

ELECTIVE IN NEUROIMAGING

ELECTIVE DIRECTOR

David A. Pastel, M.D.

Contact via email David.Pastel@hitchcock.org

ELECTIVE CO'ORDINATOR

Brit K. Willey

Contact via email or x57497 Brit.K.Willey@hitchcock.org

INTRODUCTION

Welcome to neuroradiology. This document is intended to provide you with some guidelines regarding your elective goals and objectives as well as some resources for study.

SCHEDULE

You will be spending the majority of your time in the Neuroimaging reading room, with rotations in interventional radiology (neurointerventional), depending on the procedure schedules. Tuesday mornings are when many of the CT---guided spine procedures are performed. Other scheduled and unscheduled cases occur throughout the week. The attending covering the procedures, the reading room, and angio cases are listed in the reading room each week.

CONFERENCES

Monday: **4.30p Neuro interesting case (RCR)**
Tuesday: 4.00p Rad/Onc Neuro Tumor Board
Wednesday: 4.00p Neurovascular Conference
Thursday: 7.00 ENT tumor board or Spine Conf
Friday: 7:15a Neuro conference
11.00---1p Neuro Grand rounds and Mega rounds

You should always attend the Friday morning neuro conference as well as the 4.30p interesting case conference on Monday. Other conferences should be attended at least 1X during your rotation.

There are also a number of tumor boards that may interest some students and residents. These are listed below. Check schedule and staff for attendance

Monday: 7a GI tumor board
Tuesday: 8a Pulmonary tumor board (CTOP) RCA
4p Neuro oncol tumor board 4.30p Lymphoma tumor board
Thursday: 4:30p GU tumor board

CODE OF CONDUCT IN RADIOLOGY

1. You are expected to be in the assigned clinical area between 8---5p unless you have to be at a required learning activity by your department, post---call or covering clinic. If there is a conflicting required activity, this should be discussed with Dr. Lewis prior to beginning of the elective.
2. Please dress appropriately, as you would in a clinical area. In fluoroscopy and IR, as well as during procedures in CT scrubs/white coats may be required.
3. The workstations are our offices and consulting rooms. Talking loudly, discussing personal matters, answering a cell phone and similar behaviors are unprofessional and distracting while we are reading studies. Any behavior that would be inappropriate during a clinical interaction is inappropriate in our reading rooms.
4. The PACS workstations are not to be used for email or activities unrelated to work. They can be used for accessing teaching resources but be prepared to make the workstation available if required by a member of radiology staff or resident. I would suggest that you bring your own laptop.
5. The presence of learners requires considerable time and effort by both radiology staff and residents. There are times when the number of learners or the workflow may require that staff ask you to utilize self---learning resources. Please be sensitive to this.

ASSESSMENT AND EVALUATION

You will be given a web---based exam at the end of your elective. This will cover all basic general neuroimaging. Please go to: <http://radiology.examweb.com/Login/radiology/createAccountStep1.cfm> and select "Geisel School of Medicine at Dartmouth" and put in the course code. Brit will prove you with your pin and course code.

E---value will be completed on all elective students. Input is requested from all staff and residents.

You will be given an E--value to complete of your elective.

You are expected to collect a list of 8-10 interesting cases and present them in a powerpoint conference format during the last week of the rotation. Emphasis should be on the imaging findings which illustrate the pathology.

GENERAL LEARNING OBJECTIVES

These will obviously depend on your career interests, but global learning objectives for this elective are for you to:

1. Develop basic image interpretation skills of brain MRI and CT, with an emphasis on emergency findings
2. Learn appropriate imaging algorithms for common diagnostic situations, with an emphasis on those in your area of interest
3. Learn where image guided invasive procedures are beneficial
4. Understand some of the risks and benefits of imaging – particularly the risks associated with radiation exposure and awareness of the potential impact of unnecessary or repeat CT imaging in patients.

This includes: understanding the concept of high risk groups (children and young patients especially females, pregnant patients) for radiation exposure especially from CT scans and how to minimize the risk

5. Understand how to provide the appropriate clinical information to radiology so that the correct study, with the optimal protocol can be performed and the best interpretations be made of the data.

GENERAL EDUCATIONAL RESOURCES

The self-teaching room is available all week. The code for the door is: 135. To log into the computers, use your windows login/password.

