How to make the most of your imaging department

Introduction

Radiology is a rapidly changing and expanding speciality with little formal training in its different modalities during medical school. Very few patients will be seen in a hospital without requiring some form of imaging. Indeed a significant proportion of the foundation doctor's workload involves organizing and interpreting diagnostic tests carried out within the imaging department.

This article reviews the facilities available to the clinical teams with a short guide to getting the most from the department of imaging.

Set up of the imaging department

Most hospitals have a directorate of imaging which incorporates most of the different modalities within imaging, including nuclear medicine. These may be organized into one area or in separate areas, depending on the trust and size of the hospital.

The radiology team consists of consultant radiologists, specialist radiology registrars, radiographers, ultrasonographers, radiology nurses, radiology department assistants including physicists, medical secretaries, receptionists and clerical staff. Some of the smaller district general hospitals may not have any specialist registrars.

All radiology departments will see patients from GP surgeries, hospital clinics, inpatients and accident and emergency (A&E). In addition, many accept specialized referrals from other hospitals.

Most radiology departments work from 8.30 am to 5 pm with clinical meetings running within and outside these working hours. Increasingly, however, many departments now provide evening lists which run until 8 pm or even 10 pm in some cases. Such lists include computed tomography (CT), magnetic resonance imaging (MRI) and ultrasound. They are proving to be very popular with many patients as well as being very effective in reducing waiting times. In addition some departments now provide a walk-in service for some modalities such as ultrasound where patients are scanned with no prior appointments.

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Diagnostic procedures available in the imaging department

Most imaging departments offer a comprehensive range of diagnostic and interventional procedures to support all aspects of clinical management. These include: plain films, CT, MRI, ultrasound, nuclear medicine, positive emission tomography, interventional radiology (including angiography and minimal access therapy) and can incorporate screening including barium studies. Breast screening and PET-CT (positive emission tomography co-registered with CT) may also be available in some departments.

Modern imaging facilities may also include a picture archiving communication system (PACS). PACS has revolutionized radiology practice in many ways, not only for radiologists but also for clinicians. The availability of the patient's images to both radiologists and clinicians immediately and synchronously throughout the hospital has significantly reduced reporting time as well as waiting time for clinicians. In addition, the ease with which it has become possible to view the patient's previous imaging has made comparison much easier without the need for storage and retrieval of old hard copy films. It has also reduced the number of unnecessary tests carried out. PACS has also proven to be a great teaching and training tool for both radiologists and clinicians.

Which test to choose?

The first author's first memory of radiologists during her house jobs was of a group of doctors who gave juniors a hard time by asking lots of questions every time a test was requested. She has come to learn that this is vital to safe practice.

The use of radiological investigations is an accepted part of medical practice justified in terms of clear clinical benefits to the patient, which should far outweigh the small radiation risks.

A small fraction of the genetic mutations and malignant diseases that occur in the population can be attributed to natural background radiation. Diagnostic medical exposures – the major source of man-made radiation exposure of the population – account for one-sixth of the population dose. Ionising Radiation (Medical Exposure) Regulations (IR(ME)R) (2000) require that radiation exposure to a patient is kept to a minimum and the dose for each patient examination is recorded.

The role of the radiologist or practitioner as designated by the IR(ME)R 2000 is to justify the examination. A useful investigation is one in which the result – positive or negative – will inform clinical management and/or add confidence to the clinician's diagnosis.

Radiology request forms are legal documents and should be considered as such. Request forms handed into the department for any investigation other than plain radiographs are all vetted and protocoled by a radiologist. MRI requests are often dealt with by consultant radiologists or very senior specialist registrars. It is important to help your radiologist so that they can help you. Every induction day someone from the radiology department will give a talk emphasizing the need for as much clinical information on the request form as possible. This information is truly important. Failing to provide appropriate clinical information and questions that the imaging investigation should answer may lead to the use of the wrong technique, and the report being poorly focused on the clinical problem.

Imaging techniques are undergoing rapid change and it can be difficult to select the most appropriate test. Radiologists are very happy to discuss any clinical situation in order to help outline the most useful investigation for the given clinical situation. Every department has a rota for consultants or specialist registrars assigned to this duty during the day. Part of their duty often includes organizing imaging for emergency cases. It is advisable to discuss emergency scans with the duty radiologist in order to ensure that they are organized as quickly as possible.

Clinical-radiological and multidisciplinary team meetings provide a good forum for communication with radiologists.

