. until the work is completed. The resident is encouraged to arrive before 8 am to reserve their cases on the PACS work list
- The resident is expected to read a high volume of emergency room, in-patient and out-patient musculoskeletal related plain films.
- In addition, all CTs and MRIs should be read promptly by the resident and reviewed by the attending staff on the same day.
- The resident should also independently perform fluoroscopic and bone or soft tissue biopsy procedures.
- The resident will take on an active role in teaching of elective medical students and/or off service residents.
- The resident must make sure that their reports are signed off daily.

Quantitative Expectations

The resident should be reading a minimum of:

- 100-150 x-rays per week
- 10 CTs per week (separate from CT spine, which is read as part of the neuroradiology rotation)
- 18-20 MRI's per week
- 4 arthrograms per week

Rotation Objectives

Medical Expert

- Understanding of pathophysiology of soft tissue, joint and osseous abnormalities
- Giving a reasonable interpretation of abnormalities demonstrated by all imaging modalities
- Learn detailed anatomy of the musculoskeletal system
- To formulate appropriate differential diagnosis
- Independently perform techniques under US, CT or fluoroscopic guidance to diagnose or treat musculoskeletal related pathologies
- Able to appropriately protocol MRI and CT scans independently

Communicator

- To dictate well-organized reports, describing relevant findings, diagnosis and recommendations
- To demonstrate effective communication skills when dealing with patients, staff and referring clinical services
- To communicate life-threatening findings directly to the referring physician in a timely fashion
- To document pertinent conversations with the clinician in the report

Collaborator

- To demonstrate good consulting skills when interacting with other physicians & health team members
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care

Leader

- To guide clinicians regarding which modality is more appropriate for work-up of any particular pathology
- Efficient use of health care resources

Health Advocate

- Recognize, consider, and manage consent issues, patient comfort and other patient-related issues, when participating or recommending imaging procedures
- Recognize and consider radiation doses when recommending, approving and performing diagnostic or interventional cases
- To demonstrate knowledge and awareness of radiation protection as well as appropriate handling of bodily fluids

Professional

- Demonstrate integrity, honesty and compassion
- Ability to show sensitivity and care to the patient and the patient's family
- Practice understanding of ethical and medical-legal requirements of radiologists
- Demonstrate awareness of one's own limitations while acting independently

Scholar

- Set personal learning goals & objectives during rotation(s)
- Take a leadership role in learning from others, with teaching/supervising of junior residents as well as elective students and off-service residents
- Create teaching files for use by future trainees if needed

Evaluation

- Discussed with the resident at the end of the rotation and formulated by all staff radiologists assigned to review with the resident

Recommended texts:

- Bone and Joint Imaging by Donald Resnick
- Arthritis in Black and White by Anne Brower and Donald Flemming
- Musculoskeletal MRI by Kaplan, Dussault, Helms, Anderson, Major
- Musculoskeletal imaging case review series
- Musculoskeletal Imaging: A teaching file by Felix Chew

Updated March 2017

Dr. F. Discepola

10) NEURORADIOLOGY ROTATION

Goals

The goals of the Neuroradiology rotation are to provide resident trainees with adequate knowledge base and expertise in the interpretation of images with regards to normal Central Nervous System (CNS) anatomy and common CNS pathology. The resident must also be able to advise the clinician and patient on the potential uses of Neurointerventional procedures. The trainee must acquire expertise in order to carry out diagnostic procedures such as myelograms and diagnostic lumbar punctures. In addition, the resident must feel comfortable consulting with Neurologists, Neurosurgeons and other clinicians.

The resident is expected to complete four (4) core rotations in Adult Neuroradiology, in addition to the 4 weeks spent in Pediatric Neuroradiology while at the Montreal Children's Hospital. Residents are expected to show proficiency in the supervision and interpretation of plain radiographs, CT, MRI, and infant neurosonography

General Objectives

Knowledge

- Knowledge of the anatomy of the central and peripheral nervous systems, organs of special senses, and spinal cord in both adults and children (with emphasis on radiological applications).
- Knowledge of all aspects of Neuroradiology, including an understanding of diseases that pertain to the CNS, and the appropriate imaging investigations.
- Understanding of the general principles with regards to Neuro-interventional procedures.
- Performance of basic lumbar puncture /myelogram with progressive supervision and guidance
- Understanding the principles of the various neuroradiology-specific MRI sequences and techniques

