

## DEPARTMENT OF DIAGNOSTIC RADIOLOGY

### WOMEN'S IMAGING FELLOWSHIP

**THIS FELLOWSHIP IS OFFERED TO EXTERNALLY FUNDED CANDIDATES AS WELL AS QUEBEC GRADUATES FUNDED BY RAMQ.**

The Department of Radiology at McGill University offers a one year fellowship in Women's Imaging. This fellowship will consist of Breast Imaging (6 months) at the Royal Victoria Hospital and Abdominal and Pelvic imaging (6 months) at the Montreal General Hospital.

Fellowship Directors: Dr. Caroline Reinhold (abdominopelvic) Dr. B. Mesurolle(breast)

Program Director: Dr. Jeffrey Chankowsky

*The fellow's responsibilities are separate from those of the residents, and the fellows positively impact residency training. There is no negative impact of the fellowship on residency training.*

#### **Breast Imaging**

##### ***General Guidelines:***

The breast imaging section is integrated to the Cedars Breast Clinic which offers to its patients a "one stop shop" whereby in the same visit, the patient consults her breast surgeon, has her screening or diagnostic mammogram performed as well as any additional work up including, additional mammographic views, sonographic examination and imaging guided biopsies as needed. These are performed by four faculty members (Drs E Kao, A Aldis, M El Khoury, B. Mesurolle and S. Petitclerc). One fellow and one resident rotate respectively on a 6 months and one month basis.

The Breast imaging section performs over 8,000 mammograms, 3,000 breast ultrasounds, 500 stereotactic and ultrasound guided core biopsies, and 150 localizations per year. In addition, the MR division performs approximately 15-20 breast MRIs per week. MR-guided biopsies are also performed.

The fellow will work as a junior staff in the breast center. She or he, will read mammograms, interpret breast MR studies, perform sonographic examinations as well as imaging guided biopsies, Fine Needle Aspirations and needle localizations prior to surgery. She or he, initially and through the whole learning process, will be guided by the staff radiologist while gaining more experience and becoming more autonomous with time. She or he will interact with the surgeon on site, discussing management of difficult cases.

The fellow will attend once a week, a tumor board meeting (every Thursday noon) during which the therapeutic management of the breast cancer patients is discussed between a multidisciplinary team. Breast rounds are also held in the breast center once every two months during which latest advances or guidelines are presented and discussed between, surgeons, radiologists, oncologists and pathologists. The fellow participates in preparing and presenting subjects.

With gaining experience, the fellows will participate in the teaching process of the residents during their rotation in the breast center and if they wish, in any research project. They will also be responsible for the post-biopsy reading of all the interventional procedures they performed during their rotation, so they will be able to assess the pathologic-radiologic concordance of all the lesions biopsied.

State-of-the-art equipment includes:

- 3 CAR accredited mammography units
- 10 state of the art US machines with the highest resolution transducers and Doppler capabilities.
- 1 prone digital biopsy table with vacuum assisted core biopsy capabilities
- Two high field MRI systems with a dedicated Sentinelle breast coil and the integrated interventional CAD
- Three multi-slice CT scanners
- Interventional procedures in breast include
  - Stereotactic, ultrasound and MR guided core biopsies
  - Fine needle aspirations
  - Needle localizations using ultrasound, digital and conventional mammography and if necessary MR guidance
  - En Bloc biopsy procedure

***Breast Imaging Fellow's responsibilities:***

1. Assume the role of primary imager with the faculty person as a supervisor.
2. Participate in "on- line" interpretation of the daily studies.
3. The Fellow will assume responsibility for performing ultrasound procedures with the faculty person supervising.
4. The Fellow will be responsible for running the MR service
5. Participate in the performance of procedures, including image-guided biopsies.
6. Participate in academic projects.
7. Participate in multidisciplinary rounds.

