McGill University
DEPARTMENT OF DIAGNOSTIC RADIOLOGY

COMBINED RESEARCH AND CLINICAL FELLOWSHIP IN ABDOMINAL IMAGING/NON VASCULAR INTERVENTION

Duration of training: 1 Year Fellowship Program

Name of Fellowship Director: Dr. Melanie Theriault, Dr. Caroline Reinhold

Name of Program Director: Dr. Jana Taylor

The Department of Radiology of the MUHC offers a 1-year Clinical & Research fellowship in Abdominal Imaging. The fellowship program offers exposure to clinical research in Abdominal imaging with a focus on oncological and outcomes research. The clinical component of the fellowship will expose the fellow to all areas of abdominal cross-sectional imaging and non-vascular interventional image-guided procedures. The fellowship provides an integrated experience of research clinical care and teaching. **Applicants must have completed at least one year of clinical fellowship/staff position in the field of proposed research.**

The MUHC adult hospitals comprise approximately 1,000 beds and perform approximately 250,000 radiologic procedures per year of which IR comprises approximately 5,000-6,000 procedures per year.

Vascular, hepatic and transplant procedures are mostly performed at the Royal Victoria Hospital, while the Montreal General Hospital is a Level I Trauma Centre with a large oncology practice.

Fellows rotate at the RVH and MGH sites.

The 'academic' year is July 1 to June 30.

1. CLINICAL FELLOWSHIP - GENERAL GUIDELINES

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 as well as optimizing the functioning of the abdominal section.

The fellowship is dedicated to *cross-sectional imaging and non vascular interventional procedures in the abdomen/pelvis.* From previous feedback and experience, we feel that more emphasis needs to be placed on the imaging aspect of the fellowship. The objective is to acquire as much experience and skills in ultrasound scanning and CT interpretation as in performing actual interventional procedures. It is often the imaging aspect of an interventional case that provides the real challenge not the technical placement of a biopsy needle or catheter. The emphasis on patient management remains important and is an integral part of the fellow's training. 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.

The fellow functions as a junior attending 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 given 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 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, and as such has a supervisory over the residents to perform the cases. The residents, however are required to learn basic interventional techniques such as biopsies, abscess drainages and para/thoracentesis 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 fellows rotate between CT, Ultrasound and MRI. The fellows spend approximately 1/3 of their time at the RVH and 2/3 at the MGH.

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 protocoled with instructions for technologists written on the requisition. In order to protocol the case, the PACS must be consulted in order to see which other imaging tests or previous examinations have already been performed. It is 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. Inpatient CT images should be reviewed on the scanning consoles in the CT suite 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.
4. 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 the chief Ultrasound technologist or the patient can be booked for an US at a later date.
5. Review of cases is done the same day as the examinations. There is always one staff assigned to CT. Once you have pre-viewed the cases, the cases are reviewed with the staff in charge. Dictations can be shared between the fellow and resident. All cases should be dictated under the name of the attending radiologist assigned to CT during that day.
8. Reading Material:

A) CT & MRI of the abdomen & pelvis; a Teaching File; Ros & Mortele; Lippincott 2006
B) Fundamentals of Body-CT" Webb 2006
C) Abdominal and pelvic imaging' Rita Joarder, Springer 2011
D) Stat Dx Website. The department has a license.
E) Selected articles re. *Interventional radiology*, *Radiology*, *AJR, JMRI* and *JCAT* should be reviewed during rotation for timely CT articles.

CT Intervention

1. Daily rounds on the ward.
Every in-patient who has undergone an interventional procedure (except routine biopsies), is considered to be under the care of radiology, and must be seen every day on the ward or as needed depending on their clinical status. All relevant parameters (output of catheters, clinical signs, local check of catheters) are verified and a note is written in the patient's chart. At the same time follow-up examinations (US, CTs, fistulograms) are organized by the fellow. These round should be performed in the morning for the following reasons: 1) Immediate action can be taken if an acute problem develops rather than delaying care to the following day 2) If any management decisions are taken, these can be discussed with the treating physician who you may not be able to reach during the evening, and 3) these rounds should be discussed with the staff assigned to the CT service for that day, to maximize teaching and patient care. More complicated cases can be re-discussed at the abdominal session so that everyone can benefit. A tally of the patients visited on the ward must be kept and remitted to Ruth Ramadeen once a week. These rounds are very important in many respects: For the patients, it provides continuity of care with the radiologist. Recent studies have shown that a number of catheter related complications can be avoided by having the patients visited daily by the interventional radiologist team. For the fellow, it provides the opportunity to interact with the clinicians as a junior consultant and take on responsibilities. It is not an infrequent occurrence that while on the ward, the fellow will be asked his/her opinion on other cases.
2. Preparation of procedures.
It is the fellow's responsibility to organize the procedures on a daily basis in coordination with the technical staff. Compromises are at times necessary when a time conflict in the flow of patient exists as interventional procedures may take place simultaneously. A fellow should not delay a procedure for his/her own interest at the cost of patient care. All pertinent previous studies should be reviewed, preferably the day before the scheduled procedure, and the indications, findings and technical approach discussed with the attending staff. Coagulation factors of the patient must be verified, and informed consent obtained.
3. Procedures.
Procedures are performed under the *responsibility* of the staff on CT that day. You must discuss all cases with him/her prior to starting a case.

