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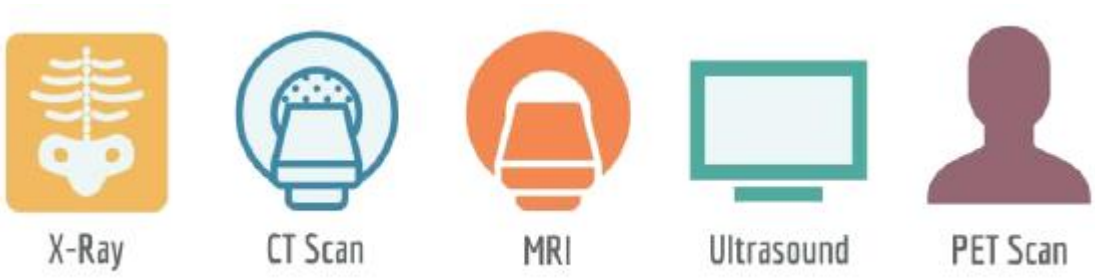
Clinical Radiology Referral Guidelines

Interventional Radiology Referrals



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EAST LANCASHIRE HOSPITALS NHS TRUST

CLINICAL RADIOLOGY REFERRAL GUIDELINES

These guidelines are intended to be used by all "referrers" requesting imaging at East Lancashire Hospitals NHS Trust. They are appropriate for both primary and secondary care clinicians and Non-Medical Referrers (NMR) to promote the best use of imaging and resources for the benefit of our patients.

The Ionising Radiation (Medical Exposure) Regulations (IR(ME)R) provide for the health protection of individuals undergoing medical exposures involving ionising radiation. All diagnostic tests should therefore be carefully considered prior to referral and should only be requested appropriately. Diagnostic tests which do not utilise Ionising Radiation (such as ultrasound and magnetic resonance imaging) carry their own potential risks and as such are as strictly governed in terms of justification. This not only serves to protect patients, but also to manage demand appropriately and keep waiting times to a minimum.

The aim for all examinations should be to obtain the maximum information with the minimum of radiation. This means that on occasions the imaging undertaken may not be what the referring clinician/NMR expects. Radiology has set examination protocols utilised for the legal authorisation and justification of requests.

Optimising radiation dose

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. However, even small radiation doses are not entirely without risk. A small fraction of the generic mutations and malignant diseases that occur in the population can be attributed to natural background radiation. Diagnostic medical exposures account for one-sixth of the total population dose.

The Ionising Radiation (Medical Exposure) Regulations (IR(ME)2017 require that the unnecessary exposure of patients to radiation is kept to a minimum and ELHT must comply with these regulations. This is achieved by avoiding undertaking investigations unnecessarily (especially repeat examinations) and the use of dose optimisation utilising locally set diagnostic reference levels (DRLs).

The effective dose for a radiological investigation is the weighted sum of the doses to a number of body tissues, where the weighting factor for each tissue depends on its relative sensitivity to radiation-induced cancer of severe hereditary effects. This provides a single dose estimate related to the total radiation risk, no matter how the radiation dose is distributed around the body (Table 1).

Typical effective doses for some common diagnostic radiology procedures range over a factor of about 1,000 from the equivalent 1-2 days of natural background radiation.

Table 1

Typical effective doses from diagnostic medical exposure			
Diagnostic Procedure	**Typical effective dose (mSv)**	**Equivalent number of chest x-rays**	**Approximate equivalent period of natural background radiation**
Radiographic examinations			
Limbs & joints (except hip)	<0.01	<0.5	<1.5 days
Chest (single PA film)	0.02	1	3 days
Skull	0.06	3	9 days
Thoracic spine	0.7	35	4 months
Lumbar spine	1.0	50	5 months
Hip	0.4	20	2 months
Pelvis	0.7	35	4 months
Abdomen	0.7	35	4 months
IVU	2.4	120	14 months
Barium swallow	1.5	75	8 months
Barium meal	2.6	130	15 months
Barium follow-through	3	150	16 months
Barium enema	7.2	360	3.2 years
CT Head	2	100	10 months
CT Chest	8	400	3.6 years
CT abdomen or pelvis	10	500	4.5 years
Radionuclide Studies			
Lung ventilation (Xe-133)	0.3	15	7 weeks
Lung perfusion (Tc-99m)	1	50	6 months
Kidney (Tc-99m)	1	5	6 months
Thyroid (Tc-99m)	1	50	6 months
Bone (Tc-99m)	4	200	1.8 years
Dynamic cardiac (Tc-99m)	6	300	2.7 years
PET head (F-18 FDG)	5	250	2.3 years
*UK average background radiation = 2.2 mSv per year: regional averages 1.5-7.5 mSv per year			

Please note that the doses from some CT examinations are particularly high and the demand for CT imaging continues to rise. **It is therefore particularly important that referrals for CT are thoroughly justified and that techniques that minimise dose while retaining essential diagnostic information are adopted.**

In these referral guidelines, the doses are grouped to support the referrer in understanding the order of magnitude of radiation doses of the various investigations (Table 2).