Specific Objectives

Medical Expert

- Knowledge of:
 - Neuroanatomy: brain and spinal cord
 - Neurovascular anatomy
 - Neuropathology: brain and spinal cord
 - cerebral tumors, degenerative and vascular diseases, drocephalus, cranial nerve pathology, sellar and posterior fossa pathology, inflammatory and demyelinating pathology
 - congenital brain diseases and malformations
 - spinal cord tumors, degenerative and vascular diseases, syringomyelia
 - congenital spinal diseases
 - inflammatory conditions of the spinal cord
 - traumatic lesions of the spine and spinal cord

Communicator

- Able to provide and organize succinct, but thorough, diagnostic reports.
- Able to consult with referring physicians both before and after studies / procedures are performed, demonstrating effective communication skills.
- Demonstrate effective communication skills when dealing with patients, during interview, consent and procedure.
- Able to explain the procedure and findings in terms that the patient and family can understand.

- Demonstrate effective skills when dealing with staff from referring clinical services.

Collaborator

- Demonstrate adequate consultation skills when interacting with other physicians & health team members
- Interact appropriately with other radiology departmental staff (technologists, nurses), demonstrating a team-based approach to managing patients.

Leader

- Consider advantages and disadvantages of various available imaging modalities, and advise consultants accordingly.
- Demonstrate awareness of the indications for various interventional modalities
- Consider advantages and disadvantages available of operative versus interventional techniques.
- Consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.
- Senior residents should show initiative in prioritizing cases, protocolling studies, and supervising cases actively imaged

Health Advocate

- Recognize and consider consent issues, patient comfort and other patient-related issues, when participating or recommending imaging procedures.
- Recognize and consider radiation doses when recommending, approving and performing diagnostic or interventional cases
- To demonstrate knowledge and awareness of radiation protection and well as appropriate handling of body fluids.

Professional

- Demonstrate integrity, honesty and compassion.
- Ability to show sensitivity and care to the patient and the patient's family.
- Practice understanding of ethical and medical-legal requirements of radiologists
- Demonstrate awareness of one's own limitations.

Scholar

- Set personal learning goals & objectives during rotation(s).
- Take a leadership role in learning from others, with teaching/supervision of junior residents on rotation, elective students, off-service residents.
- Create Teaching Files for use by future trainees.

Rotation Responsibilities

Clinical

- Report all cases assigned to resident. All cases to be reviewed by supervising Neuroradiologist (progressive autonomy). A junior resident (R2 or R3) is expected to read between 5 and 10 CTs or MRIs per shift and a senior resident between 7 and 15 CTs or MRIs per half day shift. Residents are also expected to participate in neuroradiology procedures such as myelography and lumbar puncture (in conjunction with interventional radiology).
- Provide supervision/guidance to the technologist for cases requiring consultation and/or scanning.
- Performance of lumbar puncture under direct supervision.

Teaching

- The resident is required to bring interesting cases to teaching rounds.
- Supervision/teaching of elective medical students or off-service residents.
- Teaching of technologists (if assigned).
- Include all interventional procedures in personal data bank

Rounds

- Depending on hospital site, may be required to prepare case show, short presentation, etc.

Evaluation

- Assessed on daily basis by Neuroradiology staff radiologist assigned to reviewing cases (CT, MR, US)

Reference Texts for Neuroradiology

- Diagnostic Imaging: Brain. Osborn, Salzman, and Barkovich, 2009, Amirsys.
- Diagnostic and Surgical Imaging Anatomy: Brain, Head and Neck, Spine. Harnsberger, Osborn, Ross, and Macdonald, 2006, Amirsys.
- Introduction to Cerebral Angiography. Anne Osborn, 1991, Harper & Row.
- Magnetic Resonance Imaging of the Brain and Spine. Atlas, 2008, LWW..
- Neuroradiology: The Requisites. Yousem, Zimmerman, and Grossman, 2010, Mosby.