4. Follow-up
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 and abscess drainages. The fellow must see all outpatients that have undergone procedures 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.

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

- 1:00PM - 4:00PM
    - Scanning / Checking / Performing biopsies / Teaching residents

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US

1. 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. 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.

2. Reading Material:

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

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

3. Teaching Material:

A. Teaching files from the staff radiologists

B. The ACR teaching file on CD ROM. (During the spring, the graduating residents have priority in the use of the ACR teaching file).

US intervention

Intervention in ultrasound mainly comprises biopsies: transvaginal intervention, abdominal biopsies, prostate biopsies, thyroid biopsies, thoracentesis, paracentsis and simple drainages. The procedures are supervised and dictated under the staff radiologist responsible for ultrasound 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 procedure for complex cases. Coagulation factors of the patient must be verified, and informed consent obtained.

2.3 BODY MRI

Schedule

The MRI rotation consists of body MRI (abdomen and pelvis only). The schedule for body MR is as follows:

Monday,	7:00AM – 12:30 PM; 12:30PM – 5:00 PM(every second week)
Tuesday	7:00AM - 6:00 PM
Wednesday	7:00AM -12:30 PM
Friday	7:00AM - 6:00 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. As many fellows are assigned to MRI, particularly on Tuesdays and Fridays to increase their MRI exposure, fellows covering MRI will also be asked to cover ultrasound-guided interventional procedures.

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. Body MRI by Evan Siegelman

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. MRI principles by Donald Mitchell

6. Selected articles provided by Dr. Reinhold

7. RSNA Exhibits on CD ROM dedicated to MRI

a. RESEARCH

Protected research time (2 days per week) is provided for the candidate to be involved in research projects.

Projects are carried out under the supervision of dedicated abdominal imagers. Publication of research projects, presentation of results at national and international meetings and published in leading peer-reviewed journals is mandatory

Fellows will be expected to prepare at least 3 articles for publication. Given the short duration of the fellowship, it will be mandatory that the fellow has at least one research proposal written prior to joining the Department of Radiology at McGill to ensure that the research can begin in a timely fashion. The fellows are also expected to apply for grant funding prior to arriving in the Department. Support will be provided to the fellow for the grant application process.

b. ELECTIVES

Under special circumstances, the fellow may be allocated one or two periods for elective rotations during the fellowship year. This will be given on a case by case basis depending on the needs of the fellow and staffing of the department.

3. ON CALL

The fellows rotate on the US/CT on-call and cover both the RVH and MGH. They are on-call, at home with a pager, 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 a procedure, they must contact the staff radiologist on call prior to performing the procedure. The fellows are responsible for reading all abdominal CT scans performed on an emergency basis (including inpatients) beginning at 5:00PM Friday evening until 5:00PM Sunday evening.

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 two weeks to attend a conference if he/she wishes to do so (proof of paid registration required). 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. Advance approval for such funding is required.

5. ROUNDS

Abdominal Rounds: Every Tuesday from 8:00-9:00 AM abdominal rounds take place during which:

- Fellows prepare a topic with corresponding cases to present. Each fellow is expected to prepare 3-4 topics per academic year
- Show and Tell: Interesting cases are presented by the entire abdominal team. It is the fellows' responsibility to present the interesting cases in which he/she has been involved, as well as any follow-up obtained.

MR Physics Teaching: Every Tuesday from 12:00-1:00 PM, MR Physics teaching take place during which fellows are given didactic and interactive lectures.

•When a *Visiting Professor* is received at McGill whose subspecialty is abdominal imaging, the fellow may request to attend the sessions. 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:

Fellows will be evaluated according to the Promotions Guidelines.

EXPECTED CASE LOAD (daily)

CT rotation: 20 diagnostic minimum
MR rotation: 8 minimum
US rotation: 25 diagnostic minimum + 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

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.