

The role of the radiography workforce in cardiac services



The Society & College of Radiographers

The radiography workforce is a vital part of the specialist cardiac care team. Patients with a suspected heart attack or myocardial infarct (MI) require rapid access to high quality and appropriate imaging in order to diagnose the problem and provide interventional treatment. Patients with symptoms of cardiovascular disease require imaging to determine the extent of the disease process in order to establish the process for elective treatments.

Digital angiography

A variety of imaging modalities are used to diagnose cardiac and cardiovascular disease. For suspected coronary artery disease, specialist equipment is used to identify diseased arteries through a process of digital subtraction angiography. The radiographer is responsible for imaging the heart in a number of projections (or views) to demonstrate each of the cardiac arteries and any areas of occlusion or narrowing. Many radiographers have extended their roles to undertake further clinical activities, including the injection of contrast agents to enhance the appearance and aid the positioning of a stent to maintain the patency of the artery.

Cardiac CT angiography

Angiography of the heart can also be carried out using computed tomography (CT), particularly in cases where patients have symptoms of angina. This is a very technically demanding examination, requiring radiographers to have expert CT skills and detailed anatomical knowledge.

Other applications of cardiac CT

Cardiac CT is a non-invasive technique which produces high resolution images. It is necessary to 'freeze' cardiac motion by using ECG gating and radiographers must have the necessary skills for placement of the ECG leads and an understanding of its integration into the systems software.

As well as helping to identify other disease indicators such as calcium scoring, CT is used for evaluation of anatomy and cardiac bypass grafts. Other applications include ventricular function and analysis and it is sometimes useful for the assessment of congenital defects. Radiographers undertaking this work have highly specialised skills and carry out technically demanding scanning of acutely ill patients, often in an emergency situation.

Radiographers are also required to assess patients for beta blockers, to cannulate and administer contrast agents and to technically manipulate scan protocols, assess images and perform image reconstructions.

Where occlusion of the blood vessels in the lower limbs is suspected, particularly the veins, a procedure called venography is required. Radiopaque contrast agents are injected into the blood vessels which then demonstrate lesions such as varicose veins and deep vein thrombosis. In many departments, advanced practitioner radiographers are leading venography studies, allowing cardiologists to focus their time and expertise elsewhere.

The radiography workforce delivers diagnostic imaging and radiotherapy services in a range of health and social care settings across the UK. Radiographers are pivotal to delivering fast and reliable diagnoses of disease, as well as curative and palliative treatment and care for patients with cancer. A large majority of patients will be referred for imaging during their treatment and radiographers are key to the delivery of successful clinical outcomes.

The Society and College of Radiographers (SCoR) is a professional body and trade union. With more than 90% of the radiography workforce in membership, it represents the entire profession. It shapes the healthcare agenda and leads opinion on a wide range of professional issues, setting standards and developing policies that are adopted and acclaimed by governments and health professionals worldwide.

The SCoR pioneers new ways of working and ensures that its members work in a safe and fair environment. Its activities are designed to ensure that patients receive the best possible care.

The SCoR believes that:

- Every patient must have the right diagnostic examination, at the right time, undertaken by the most appropriate person, using the right equipment to the best possible standard and with timely results to inform the outcome.
- Every cancer patient must be able to be in control of decisions about their care and have access to the most effective treatment, delivered at the right time and by the most appropriate person.

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Cardiac MRI

The scope of radiographic practice in cardiac MRI continues to broaden. Cardiac MRI is used to diagnose many diseases and conditions including assessment of left ventricle structure and function, congenital heart defects, valvular heart disease and pericardial disease.

MR Angiography (MRA) techniques are used for assessment of peripheral arteries, thoracic vessels, coronary arteries and pulmonary vein evaluation.

Perfusion Cardiac MR is a technique used for perfusion and ischaemia testing, as well as the diagnosis of coronary heart disease, heart valve problems and congenital heart defects.

Highly specialised radiographers inject a contrast agent, such as gadolinium, to highlight the heart and blood vessels on the MRI scan. They are required to have a highly developed understanding of the physical principles of MRI and the structure and function of the heart to enable them to manipulate scan parameters to produce high quality images.

Radiographers must also have a knowledge of the structure and function of the contrast agent in order to perform techniques such as late gadolinium enhancement and first pass perfusion.

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Nuclear medicine

For patients who suffer symptoms of angina, particularly when taking mild exercise, an examination known as radionuclide stress testing may be appropriate. This test involves the administration of a radionuclide called Thallium which is taken up by the heart muscle. The patient undertakes exercise under the supervision of the radiographer which results in the heart muscle concentrating the radionuclide, the distribution of which can be shown using a gamma camera. The patient is then allowed to rest during which time the radionuclide redistributes and is then imaged. Areas of muscle showing differences in concentration can indicate the presence or result of a myocardial infarction.

It is also possible to image the heart dynamically to demonstrate the ejection fraction of the ventricles. This test indicates the efficiency of the heart as a pump by allowing the radiographer to calculate how much blood, as a proportion of the maximum capacity, is pumped out of the ventricles at each contraction, again demonstrating the efficiency of the heart muscle.

Ultrasound

Imaging of the heart by ultrasound is frequently undertaken during fetal assessment procedures in order to identify congenital heart disease. Ultrasound is a non-invasive procedure compared with angiography.

In adults, assessment of the patency of the heart valves can be demonstrated, again with no risk to the patient compared to angiography or nuclear medicine procedures.

Specialist ultrasound procedures using Doppler imaging can demonstrate blood flow in the heart, in the major blood vessels of the neck leading to the brain and in the lower limbs. The Abdominal Aortic Aneurysm screening programme requires a single examination of the aorta by ultrasound in order to identify patients at risk.

Summary

The radiography workforce is a vital part of the specialist cardiac team, providing rapid access to a range of high quality and appropriate imaging during a critical period of the care pathway. Radiographers have developed their clinical practice in a variety of complex procedures, improving outcomes for patients with, or at risk of cardiovascular disease.

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