***At the end of their fellowship,***

**The fellow has become a fulfilled breast imager able to:**

1. **Diagnose breast cancers at their very early stage**
2. **Use the BIRADS lexicon, while describing an anomaly in the report and deciding for the subsequent management.**
3. **Perform easily and safely, imaging guided biopsies (stereotactic, US and MRI guided)**
4. **Perform pre-operative needle localizations**
5. **Manage properly any anomaly noted on a mammogram, US or MRI**

## **Abdominal and Pelvic Imaging**

### **1. CLINICAL FELLOWSHIP - GENERAL GUIDELINES**

Fellows will spend the 6 months doing body MRI whenever the body MR sessions take place. The remainder of the time the fellows will rotate through ultrasound and CT. The following guidelines are designed to clarify the fellow's job description. The duties described are geared towards enriching the fellow's own experience and achievement, while contributing to the efficient functioning of the abdominal section.

The fellowship is dedicated *abdominal and pelvic cross-sectional imaging*. At the conclusion of the training, the fellow should be able to function autonomously as a radiology consultant in US scanning, body CT and MR interpretation, as well as performing and managing non-vascular interventional procedures in the abdomen and pelvis.

The fellow functions as a junior attending staff, and as such must be integrated into the *teaching team*:: Teaching the residents basic interventional procedures, teaching at the viewer in CT as well as in ultrasound, giving teaching rounds, presenting progress of research projects should occur regularly.

Academic work: Every fellow is encouraged to undertake a *research project* by a staff supervisor. Protected academic time (a half day to one full day per week) is granted to the fellows depending on the nature of the project. Outside the *protected academic time*, the fellow is expected to devote his/her endeavors to clinical activities during the day. Protected time is usually not granted when there is a critical shortage of staff radiologists, or when one fellow is away.

Relationships with staff in the section: There are 10 staff radiologists in the division of abdominal and pelvic imaging across the McGill University Health Center. All are abdominal imagers, but each staff-member has areas of sub specialization in one field or another (US, CT, MRI, or intervention). The fellow should interact with all staff-members during the course of the fellowship.

Relation with resident staff: As stated above, the fellow functions as a junior attending, and as such is incorporated within the teaching team. With respect to procedures, the fellow is primarily responsible for all interventional procedures, supervised directly by attending staff. The residents are required to learn basic interventional techniques such as biopsies, abscess drainages and nephrostomies during their residency training, and the fellow is expected to assist the residents in acquiring the necessary experience in these techniques.

## 2. THE ROTATIONS

The fellow CT, Ultrasound and MRI. Imaging-guided procedures will be performed in each of these modalities.

### 2.1 CT ROTATION

#### *Schedule*

- Scheduled scanning takes place from 8:00AM to approximately 5:00PM.

#### *CT*

The CT service is a very busy one where efficiency is of utmost importance. The following are some guidelines to make the fellow's integration into the service easier and make his/her experience both profitable and enjoyable. When a resident is assigned to the CT rotation the fellow directly supervises the resident who is responsible to run the service, with the fellow's help, as well as that of an attending radiologist, and to serve as the first line consultant to referring clinicians. When there is no resident rotating through CT, the fellow is in charge and reports directly to the attending staff.

The rotation in CT includes abdominal and pelvic (body) CTs, since chest, bone, spine, neuro, and ENT CTs are performed within the subspecialty rotations. Body CTs are performed daily. Emergency CTs can be arranged at any time depending on the urgency of the case as well as availability of scanners. Scheduled scanning takes place from 8:00AM to approximately 5:00PM.

