East Lancashire Hospitals NHS Trust
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Clinical Radiology Referral Guidelines

Obstetric and Gynaecological 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

Obstetrics and Gynaecology

Clinical/diagnostic problem	Investigation	Dose	Recommendation [Grade]	Comment
Screening in pregnancy	US	None	Indicated	▪ Screening in early pregnancy (9-13 weeks) accurately dates a pregnancy by measuring the crown-rump length, which reduce the intervention rate for infants born at or after full term. US accurately assess fetal number and chronicity and improves outcome for multiple pregnancies. Assessment of nuchal translucency thickness from 9-14 weeks has been shown to be effective in screening for Down's syndrome. ▪ Screening for structural abnormality at 18-20 weeks has not been shown to alter perinatal mortality except where selective termination of pregnancy is applied in the presence of gross fetal abnormality. US has proven value in assessing placenta praevia (transvaginal US (TVUS) for posterior placentas) and intrauterine growth restriction. ▪ The routine use of US in late pregnancy in low-risk or unselected populations is not associated with improvements in overall perinatal mortality. In the specialise care of high-risk pregnancies, the use of US including Doppler is associated with a reduction in perinatal mortality. ▪ US is essential for the safe practice of intervention and therapeutic procedures such as amniocentesis, fetal blood sampling and transfusions during pregnancy.
Suspected pregnancy	US	None	Indicated only in specific circumstances	Urinary detection of human chorionic gonadotropin (pregnancy test) should be the first-line investigation. Serum assay of human chorionic gonadotropin should be considered if pregnancy is clinically suspected and urinary pregnancy test is negative or difficult to interpret. There is no indication for US except for dating, or when a complication of early pregnancy is suspected.

Suspected ectopic pregnancy.	US	None	Indicated	After a positive pregnancy test. TVUS is most accurate. In cases where no intrauterine pregnancy is seen and there is doubt, the use of quantitative measurements of serum human chorionic gonadotropin together with TVUS improves the diagnosis of ectopic pregnancy.
Possible early intrauterine pregnancy failure	US	None	Indicated	Diagnosis of failed pregnancy can only be confirmed by US if the mean gestation sac diameter is >20mm with no identifiable embryo, or embryo with a crown-rump length >6mm with no heartbeat. Repeat TVUS after 1 week is needed (especially when the mean diameter of the gestational sac <20mm or crown-rump length ,6mm). Where there is doubt about the viability of a pregnancy, delay in evacuation of the uterus is essential for safe practice.
Postmenopausal bleeding: to exclude significant endometrial pathology	US	None	Indicated	TVUS is indicated to exclude significant endometrial pathology in postmenopausal bleeding. Endometrial thickening ≥5mm requires biopsy for specific diagnosis.
Suspected pelvic mass.	US	None	Indicated	A combination of transabdominal and TVUS is often required. US should confirm a lesion's presence and determine the likely organ or origin. TVUS should bus used to define the anatomy further. MRI is the best second-line investigation, although CT is still widely used.
Pelvic pain, including suspected pelvic inflammatory disease and suspected endometriosis.	US	None	Indicated	US is helpful, especially when clinical examination is difficult or impossible but has poor predictive value when diagnosing pelvic inflammatory disease. In the clinical setting laparoscopy is usually the next step after US. CT may be used to exclude other inflammatory conditions.
	MRI	None	Specialised investigation	MRI can be useful to localise the larger foci of endometriosis
Lost intrauterine contraceptive device (IUCD)	US	None	Indicated	The plastic levonorgestrel device is impregnated with barium sulphate and may be difficult to see on transabdominal US. TVUS is therefore recommended for patients with this device.

	AXR	☢	Indicated only in specific circumstances	AXR is indicated only when ICUD is not seen in the uterus on US.
Recurrent miscarriages	US	None	Indicated	US will show the major congenital and acquired uterine problems. There is increasing expertise and confidence in the role of 3D US.
	Hysterosalpingography (HSG) Sono-HSG	☢ ☢ None	Specialised investigation	HSG or sono-HSG are only indicated when US has suggested and endometrial cavity lesion or congenital uterine abnormality. Practice varies in different centres.
Infertility	US	None	Indicated	Compared with bimanual pelvic examination. TVUS enables pelvic anatomy to be assessed with more accuracy and reliability. US can assess pelvic pathology, such as endometriosis, endometrioma, cyst, polyp, leiomyoma, adnexal and ovarian lesions. It is used for follicle tracking during treatment.
	HSG Sono-HSG	☢ ☢ None	Specialised investigation	For initial assessment of tubal patency, HSG is recommended. HSG is also useful for the detection and confirmation of congenital and acquired uterine abnormalities.
Suspected cephalopelvic disproportion	MRI CT	None ☢ ☢	Specialised investigation	The indication for pelvimetry by any method is debatable. There is no evidence to support the use of XR pelvimetry. MRI or CT should only be used in exceptional cases. MRI is preferred as it avoids ionising radiation.
Polycystic ovaries	US	None	Indicated only in specific circumstances	Polycystic ovarian syndrome is a clinical and biochemical diagnosis. At least two of these criterial are required: ▪ Oligomenorrhoea and / or anovulation. ▪ Clinical and / or biochemical hyperandrogenism. ▪ Polycystic ovaries, with the exclusion of other causes. The diagnosis of a polycystic ovary on US requires the demonstration of a least 12 follicles measuring 2-9mm in diameter and / or an ovarian volume in excess of 10ml.