Updated March 2017

Dr. L. Rosenbloom

11) Plain film- Emergency Radiology

Goals

By the end of residency training, the resident should be familiar with the indications for ER plain radiograph imaging and be able to protocol, detect and diagnose common pathologies of the acutely ill patient

Rotation Objectives

Medical Expert

After completing one month of plain-film ER imaging, the resident should be able to:

- Know the most frequent indications for standard CR imaging
- Recognize normal anatomy of the chest, abdomen, pelvis, spine, and extremities on radiographs.
- Be familiar with the different lines and tubes seen on radiographs and learn how to detect their complications and misplacement.
- Recognize pathology and be able to discuss characteristics of commonly seen pathologies
- Know the most frequent indications for Emergency CT scan
- Know how to detect normal variants and congenital anomalies such as azygous fissure and lobe.

Communicator

- To dictate well organized reports in a timely fashion, describing relevant findings, diagnosis and recommendations.
- To demonstrate effective communication skills when dealing with patients, staff and referring clinical services.
- Recognize emergency situations requiring immediate notification of treating physician

Collaborator

- To demonstrate good consulting skills when interacting with other physicians & health team members.
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care.
- Be prepared to collaborate in research initiatives and ongoing projects.

Leader

- To demonstrate awareness of the indications for standard CR imaging as well as urgent CT examinations.
- Consider advantages and disadvantages of CR imaging versus other imaging modalities.
- To consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

Health Advocate

- Recognize and consider consent issues, patient comfort and other patient-related issues, including exposure and pregnancy issues in ER patients.
- Be proactive in helping to choose the most appropriate imaging for any given clinical situation.

Professional

- To demonstrate integrity, honesty and compassion.
- To practice understanding ethical and medical-legal requirements of radiologists.
- To demonstrate awareness of own limitations.

Scholar

- To set up personal learning goals and objectives during rotation.
- To take a leadership role in the teaching of others, with teaching/supervision of junior residents on rotations, elective students and off-service residents.
- Scan the literature for current articles relating to Emergency Radiology.
- To be open to participate in establishing appropriateness criteria for determining the optimum imaging strategy for given clinical problems. For example, Ottawa rules criteria for on call imaging.

Rotation Responsibilities

- Focus on learning how to adequately interpret plain radiographs. Twice daily review with staff and prompt dictation/signing of reports. When necessary, interrupt routine to notify treating physicians in emergency situations.

Teaching

- The resident is encouraged to bring interesting cases to resident rounds.
- Supervision/teaching of elective medical students or off-service residents, along with assigned radiologist.

Evaluation:

- Assessed on a daily basis by staff assigned to ER -reading, using the DAILY ITER (specific for rotation). Submit the completed forms to appropriate secretaries.

Rotation Expectations:

- The resident must report to the staff assigned to plain film reading each half-day in order to plan work.
- Expected volumes: 25-50 CR cases per ½ day shift

Suggested References:

- Radiology of Emergency Medicine, Harris and Harris, Lippincott Williams & Wilkins; Fourth edition 1999 (please note the 5th edition will be available October 2012).
- Orthopaedic Imaging: A Practical Approach, Greenspan, Lippincott Williams & Wilkins; Fifth edition 2010.
- Emergency Radiology: The Requisites, Soto and Lucey, Mosby Elsevier; First edition 2009.
- Atlas of Normal Roentgen Variants That May Simulate Disease, Keats and Anderson, Mosby Elsevier; Ninth edition 2012.

Dr. R. Satin

Updated March 2017

12) ULTRASOUND ROTATION GUIDELINES – JUNIOR RESIDENTS

By the end of the junior year the resident should be competent in ultrasound skills required for general ultrasound including ultrasound of the abdomen, pelvis, small parts and peripheral vascular system.

Rotation Objectives

Medical Expert

- To learn ultrasound scanning techniques for abdominal and pelvic imaging
- To learn to use the endovaginal probe
- To know indications for a variety of ultrasound examinations
- To learn normal ultrasound anatomy of the abdomen, pelvis, peripheral vascular system, scrotum and thyroid.
- To learn the common pathologies in the above systems
- To correlate the ultrasound findings with other imaging modalities (plain films, CT, MRI, pet scans etc.)
- To learn the basic ultrasound physics instrumentation

Communicator

- To dictate well organized reports containing the relevant findings, diagnosis and recommendations
- To effectively communicate with patients, staff and referring clinical services

Collaborator

- To demonstrate good consulting skills when interacting with other physicians and health team members
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care

Leader

- To be aware of the indications for various ultrasound examinations
- To know the advantages and disadvantages of ultrasound vs. other imaging modalities
- To consider available imaging resources when planning and recommending patient care using them effectively and efficiently.

