East Lancashire Hospitals NHS Trust
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Clinical Radiology Referral Guidelines

Head & Neck Referrals

Safe | Personal | Effective

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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

ENT/Head & Neck

Clinical/diagnostic problem	Investigation	Dose	Recommendation	Comment
Middle or inner ear symptoms (including vertigo)	CT	☢ ☢	Specialised investigation	CT should be used for middle ear disease and assessment of the bony labyrinth.
	MRI	None	Specialised investigation	MRI is the best investigation for vestibular schwannoma (acoustic neuroma) and other lesions of the internal auditory canal or cerebellopontine angle.
Sensorineural hearing loss	MRI	None	Specialised investigation	MRI is more sensitive than CT for diagnosis of vestibular schwannoma; however, CT may be useful in the diagnosis of otospongiosis and bony inner ear deformities.
Sinus disease	CT Sinus	☢ ☢	Specialised investigation	CT is useful to show the presence and distribution of disease and sinonasal anatomy before functional endoscopic sinus surgery. A low-dose radiation technique should be used. CT is indicated when maximum medical treatment is ineffective. MRI or contrast-enhanced CT (with coronal and axial images) are specialised investigations indicated when there is development of complications such as orbital cellulitis, or if malignancy is suspected.
	XR Sinus	☢	Not indicated	Acute sinusitis can be diagnosed and treated clinically. If it persists past 10 days on treatment, CT is recommended when the results could alter management. Signs on XR sinus are often non-specific and are encountered in asymptomatic people
Thyroid nodules	US	None	Indicated only in specific circumstances	US is the best investigation for differentiating between thyroid and extra thyroid masses, for guiding aspiration or biopsy (especially in difficult-to-palpate or small thyroid nodules), and for the detection of associated lymphadenopathy in thyroid malignancy. While US can be specific for malignancy, it has poor sensitivity. With generalised thyroid enlargement or multinodular goitres US readily shows retrosternal extension; real-time studies show the effect of neck extension, etc. CT or MRI is needed to demonstrate full retrosternal extent and tracheal compromise. Nuclear imaging cannot reliably distinguish between benign and malignancy nodules is not required if nodules are present.

				Triple assessment (clinical, US, FNAC) has largely replaced NM as the initial assessment procedure.
	US-Guided FNAC FNAC	None None	Indicated	Thyroid nodules are extremely common; most are benign. Clinically guided FNAC (without imaging) is the most cost-effective initial investigation.
Thyrotoxicosis	NM US	☢ ☢ None	Specialised investigation	NM can differentiate between Graves' disease, toxic nodular goitre, and subacute thyroiditis. It provides function information about nodules but is not usually indicated for this purpose. It is also useful in thyroiditis. US with colour Doppler may also be of help in experienced hands.
Ectopic thyroid tissue (e.g., lingual thyroid)	NM US	☢ ☢ None	Indicated	NM is sensitive for small ectopic rests of thyroid tissue. US is useful in children. Cross-sectional imaging may be helpful for assessment of neoplastic transformation and associated findings.
Hyperparathyroidism	US NM CT MRI	None ☢ ☢ ☢ ☢ None	Specialised investigation	Seek advice locally. Diagnosis is made on clinical/biochemical grounds. Imaging can assist in preoperative localisation to facilitate focused or minimally invasive surgery. Much depends on local policy and available technology and expertise. US, NM, CT, and MRI are all accurate in the unoperated neck. A combination of US and NM usually provides adequate information preoperatively, but other investigation may be useful to localise residual, ectopic, or recurrent tumours.
Ingested foreign body	XR lateral soft tissue of neck	☢	Indicated only in specific circumstances	Direct examination of the oropharynx, laryngoscopy and endoscopy are the investigation of choice. XR is useful for the identification of radio-opaque foreign bodies, hence clinical history is essential in determining the type of foreign material ingested. CT may be used in specific circumstances.
Neck mass of unknown origin	US	None	Indicated	US is the first-line investigation for characterisation of neck mass. May be combined with FNAC.
	CT MRI	☢ ☢ None	Indicated only specific circumstances	CT or MRI may be indicated if the full extent of the lesion is not established by US. It is also useful for the identification of other lesions, and for staging.

Salivary obstruction	US Sialogram	None ☢ ☢	Indicated	US or sialogram are indicated for intermittent, food-related swelling. MR sialogram may be preferred by some centres.
	XR	☢	Indicated only in specific circumstances	Where there is a calculus in the floor of the mouth, XR may be all that is required.
Salivary mass	US	None	Indicated	US in the initial investigation of choice for a suspected salivary mass. It can be combined with FNAC if necessary. US is extremely sensitive and has high specificity.
	MRI CT	None ☢ ☢	Specialised investigation	Whenever deep lobe involvement or extension into deep spaces is suspected, MRI or CT should be used. MRI may be better than CT for malignant lesions (in the assessment of local spread, including perineural extension).
Dry mouth: Connective tissue disease	US Sialogram NM	None None ☢ ☢ ☢ ☢	Specialised investigation	Not commonly required. US and sialogram may be diagnostic but NM provides better functional assessment.
Temporomandibular joint dysfunction	MRI	None	Specialised investigation	XRs do not add information because most temporomandibular joint problems are due to soft tissue dysfunction rather than bony changes, which appear later and are often absent in the acute phase. MRI is the investigation of choice to identify internal derangement. US may help show an effusion but has not been fully evaluated. CT may be useful in special circumstances such as post -surgical repair, implants or bony ankylosis.
	CT	☢ ☢	Indicated only in specific circumstances	