#### DUTIES INCLUDE:

1. CT studies are tailored to answer specific questions. Technique protocols have been developed for this service and should be referred to at the beginning of the rotation.
2. Each scheduled CT examination must be protocolled by the resident under your supervision with instructions for technologists written on the requisition. In order to protocol the case, the computerized printouts must be consulted in order to see which other imaging tests or previous examinations have already been performed. The filing room clerks print out a list of recent examinations as well as previous US and CT reports. It is however, the fellow's responsibility to ensure that all previous pertinent clinical and imaging information is available at the time the scan is performed, or at the very least at the time of reporting. Questions about protocols should be discussed with attending radiologist on service, preferably the day before, or at the very beginning of the session.
3. The previous examinations have been archived digitally, and are automatically retrieved and placed on the Abominal Workstations (four are located in the CT reading room and three in the US reading room). However, because some patients are booked at the last minute and some do not provide their unit number at the time of booking, it may happen that previous examinations are missing. It is the responsibility of the resident and clinical fellow to obtain those previous or correlative examinations that are missing by contacting the filing room or transferring them via Netscape as soon as the patients arrive. Appropriate studies necessary for interpretation of the CT should be on hand in the CT suite.
4. Review the patient's chart of each inpatient. Do not hesitate to speak to the patient and obtain a pertinent clinical history when needed. Specifically, check for allergies, renal function and relevant clinical information. Verify that the indication is appropriate before the patient is installed in the scanning room.

5. Ideally each case should be reviewed on the viewing stations before the patient is taken off the CT table. Recuts can be performed immediately or the patient can be taken off the table with recuts done at a later time. Remember, the goal is to expedite patient through put while maintaining excellence in all examinations.

6. If it is felt during the preliminary viewing of a case, that a particular question can be clarified with US, an US can be arranged the same day if the schedule allows by contacting Suzanne Roy (local 3209) or the patient can be booked for an US at a later date.

7. Review of cases are done the same day as the examinations. There is always one staff assigned to CT. Once you have pre-viewed the cases with the resident, the cases are then reviewed with the staff in charge. Dictations can be shared between the clinical fellow and resident. All cases should be dictated under the name of the attending radiologist assigned to CT during that day. All emergency and inpatient CTs must be dictated STAT, and must be reviewed on a priority basis.

8. Reading Material:

A. Lee and Segal - *Computed Tomography*.

B. Moss - *Body CT*

Optional to Lee and Segal. There is more text but not necessarily more information.

C. Selected articles re. *Interventional radiology, Radiology, AJR* and *JCAT* should be reviewed during rotation for timely CT articles.

9. Teaching Material:

A. Teaching files from the staff radiologists

B. The CT game: an interactive CD ROM on CT containing over 3000 CT cases

C. The ACR teaching file video-disk. (During the spring, the graduating residents have priority in the use of the ACR teaching file).

### ***CT Intervention***

Procedures are performed under the *responsibility* of the staff whose name is indicated on the weekly schedule. You must discuss all cases with him/her prior to starting a case.

After a procedure has been performed, it is your responsibility to ensure that the appropriate microbiology, pathology and cytology requisitions are completed. A note in the chart must be written outlining the procedures and the patient's tolerance to it. Several F/U forms are available in special procedures, CT, and US for frequently performed procedures such as biopsies, abscess drainages, biliary drainage, or nephrostomies. All outpatients that have undergone procedures must be seen by the fellow before the patients leave the Department. For procedures performed on patients admitted to Day Surgery, the fellow must see the patient in Day Surgery during the course of the afternoon to discharge them. Similarly, in selected cases where inpatients have undergone a procedure in the morning that requires monitoring a few hours later, the fellow can visit the patient at the end of the afternoon, prior to the abdominal review session. Results of all biopsies and aspirations must be entered in the computer database.

## **2.2 US ROTATION**

### ***Schedule***

- 8:00AM - 12:00PM
  - Scanning patients. The objective is to acquire *advanced* skills in scanning patients
  - Checking technicians. The objective is to make independent decisions on clinical cases: when to scan, what to scan, when to call your staff...
  - Performing biopsies, and procedures under ultrasound guidance
  - Teaching residents: clinical cases and the basics of biopsy procedures

- 12:00PM - 1:00PM
  - There are no regular booked cases during lunch time. However, scanning often continues over this hour and you are expected to report to US until scanning of AM patients is completed. On *Wednesdays* this is particularly critical since the staff radiologists have a luncheon meeting from 12.00PM- 1.00PM
  - Monday 12:15PM: Abdominal rounds (if free)
- 1:00PM - 4:00PM
  - Scanning / Checking / Performing biopsies / Teaching residents
- 4:30PM -6:00PM
  - Abdominal Rounds