Health Advocate

- Recognize and consider consent issues, patient comfort and other patient related issues when performing sonograms and sonographically guided procedures.

Professional

- To demonstrate integrity, honesty and compassion
- To understand the ethical and medical-legal requirements of radiologists
- To know one's own limitations

Scholar

- To set personal learning goals and objectives during ones rotation
- To take part in the teaching of elective students and off-service residents.

Quantitative Expectations (Per Day)

- 6 cases
- Distribution of cases:
 - Pelvis – 2
 - Abdomen -2
 - Small parts – 2 (concentrate on scrotal ultrasound)

Rotation Responsibilities

1st week:

- Focus on learning basic ultrasound scanning techniques
- May review interesting cases that have occurred during the day with assigned radiologist

Subsequent weeks:

- Review pt. charts, lab data and previous imaging for study interpretation
- Concentrate on scanning emergency patients and in patients
- Concentrate on learning endovaginal scanning
- Scan as many patients as conditions allow
- Report cases you are involved with after reviewing them with supervising radiologist
- Learn the basic physics of ultrasound including colour and pulsed doppler
- Become familiar with normal abdominal, pelvic, small parts, and first trimester fetal anatomy
- Perform and interpret abdominal, pelvic, small parts and 1st trimester obstetrical scans
- Perform and interpret emergency cases when on call
- Discuss interesting cases with supervising radiologist for possible teaching file use
- Prepare cases for showing at departmental resident conferences

On call

- Call the front desk when the exam is finished so they can arrange for patient transport. Do not leave the patient alone in the ultrasound room. Use family members to stay with the patient and tell the family member to ask about transport if no one comes after 30 minutes.

Teaching

- Bring interesting cases to resident conferences
- Teach elective medical students and off service residents along with assigned radiologist.
- Teach ultrasound students, as appropriate

Evaluation

- Assessment by staff assigned to ultrasound
- Formal assessment at the end of the four week rotation

Resources

- Ultrasound Teaching Manual M. Hofer, M.D.
- Requisite Series: Ultrasound
- Rumack & Wilson: Diagnostic Ultrasound, 4th ed.
- ACR Teaching Files on CD-ROM
- Journals (Radiology, Radiographics, AJR, Journal of Clinical Ultrasound, Journal of Ultrasound in Medicine)

13) Ultrasound Rotation Guidelines – Senior Residents

By the end of the residency the resident should be competent in performing and interpreting ultrasound studies of the abdomen, pelvis, small parts and peripheral vascular system

Rotation Objectives

Medical Expert

- To perfect scanning techniques for abdominal and pelvic imagining including endovaginal scanning
- To know the indications for the gamut of ultrasound examinations
- To learn normal ultrasound anatomy of the abdomen, pelvis, peripheral vascular system, scrotum and thyroid
- To learn the common pathologies in the above systems
- To correlate the ultrasound findings with other imaging modalities (plain films, CT, MRI, PET scans etc.)
- To learn more advanced ultrasound physics and instrumentation with a view to image optimization

Communicator

- To dictate well organized reports containing the relevant findings, diagnosis and recommendations
- To effectively communicate with patients, staff and referring clinical services

Collaborator

- To demonstrate good consulting skills when interacting with other physicians and health team members
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care

Leader

- To be aware of the indications for various ultrasound examinations
- To know the advantages and disadvantages of ultrasound vs. other imaging modalities
- To consider available imaging resources when planning and recommending patient care using them effectively and efficiently.

Health Advocate

- Recognize and consider consent issues, patient comfort, and other patient related issues when performing sonograms and sonographically guided procedures.

Professional

- To demonstrate integrity, honesty and compassion
- To understand the ethical and medical-legal requirements of radiologists
- To know ones own limitations

Scholar

- To set personal learning goals and objectives during ones rotation.
- To take a leadership role in the teaching of others with teaching/supervision of junior residents on rotation, elective students and off-service residents.