The Royal College of Radiologists (2007) have developed referral guidelines *Making the Best Use of Clinical Radiology Services* which aim to help clinicians, radiologists radiographers, and other health-care professionals choose the best imaging investigation for a range of clinical problems.

Reporting within the department of imaging

Most of the investigations carried out within the department of imaging are reported by radiologists. Reporting of CT scans, MRI scans, and most contrast and interventional studies is done by consultant radiologists or post FRCR registrars.

The role of sonographers is well established in most hospitals. They usually scan and report independently. Their roles are also extensive in obstetric scanning.

In addition to sonographers, there is also a growing role for radiographers in reporting plain radiographs in the A&E department. Some hospitals have extended the role of some radiographers to include reporting CT head scans independently following appropriate training.

Reporting within the nuclear medicine department may be carried out by either radiologists with appropriate qualification in nuclear medicine or by physicians who are dually accredited in nuclear medicine, or sometimes by a combination of the above.

Flagging of abnormal results

There are many pathways set up by most radiology departments to ensure that serious abnormal results are brought to the attention of the appropriate clinical team thus reducing delay in treatment.

Radiographers will often red dot an abnormal A&E radiograph. In addition, there is often an agreed set up between the radiology and the A&E departments where abnormal or missed pathology is easily brought to the attention of the A&E staff. This may be facilitated by a dedicated folder on PACS.

In most departments, there is an urgent referral system where suspicious lesions on chest X-rays are referred directly to a consultant chest physician with a copy of the report forwarded onto the GP or the requesting clinician involved. Similar fast-track referral systems are often set up for other pathologies as well. In addition, the reporting radiologist will often contact the referring clinician directly where there are abnormal findings which warrant urgent medical attention.

On-call service

Most radiology departments provide an out-of-hours on-call service. Most radiologists do not work on a shift rota. The on-call service is often provided by a radiology specialist registrar and consultant, radiographers, and radiology nurse for interventional cases. In most district general hospitals, it is often a radiology consultant providing the service with no specialist registrars. Some busy centres may have more than one specialist registrar and consultant on call.

The radiology staff, except for some of the radiographers, provide an on-call service from home. In many district general hospitals there is often a teleradiology link for some CT scans. Large trauma centres, however, will often have the staff on site to avoid delay in treatment.

The services provided out of hours vary greatly depending on the size of the department. However, in most cases services are limited to imaging which is required for the patient's immediate management rather than routine investigations. This is the result of staff shortages both at radiologist and radiographer level. All departments will provide plain radiographs, limited intravenous urograms, CT and ultrasound services out of hours. Availability of out-of-hours MRI and interventional services is variable. In some departments sonographers may run an emergency ultrasound service on a Saturday morning, but this is often not widely available.

There is often a link with a larger local department for urgent MRIs and interventional cases if this service is not available on site.

Availability of emergency paediatric interventional cover including radiological reduction of intussusception is also very variable as it requires an on site paediatric surgical service.

Conclusions

Every imaging department provides a wide range of diagnostic and interventional procedures to support all aspects of clinical management. In addition, they provide an invaluable source of knowledge in interpreting imaging in the clinical context, and guiding clinicians in choosing the correct imaging test to assist with the management of the patient. Good communication between clinicians and radiologists is the foundation of a good service.

The sixth edition of *Making the Best Use of Clinical Radiology Services* (Royal College of Radiologists, 2007) are the latest guidelines published by the Royal College of Radiologists and can help all health-care professionals choose the best imaging investigation for a range of clinical problems. **BJHM**

Conflict of interest: none.

Ionising Radiation (Medical Exposure) Regulations 2000 (2000) Statutory Instrument 2000, No 1059. The Stationery Office, London (www.opsi.gov.uk/si/si2000/20001059 accessed 28 March 2008)

Royal College of Radiologists (2007) *Making the Best Use of Clinical Radiology Services.* 6th edn. Royal College of Radiologists, London

KEY POINTS

- Always provide a request form for every imaging investigation – a request form is a legal document.
- Do confirm that the correct patient ID is provided on the form. Imaging the wrong patient is not unheard of.
- Check the pregnancy status of any woman of child-bearing age before any investigation involving radiation.
- Provide imaging from other hospitals if available as this is often very useful.
- Do build a good relationship with your radiologist – this always pays off.
- Do not be economical with the clinical information on the request form as it can lead to a misleading report.
- Do not request an imaging test if it does not really add any further information. The radiologist will be happy to suggest an alternative test which may be of further use.