## *US*

1. The US division sees a variety of cases. Pelvic cases are intermixed with abdominal cases. Approximately 30% of our case load is female pelvic imaging. The objective of the US rotation is to provide a large experience in US-guided procedures and advanced skills and knowledge in US imaging including color Doppler imaging. To achieve this, the fellow's responsibilities will be 1) to perform procedures, 2) to verify cases scanned by technicians, and 3) to scan a number of patients by him/herself. In US more than anywhere in the Department efficiency must be sought, and not all patients can be scanned on the most up to date or state-of-the-art equipment. When not performing US-guided procedures, the fellow's primary responsibility is to verify and/or scan patients. By taking an active role and assuming responsibility in this respect the fellow will greatly enrich his/her experience and expertise. All ultrasound cases should be dictated on a rotational basis with the various staff members assigned to US that day. There will be at least one, and usually two staff radiologists covering US. The fellows should consult the staff for cases they are unclear about, while the patient is still on the table. All interesting cases should be videotaped for discussion and review during the late afternoon abdominal review sessions.

### 2. Reading Material:

A. Rumack, Wilson, Charbonneau - *Diagnostic Ultrasound*

B. Selected articles re. *Interventional radiology, Radiology, AJR* and *JCAT* should be reviewed during rotation for timely CT articles.

### 3. Teaching Material:

A. Teaching files from the staff radiologists

B. The ACR teaching file video-disk. (During the spring, the graduating residents have priority in the use of the ACR teaching file).

C. Video tapes: There are several hundred videotapes of interesting US cases which are indexed in the 4D patient 2 database and can be reviewed.

## *US intervention*

Intervention in ultrasound mainly comprises biopsies: transvaginal intervention, abdominal biopsies, prostate biopsies, thyroid biopsies, thoracentesis, and simple drainages. The procedures are supervised and dictated under the staff radiologist responsible for intervention that day. Before starting the biopsy, the fellow must discuss the clinical indications, planned approach etc. with the staff, and obtain adequate supervision. As part of his/her teaching responsibilities, the fellow must also teach the residents basic skills in US-guided biopsies. All pertinent previous studies should be reviewed, preferably the day before the scheduled. Coagulation factors of the patient must be verified, and informed consent obtained.

## **2.4 BODY MRI**

### ***Schedule***

The MRI rotation consists of body MRI (abdomen and pelvis). The fellows will spend 6 months in body MRI (each week consists of 10 body MRI sessions – a total of 50-60 body MR cases, of which approx. 20 are female pelvis) The body MRI service is currently staffed by seven radiologists (Dr. Reinhold, Dr. Artho, Dr. Aldis, Dr. Taylor, Dr. Tsatoumas, Dr. Stein, Dr. Petittclerc).

The schedule for body MR is as follows:

<b>Monday,</b>	7:00 – 11:00 A.M
<b>Tuesday</b>	7:00- 3:00 PM
<b>Wednesday</b>	7:00-11:00 A.M.
<b>Friday</b>	7:00-5:00 PM

The fellow is required to be present in the scan room during scanning times as outlined on the schedule above. MR similarly to US requires active physician presence while the data is being acquired (see monitoring cases below). In addition, by watching the technologists program the sequences, the fellow will increase his/her familiarity with the various scanning parameters, learn ways to decrease scanning time, improve resolution etc.

### ***Objectives***

1. Know contraindications to MR imaging.
2. Know indications for MR imaging.
3. Be familiar with basic pulse sequences and their clinical applications.
4. Be familiar with basic imaging artifacts.
5. Recognize the normal anatomy in the various imaging planes, and with various pulse sequences.
6. Recognize pathology and be able to discuss the signal characteristics of commonly seen pathology.