Quantitative Expectations (Per Day)

- 10 cases

Distribution of cases

- Pelvis - 4

- Abdomen – 4
- Small parts – 2 (concentrate on thyroid imaging)

Rotation Responsibilities

- Review charts, lab data and previous imaging for ultrasound study interpretation
- Concentrate on scanning areas where you did not get enough experience on earlier rotations. Scan as many patients as conditions allow.
- Report cases you are involved with after reviewing them with supervising radiologist.
- Learn the more advanced physics of ultrasound
- Perform and interpret emergency cases when on call.
- Discuss interesting cases with supervising radiologist for possible teaching file use.
- Prepare cases for showing at departmental resident conferences.

On call

- Call the front desk when exam is finished so they can arrange for the patient transport. Do not leave patient alone in the ultrasound room. Use family members to stay with the patient and tell the family member to ask about transport if no one comes after 30 minutes.

Teaching

- Bring interesting cases to resident conferences
- Teach elective students and off-service residents along with assigned radiologist
- Teach ultrasound student technologists as appropriate

Evaluation

- Assessment by staff assigned to ultrasound
- Formal assessment at the end of the 4 week rotation

Resources

- Ultrasound Teaching Manual M. Hofer, M.D. (basic)
- Requisite Series: Ultrasound
- Rumack & Wilson: Diagnostic Ultrasound, 4th ed.
- ACR Teaching Files on CD-ROM
- Journals (Radiology, Radiographics, AJR, Journal of Clinical Ultrasound, Journal of Ultrasound in Medicine)

Updated March 2017

Dr. J. Cassoff

14) Nuclear Medicine Rotation Guidelines

Goals

There are two aspects of this rotation for residents to keep in perspective:

Basic Science

- Nuclear Physics relevant to Nuclear Medicine
 - Radiation Safety
 - Radiation Biology
 - Radiopharmacy
 - Instrumentation: Dose calibrators, portable radiation detectors, probes.
 - Gamma cameras, PET scanners, Bone mineral densitometers.
 - Quality Control
 - Basic Statistics
 - Computer Science
 - The concept of Molecular Imaging
 - Antibodies, Tracer Kinetics and basic principles of radioiodine ablation.
- NB: Basic Sciences are a critical aspect of day-to-day Nuclear Medicine practice and indeed are emphasized on qualifying examinations, particularly American Board of Radiology examinations.

Clinical Science

The Resident should achieve the following objectives in the clinical sciences.

Medical Expert

- To be able to correctly interpret scans.
- Become adept at performing nuclear medicine procedures.
- To acquire an appreciation of the role of nuclear medicine in the general practice of medicine and surgery.

Diagnostic Algorithm

- To acquire in depth knowledge of the pathophysiological basis of the specialty,
- To understand the clinical applications of the specialty.
- To be able to perform radiotherapy with unsealed sources

Communicator

- To become an effective communicator with the patient, family members and the consulting physicians.

Collaborator

- To develop an expertise in correlative imaging.

Leader

- To utilize resources effectively to balance patient care, learning needs and outside activities.
- To allocate the finite health care resources wisely
- To work effectively and efficiently in a health care organization

Health Advocate

- To become a health advocate for the patient and the medical system in general.

Scholar:

- To utilize the appropriate nuclear medicine texts, journals, audio–visual series, government publications (CNSC) and on-line resources in order to gain the appropriate knowledge needed to become a nuclear medicine specialist.
- To implement a personal continuing education strategy
- To critically appraise sources of medical information
- To contribute to teaching files
- To teach junior residents, house staff and medical students
- To contribute to development of new knowledge

Professional

- To become a true professional who delivers the highest quality care with integrity, honesty and compassion.
- To display appropriate personal and interpersonal professional behaviour.
- To practice medicine ethically.
- To become aware of the medico-legal issues relevant to nuclear medicine practice.

Quantitative Expectations

- General musculoskeletal/bone: 25%
- Cardiac imaging: 20%
- FDG PET/CT: 20%
- Endocrine: 10%
- Radionuclide therapy: 5%
- Gastrointestinal imaging: 5%
- Renal: 5%
- Pulmonary: 5%
- Infection imaging: 5%

Dr. Stephan Probst

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