

Clinical Radiology

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Clinical radiology

Clinical radiology may be a specialised branch of medicine that uses state of the art equipment and a variety of techniques to capture images of the within of the body.

Clinical radiologists (radiologists) are qualified medical doctors who have undertaken another five years of additional study and intensive training to specialise in their field. They are trained to perform and interpret medical images to diagnose and sometimes treat injuries and diseases of all parts of the body.

You may be referred to a clinical radiologist by your doctor or specialist.

X-rays (also known as plain radiography)

MRI (magnetic resonance imaging) scans

Ultrasound (sometimes called sonograms/sonographs)

CT (computed tomography) scans – these were previously referred to as CAT (computerised axial tomography) scans

Fluoroscopy – endless X-ray almost like an 'X-ray movie'

Nuclear Scans – such as bone scans, thyroid scans and PET CT scans

Interventional radiology – radiologists treat abscesses, pain conditions, blocked arteries and tumours using images obtained by fluoroscopy, CT, ultrasound and MRI.

Ultrasound is the term used for high-frequency soundwaves. Ultrasound examinations use these sound waves to supply an image or image onto a screen showing the within of your body.

An ultrasound is administered by a trained health care provider (sonographer, radiologist or sonologist) employing a smooth, hand-held device called a transducer that they move across the body with a sliding and rotating action. The transducer transmits the high-frequency sound waves into your body. Different sound waves are reflected from different soft tissue, structures or parts in the body in different ways. These sound waves are converted to electrical impulses that produce a moving image displayed on a screen.

Radiography is that the imaging of body structures, or parts of the body, using X-rays. X-rays are a form of radiation (X-radiation) similar to visible light, radio waves and microwaves. X-radiation is special because it has a very high energy level that allows the X-ray beam to penetrate through the body and create an image or picture.

Magnetic resonance imaging (MRI) is a scanning procedure that uses strong magnets and radiofrequency pulses to generate signals from the body. These signals are detected by a radio aerial and processed by a computer to make images (or pictures) of the within of your body.

An ultrasound has many advantages. It is painless and does not involve radiation, which means it is very safe. There are no injections unless your doctor has specifically requested one. The high-frequency sound waves ensure images show very high detail, capable of watching the very tiniest parts of the body. Ultrasound can be carried out while there is movement, so it is excellent for the imaging of babies and children.

Computed tomography (CT) is a way of using X-rays to take pictures or images in very fine slices through the part of the body that the doctor has asked to be investigated. One way to think of it is of taking slices through a loaf of bread.

When CT scanners were first invented, they took one slice at a time and were quite slow when compared to today's machines. Most modern scanners now take quite one slice at a time. This may range from 4 to 320 slices and up to 640 slices for the most recent machines. This is referred to as "multi-slice" or "multi-detector" technology, and may be abbreviated as MSCT or MDCT.

Nuclear medicine may be a subspecialty of radiology which involves the utilization of radioactive medication (radiopharmaceuticals) to diagnose and treat disease. These radioactive materials are usually injected into a vein, but are sometimes swallowed or inhaled.

A gamma camera tracks the movement of the radiopharmaceuticals from outside the body by detecting the gamma radiation emitted by the medication. Depending on the type of test, two or three dimensional images of the internal body can be created.

Radiopharmaceuticals are often used to treat hyperthyroidism, thyroid cancer, solid tumours and bone metastases.

Interventional radiology may be a medical specialisation that involves performing a variety of imaging procedures to get images of the within of the body. The interventional radiologist carefully interprets these images to diagnose injury and disease, and to perform a range of interventional medical procedures.

Interventional radiologists use imaging techniques such as X-rays, MRIs (magnetic resonance imaging) scans, fluoroscopy (an X-ray procedure that makes it possible to see internal organs in motion), CT (computed tomography) scans and ultrasounds.

Interventional radiologists perform a broad range of procedures such as treating tumours, taking organ biopsies or placing stents by inserting tiny instruments and thin plastic tubes (catheters) into the body via an artery or vein. The images are used to guide the catheters and instruments to the precise area where the procedure or treatment is to be performed. This reduces the need for traditional (open) or keyhole (laparoscopic) surgery as treatment can be given via a small plastic tube about the size of a straw.

Angiography is the X-ray imaging of blood vessels using contrast agents injected into the bloodstream (see Angiography).

CTCA uses computerized tomography (CT) scanning to require pictures or images (angiograms) of the coronary arteries of the beating heart. These arteries supply blood to the heart muscle, and disease of those vessels (atherosclerosis) is liable for most heart attacks.

Liquid contrast agents, sometimes called contrast medium (see Iodine-containing contrast medium (ICCM)), are injected into a vein (usually in the arm). Contrast agents increase the density of the blood in the vessels, and allow the inside and outside structure of blood vessels to be clearly visible on the CT angiogram images.

Medication to reduce blood flow and slow down the heart rate might also be given to make the images even clearer and easier to interpret. This will either be taken in tablet form or into a vein through a cannula (a thin plastic tube) inserted within the arm.