### ***Fellow responsibilities***

1. Screen and interview patients prior to scan.
2. Inject an antispasmodic IM
3. Review cases scheduled for next day, including indications, pertinent CT, US etc. and imaging protocols.
4. Monitor studies.
5. Contribute to teaching file.

### ***Reading / Studying list:***

1. Magnetic Resonance imaging of the body by Higgins, Hricak and Helms. This is available in the department but should not be taken home. Physics section is also good to read through.

2. MRI text by Stark and Bradley. The physics section is rather detailed and difficult to cover unless you understand well the basics. Body section is good.
3. GE manuals. Can be obtained from the MR chief technician Lori Rohoman. Can be photocopied for reading at home.
4. Questions and answers on MRI. A small soft cover book that covers basic MRI physics. Can be borrowed from Dr. Reinhold
5. Selected articles. These articles must be read on site and should not leave the department, they must be returned every evening to Dr. Reinhold.
6. MR uterus module
7. RSNA exhibits on CD ROM dedicated to MRI

### **3. ON CALL**

The fellows rotate on the US/CT on-call list as junior staff. They are on-call at home with a bell-boy, and are a resource person for the residents on-call. Their expertise may be requested for ultrasound, CT cases or interventional procedures. Whenever they are requested to perform an invasive procedure, they must contact one of the staff radiologists who routinely rotate in intervention prior to performing the procedure.

### **4. VACATION/CONFERENCES**

The fellow is granted 4 weeks of vacation plus an additional week during either the Christmas or New Year's holidays. The fellow is also granted one week to attend a conference if he/she wishes to do so. If he/she presents a paper at a major conference, the time of the conference is not counted against his/her conference or vacation time. In addition, he/she may request funding for expenses incurred to attend the meeting where he/she presents, provided that the research was done in the department of Radiology at McGill University.

### **5. ROUNDS**

- Every day or every other day at 4.30pm, an abdominal review session takes place during which
  - the interesting cases of the day are reviewed by the entire abdominal team. There are usually 3 to 6 staff radiologists present in addition to the residents in US, CT, GI, body MR and angio. It is the fellow's responsibility to present the interesting cases in which he/she has been involved, as well as follow-up obtained on patients previously examined.
  - the interventional cases are discussed.
- The resident GI rounds on Wednesdays and the abdominal rounds on Monday can be attended when on the NVI or CT rotation and there is no procedures to perform. However, this should be discussed with the attending assigned to the service that day.
- When a Visiting Professor is received at McGill whose subspecialty is abdominal imaging, the fellow may request to attend the sessions. Usually, the fellows are allowed to attend one

day each. If the fellows want to attend other Visiting Professor sessions, they can use their conference time to do so.

- A McGill Research Day takes place once a year, usually during the winter or early spring. The fellow will often be requested to present his/her research as a formal slide presentation at that time.

#### FELLOW EVALUATION:

The fellow is evaluated on a daily basis by the attending staff and will meet regularly with the fellowship supervisor for face-to-face feedback. A formal written evaluation is completed every six months, using the CanMEDS roles scheme.

#### EXPECTED CASE LOAD (daily unless specified)

##### Breast Imaging

Mammograms: 40

Ultrasounds: 15

Biopsies: 10, US guided and 4 stereotactic per week

MRI (weekly): 10

Needle localization: 4

##### Abdominal Imaging:

CT rotation: 12 diagnostic

MR rotation: 5

US rotation: 20 diagnostic + 4 procedures

#### ACADEMIC FACILITIES

Internet access from all workstations and from fellow's office

Access to libraries at MGH, RVH and McGill

Multimedia learning materials available

Free online journal access via McGill portal

#### **Summary: Role of the Women's Imaging Fellow:**

Assume the role of primary imager with the faculty person as a supervisor.

Participate in "on-line" interpretation of the daily studies.

The Fellow will assume responsibility for performing ultrasound procedures with the faculty person supervising.

The Fellow will be responsible for running the CT and MR service when covering these clinical services.

Participate in the performed of procedures, including imaging-guided biopsies.

Participate in academic projects.

Participate in multidisciplinary rounds.