Table 2 **Typical effective doses of ionising radiation from common imaging procedures**		
Symbol	Typical effective dose (mSv)	Examples
None	0	Ultrasound (US), Magnetic Resonance Imaging (MRI)
☢	<1	Chest, limbs & pelvis X-ray, mammography
☢ ☢	1-5	Lumbar spine X-ray, Nuclear Medicine (NM) (e.g., bone), Computed tomography (CT) head and neck
☢ ☢ ☢	5-10	CT chest or abdomen, NM (e.g., cardiac)
☢ ☢ ☢ ☢	>10	Extensive CT studies, some NM studies (e.g., some Position Emission Tomography co-registered with CT (PET-CT)
The average annual background dose in most parts of Europe falls within the 1-5 mSv range ☢ ☢		

Pregnancy and Protection of the foetus

Irradiation of a foetus should be avoided whenever possible. This includes situations in which the woman herself does not suspect pregnancy. The prime responsibility for identifying such patients lies with the referring clinician. Radiology also checks the pregnancy status of patients when they attend for examination.

Persons of childbearing potential presenting for an examination in which the primary beam irradiates the pelvic area (essentially, any ionising irradiation between the diaphragm and the knees), directly or by scatter, or for a procedure involving radioactive isotopes, will be asked whether they are or may be pregnant.

If the patient can exclude the possibility of pregnancy, the examination can proceed. If the patient is definitely pregnant, or if pregnancy cannot be excluded, the justification for the proposed examination should be reviewed by the radiologist and the referring clinician/NMR, with a decision taken on whether to defer the investigation until after delivery. However, a procedure of clinical benefit to the parent may also be of indirect benefit to the unborn child and a delay in an essential procedure may increase the risk to the foetus as well as the parent. This consideration is especially relevant in an emergency situation and all decisions must be documented.

Guidelines Key

The pages of each section are composed five columns:

Clinical/diagnostic problem	Situation for requesting an examination
Investigation	Possible imaging techniques
Dose	Level of exposure to radiation ☢
Recommendation	Recommendation on appropriateness of the investigation
Comment	Explanatory notes

Interventional Radiology

Clinical/diagnostic problem	Investigation	Dose	Recommendation	Comment
Leg ischemia (incapacitating claudication, rest pain with or without tissue loss) with iliac stenotic disease	Primary angioplasty plus selective stenting	☢ ☢ ☢	Indicated	The decision to place a stent after angioplasty depends on several factors, including an intimal flap, a residual pressure gradient and recoil of the lesion after balloon deflation.
Leg ischemia (incapacitating claudication, rest pain with or without tissue loss) with iliac occlusive disease	Iliac stent placement	☢ ☢ ☢	Indicated	The policy of primary stenting for iliac occlusive disease is accepted.
Leg ischemia (incapacitating claudication, rest pain with or without tissue loss) with femoro/popliteal stenotic/occlusive disease	Superficial femoral / popliteal artery angioplasty	☢ ☢ ☢	Indicated	Percutaneous transluminal angioplasty of the superficial femoral and popliteal arteries is effective for restoring patency in the short term. Repeat angioplasty obviates the need for surgical bypass. In claudicants, exercise and management of risk factors both have important roles. Surgery may provide better long-term primary patency.
Leg ischemia (rest pain with or without tissue loss) with crural stenotic / occlusive disease	Angioplasty of crural vessels	☢ ☢ ☢	Indicated	When there is suitable lesion in the crural vessels, angioplasty should be the first-line treatment in patients with critical ischemia. Crural angioplasty for severe disabling claudication is sometimes practiced but remains controversial.

False aneurysm (pseudoaneurysm) of the common femoral artery following diagnostic / therapeutic arterial punction	US compression	None	Specialised investigation	Both US compression and US-guided injection are of proven benefit in treating femoral pseudoaneurysms. Treatment with thrombin seems more effective.
	US-guided thrombin injection	None	Specialised investigation	
Obstruction of the renal pelvis of ureter	Percutaneous nephrostomy	☢ ☢	Indicated only in specific circumstances	Percutaneous nephrostomy is indicated as an alternative to retrograde stenting. This procedure is most safely performed within normal working hours. Obstruction with renal sepsis, or in a single kidney or transplant kidney may require more urgent drainage. Nephrostomy for malignant obstruction needs careful consideration

Interventional radiology may also be able to help in the clinical management of the following problems. The decision will depend on the clinical condition of the patient and local expertise. Discussion with your local interventional radiologist is recommended.

Vascular

- Asymptomatic carotid disease
- Symptomatic carotid disease
- Pulmonary embolus
- Acute massive lower GI haemorrhage
- Chronic or recurrent upper GI haemorrhage
- Chronic mesenteric ischaemia
- Hypertension due to fibromuscular dysplasia
- Hypertension due to atherosclerotic renal artery stenosis
- Abdominal trauma with acute GI bleeding, with or without retroperitoneal or intraperitoneal haemorrhage (see also T34-T37)
- Embolisation for uncontrolled haemorrhage after pelvic fracture
- Vena cava obstruction

Hepatic

- Ascites due to portal hypertension
- High biliary obstruction (intrahepatic ducts or upper half of extrahepatic bile duct)
- Low biliary obstruction (lower half of extrahepatic bile duct or pancreatic duct)
- Actual or suspected acute calculous of acalculous cholecystitis
- Varicocele
- Focal liver lesion(s) requiring biopsy
- Unresectable liver tumours
- Primary hepatoma and liver metastases

Renal

- Renal failure due to atherosclerotic renal artery stenosis
- Flash pulmonary oedema due to atherosclerotic renal artery stenosis
- Renal calculi

Miscellaneous

- Subphrenic abscess
- Pelvic abscess
- Pulmonary mass diagnosis
- Mediastinal mass (non-vascular)
- Percutaneous gastrostomy required for enteral nutrition