

A general guide to patient preparation for radiological investigations

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Imaging studies form an integral part of patient work-up and knowledge of patient preparation is essential to avoid unnecessary study cancellations and delays.

Radiological imaging is comprised of several different modalities. The method of imaging dictates patient preparation.

Some of the imaging modalities (radiographs, fluoroscopy and CT) use ionising radiation to obtain images whereas sonar and MRI are performed without the use of ionising radiation. Ultrasound essentially uses sound waves to evaluate the acoustic properties of tissues and MRI utilises magnets and radio waves.

Some imaging modalities may also require the administration of intravenous contrast that further influences patient preparation.

Patient preparation for imaging can be divided into two main categories:

1. Pre-existing conditions affecting the study or use of contrast agents
2. Study-specific preparation

1. Pre-existing conditions affecting the study or use of a contrast agent

Allergies

A history of previous contrast allergy, allergy to other medications (e.g. penicillin) or asthma may predispose the patient to an allergic reaction to intravenous contrast. The radiology practice as well as the ordering physician should be informed as an alternative study may need to be requested or the patient may require pre-medication, usually in the form of corticosteroids.

Renal function

Renal function blood tests (urea and creatinine) need to be done within 30 days of the examination for all adult patients requiring intravenous contrast (usually contrast-enhanced CT and MRI). Poor renal function may prohibit the use of intravenous contrast and an alternative imaging method may be preferred.

If there is a history of kidney disease or the patient is on dialysis the radiology practice needs to be alerted so that the necessary precautions can be taken.

Pregnancy

If a patient is or might be pregnant the radiology department needs to be informed. The use of ultrasound is safe in pregnancy. MRI is currently considered to be the preferred cross-sectional imaging method in pregnant patients, however MR contrast is contra-indicated. The use of ionising radiation (radiographs, fluoroscopy and CT) is avoided in pregnancy unless critical and, under those circumstances, are done with extra precautions to limit the radiation exposure to the foetus. With the exception of ultrasound, all imaging studies are preferably postponed until after delivery if possible. The managing clinician and radiologist usually discuss the indication for the study to determine the safest study that would provide the necessary information.

Diabetes

Diabetic patients on any medication containing metformin may need special preparation if the scheduled study requires intravenous contrast (CT, IVP). The metformin-containing medication must not be taken on the day of the examination and for 48 hours thereafter. Follow-up with the managing physician is recommended for instructions on when and how to resume the medication.

Myasthenia gravis

Patients known with myasthenia gravis need to alert the radiology department as intravenous contrast agents may precipitate myasthenic symptoms or adverse drug reactions.

Porphyria

Patients known with porphyria need to inform the radiology practice as the use of certain contrast agents may be contraindicated.

2. Study-specific preparation**Conventional radiography**

No patient preparation is required.

Cross sectional imaging**1. Computerised Tomography (CT)**

Computerised tomography images are acquired with the use of ionising radiation and often require the administration of intravenous contrast.

Studies are relatively short in duration depending on the examination and may range from five minutes to 30 minutes or longer. The patient will be required to remain still for approximately 30–60 seconds at a time and may be required to hold their breath for up to 30 seconds at a time. A restless or confused patient may therefore require sedation to enable the patient to remain still for the duration of the study.

Patients are advised to remove all jewellery and other metallic objects prior to the study as this may cause artefact on the images.

Patients should only drink clear liquids for the four hours prior to the study. Patients are advised to be well hydrated before and after the study to assist with renal clearance of the contrast agent.

Patients can continue to take their chronic medications at their normal time (except metformin-containing medications, as explained above).

If an abdominal study is planned, the patient may require oral contrast. These patients must arrive for their appointments timeously as oral contrast is administered over 1–2 hours prior to the study.

Vascular access may be required for administration of contrast depending on the examination performed. At least a 20G intravenous cannula needs to be inserted, preferably in the cubital fossa. Multiphase examinations or CT angiography are performed with power injectors requiring a well-functioning intravenous cannula (at least an 18G) in a large vein (foot or volar wrist cannulas cannot be used).

2. Magnetic Resonance Imaging (MRI)

MRI acquires images with the use of magnets and radio waves. The examination times are considerably longer than for other imaging modalities and may take on average between 45 to 60 minutes per body part. The patient will therefore be required to lie still for long periods at a time. During the imaging there is a loud intermittent noise, acoustic noise protection is usually provided by the radiology practice.