TEXTBOOKS

Neuroimaging textbooks are available in the reading room. These books stay in the reading room. Under no circumstances may you remove these books from reading room.

| | | |
|------------------|-------|--|
| PACS TEACHING | FILMS | |
|------------------|-------|--|

On the PACS workstations (which must be logged in by any staff or resident member) you can access the public teaching files

Under Folders...Public....Student teaching...(chest, GI, GU, MSK, Neuro) there are multiple basic teaching cases. Look under comments for the diagnosis. Try to look at the films before you read the interpretations.

There are also various other folders here such as neuro, body MRI, cardiac etc which you are welcome to look at if you wish.

CORE CASES

If you are a DMS student you will already have done some of the CORE cases. This is a good time to go over cases and do those that you have not previously. There are two neuro cases. At <http://core.instruct.de> there is a series of interactive cases that are designed to teach the student curriculum in radiology. These include cases in chest, GI, GU, neuro, pediatrics and MSK. They include multiple web-links to expand the learning experience. Your prior login or that from CLIPP is valid. If you wish to do these cases and are not a DMS student, please email petra.lewis@hitchcock.org to be registered. Anyone with a Hitchcock email can self register at the site.

OTHER GENERAL WEB RESOURCES

www.learningradiology.com (note, use the ppt links, some of the flash links go to adverts for his book)

[University Virginia radiology tutorials](#)

[BrighamRad teaching cases](#)

[Beth Israel \(Lieberman\) web-tutorials](#) (see list at bottom page)

[Harvard guide to imaging in pregnant patients](#)

[Dartmouth Anatomy web-course](#)

[Yale cardiothoracic imaging module](#)

[ACR appropriateness criteria](#)

[AMSER National Curriculum in Radiology for Medical Students](#)

WEB SOURCES OF RADIOLOGICAL IMAGES

<http://images.google.com/>

<http://www.yottalook.com/>

<http://goldminer.arrs.org/>

<http://www.e---anatomy.org/index.html>

RADIOLOGY- TEACHES

Radiology-TEACHES was created by a group of Baylor faculty in conjunction with the American College of Radiology (ACR) and National Decision Support Company (NDSC) to assist in learning about evidence-based clinical decision support and appropriate utilization of imaging. The foundation of the program is the [ACR Appropriateness Criteria](#). **This is optional for this elective.**

- Case Based
- 3 Self-study modules
 - Pretest
 - Education
 - Posttest

Your login information for the Education Portal is as follows:

Username: Student email address

Password: Student last name (if your last name is less than six digits then a 9 will be used to add up to six digits ex. smith99)

The link to the Education Portal is: <https://3s.acr.org/Institution/Home.aspx?Name=ACRSelect>

Once logged on to the portal, navigate to the right side of the portal under “Activities” and click the “Assignments” radio button. Expand the selection by clicking the + icon to expand the General Radiology and then do the same for the Choosing Wisely topic. Click the title (link) for the Radiology TEACHES Pre-test and educational module.

A short how-to-video is located [here](#).

NEUROIMAGING

Goals of rotation

- Understand the strengths, weaknesses and limitations of CT vs. MRI in the evaluation of patient's with central neurologic symptoms and diseases
- Understand the strengths, weaknesses and indications of spine CT, MRI, and myelography in the evaluation of the spine and spinal cord
- Understand the indications for conventional carotid and cerebral angiography, its risks and benefits in comparison with CTA and MRA
- Understand the role of imaging (including MRI vs. CT) in the evaluation of common clinical complaints, including stroke, headache, trauma, mass lesions, back pain, radiculopathy and demyelinating disease
- See how different MR sequences are used to identify different pathophysiological processes.
- Understand the usual appearances of gray matter, white matter, fluid, edema, masses, blood, and fat on common MR sequences (T1, T2, FLAIR, STIR)
- Know some of the uses of contrast in MRI and CT
- Review basic neuroanatomy on head CT and MRI
- Develop a basic but comprehensive standard method to evaluate routine non---contrast head CTs
- Get an overview of common procedures done in neuroradiology, including the use of nerve root blocks for management of back pain and vertebroplasty for compression fractures
- Be able to recognize the appearance of common pathological processes such as stroke, edema, herniation, subdural, epidural and subarachnoid hemorrhage on CT

Specific recommendations

- Obtain access to PACS so you can dictate studies. Contact person is Skye Kerr.
- Accompany the neuroradiology fellow/resident during the workup and performance of nerve root blocks and vertebroplasties
- Become an active participant in the daily MR and CT reading including pre---reading studies when a workstation is available

Additional reading

[University Virginia Intro to Head CT module](#)

[University Virginia Evaluation of the Cervical Spine](#)

[SUNY Downstate brain MRI anatomy](#)