Paediatric patients as well as restless or confused patients may require sedation or general anaesthesia during the MRI.

Patients known with claustrophobia may require anti-anxiety medication.

Pregnancy needs to be reported to the radiology practice. Even though MRI is deemed safe in pregnancy, MRI contrast is not.

Patients should remove all jewellery and drug delivery patches prior to the study.

Patients are also advised to leave their valuables at home as cellphones, hearing aids, glasses and any other metallic objects cannot be taken into the MRI suite.

Due to the use of strong magnetic fields, the following devices may be hazardous and need to be reported to the radiology department. These devices need to be identified prior to the study and the manufacturer's guidelines need to be followed as to MRI safety.

- Cardiac pacemaker
- Implanted cardioverter defibrillator
- Artificial heart valves
- Aneurysm clips or vascular stents
- Electronic implant or device
- Magnetically-activated implant or device
- Neurostimulator system
- Spinal cord stimulator
- Cochlear implant or implanted hearing device
- Implanted drug infusion device (i.e. insulin pump)
- Any type of prosthesis or implant
- Artificial or prosthetic limb
- Any metallic fragment or foreign body (e.g. orbital metal fragments or shrapnel)
- Any external or internal metallic object
- Hearing aids
- Skin tattoos

Some MRI studies may require the administration of intravenous contrast. Venous access is usually obtained in the MRI suite if required.

Certain MRI studies require specific patient preparation:

Cardiac MR: No coffee, caffeine-containing drinks, tea or chocolate should be consumed in the 24 hours preceding the study. No exercise in the 24–48 hours preceding the study.

MR Enterography: Patients should remain nil per os for at least four hours prior to the study. Oral contrast is administered prior to the study and the patient needs to arrive for the appointment timeously to allow time to drink the contrast.

MRCP: Patients should remain nil per os for at least six hours prior to the study to ensure that the gallbladder is adequately distended.

MR Bladder: Patients should empty their bladders two hours prior to the examination.

MR Urogram: Patients should empty their bladders one hour prior to the examination.

MRI Rectum/pelvis: The study may require the instillation of rectal or vaginal gel which will be done in the MRI suite.

MR Abdomen/pelvis: Patients should remain nil per os for at least four hours prior to the study.

MR Breast: appointments should preferably be scheduled within day 7–10 of the menstrual cycle.

Ultrasound

Ultrasound uses sound waves to acquire images and is deemed safe in all patients.

The length of the study varies depending on the examination.

The following studies require specific patient preparation:

Renal ultrasound: Patients should drink at least four glasses of water within the two hours prior to the study and should refrain from emptying their bladders as a full bladder is required for the study (unless the patient is known with chronic renal disease or on dialysis).

Pelvic ultrasound: Patients should consume at least four glasses of water in the hour preceding the study to ensure a full bladder at the time of the study.

Abdominal ultrasound: Patients should remain nil per os from midnight of the preceding day (at least six to eight hours).

Mammography

Patients should bring all their previous mammograms to the appointment especially if these were done at other institutions.

No deodorant, perfume or skin products should be applied to the breasts, axillae or chest walls on the day of the appointment

Fluoroscopy

Images are acquired with the use of ionising radiation.

For studies of the gastrointestinal tract (contrast swallow or meal) patients should remain nil per os from midnight of the preceding day (at least six to eight hours).

Bowel preparation as well as a special diet is prescribed prior to a contrast enema. Details regarding the bowel preparation protocol can be obtained from the radiology department.

Angiography

Angiography uses ionising radiation to guide the intervention.

Even though the patient preparation varies depending on the type of examination, basic guidelines are relevant to all interventional studies.

Patients should remain nil per os for at least six hours prior to the procedure. All regular medications should be taken with small sips of water, except for anti-coagulants. Any anti-coagulant medication, including aspirin, needs to be discontinued prior to the procedure. The length of time that the medication needs to be stopped varies between different anti-coagulants and discussion with the interventional radiology department is recommended as alternative anti-coagulation may need to be used in the interim.

Blood tests need to be performed prior to most angiographic procedures and include renal function tests (urea, creatinine), haemoglobin, platelets and INR.

Adequate patient preparation forms an integral part of radiological imaging and procedures. Preparation protocols vary between radiology departments and even though general guidelines remain the same, it is recommended that the radiology department where the study is to be performed is contacted to ensure that the correct preparation is instituted.

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