The ROYAL MARSDEN NHS Foundation Trust | ICR The Institute of Cancer Research

Spring 2018

Update from the Imaging Clinical Research Facility

Highlight on Nuclear Medicine

Nuclear Medicine is a field of medicine which uses diagnostic imaging techniques and radioactive tracers to produce images of the body to help diagnose and treat disease. These radioactive tracers are chemical compounds made up of radioactive atoms called radioisotopes. There are a wide range of tracers available, chosen for their ability to localise within a specific organ or disease.

PET (Positron Emission Tomography) scanners work by detecting the radiation given off by an injected radiotracer as it collects in different parts of the body. They produce detailed 3-dimensional images that can clearly show the part of the body being investigated, including any abnormal areas, and can highlight how well certain functions of the body are working. PET scans are particularly helpful for investigating cancer to determine how far the cancer has spread and how well it's responding to treatment.

A computerised tomography (CT) scan uses X-rays and a computer to create detailed images of many structures inside the body, including the internal organs, blood vessels and bones. PET scans are often combined with CT scans to produce even more detailed images, providing both structural and functional information. This is known as a PET/CT scan. These are the most common imaging modality used in nuclear medicine, particularly in the detection, assessment and monitoring of cancer.

One of the most commonly used PET/CT tracers in clinical oncology is a radiolabeled glucose molecule called Fluorine-18 fluorodeoxyglucose (18FDG). Since rapidly dividing cancer cells use up glucose in the body, the FDG radioisotope allows doctors to see cancer cells and where they may have spread.

As a specialist cancer imaging Clinical Research Facility, we support research into the development and evaluation of new radiotracers and enable these to be applied to a portfolio of experimental medicine research studies. We currently support 41 active research studies involving PET/CT imaging for assessing treatment response to various cancer therapies. We have 3 PET/CT scanners, 2 at Sutton and 1 at the Chelsea site.

If you would like more information about the Imaging Clinical Research Facility or are interested in working with us, please email imagingCRF@rmh.nhs.uk or call 020 8915 6624.

NHS National Institute for Health Research

ARSAC – How Nuclear Medicine scans are regulated

Anxious about being exposed to radiation from nuclear medicine procedures? The Administration of Radioactive Substances Committee (ARSAC) is there to protect your interests, ensuring you will not be exposed unnecessarily to radiation. As part of research study development, Medical Physics and Clinical Radiation Experts review protocols to calculate the radiation dose a participant will receive and to assess the risks associated with doses above standard practice (i.e. additional to what you would receive if not participating in the trial). An application is them made to ARSAC, who must be satisfied that all administrations are justified. Only then will approval be granted, and the study permitted to proceed. ARSAC has recently updated its approvals process in response to changes in medical radiation exposure regulations. This is a tightly regulated process, which has not been fully described here.

You can learn more at:
www.gov.uk/government/organisations/administration-of-radioactive-substances-advisory-committee

Nuclear Medicine Research Studies

A Phase I trial of ONX-0801 (a novel α-folate receptor-mediated thymidylate synthase inhibitor) exploring once weekly and alternate week dosing regimens in patients with solid tumours.

This molecular imaging study assesses treatment response, by pre and post treatment (18F-FLT) PET/CT scan, in patients with ovarian cancer. ONX-0801 is a novel therapy targeting solid tumours expressing a specific receptor typically found in ovarian cancer. This drug blocks the action of an enzyme called thymidylate synthase, which in turn may stop cancer from growing. By using (18F-FLT) PET/CT as a quantitative measurement tool, it could aid in predicting a patient's response to treatment. ONX-0801 has been shown to shrink tumours in a significant number of trial patients and is being hailed as a major breakthrough in the treatment of ovarian cancer.

mIBG study - A Cancer Research UK Phase I/II study to compare [124I]mIBG PET/CT to [123I]mIBG imaging in patients with metastatic neuroblastoma

This trial is comparing a novel imaging technique for measuring neuroblastoma, a rare cancer which predominantly affects young children. A radioactive iodine tracer called [124I]mIBG using PET/CT scan will be compared to routine scans such as [123I] mIBG planar scintigraphy. The novel [124I]mIBG PET/CT scan will provide a more accurate three dimensional picture to pinpoint neuroblastoma, assisting physicians to localise disease and treatment decisions. If successful, this could change and improve patient pathways across the NHS and globally with fewer scans for patients in addition to providing more accurate images. Recruitment is continuing to progress at both The Royal Marsden and UCLH.

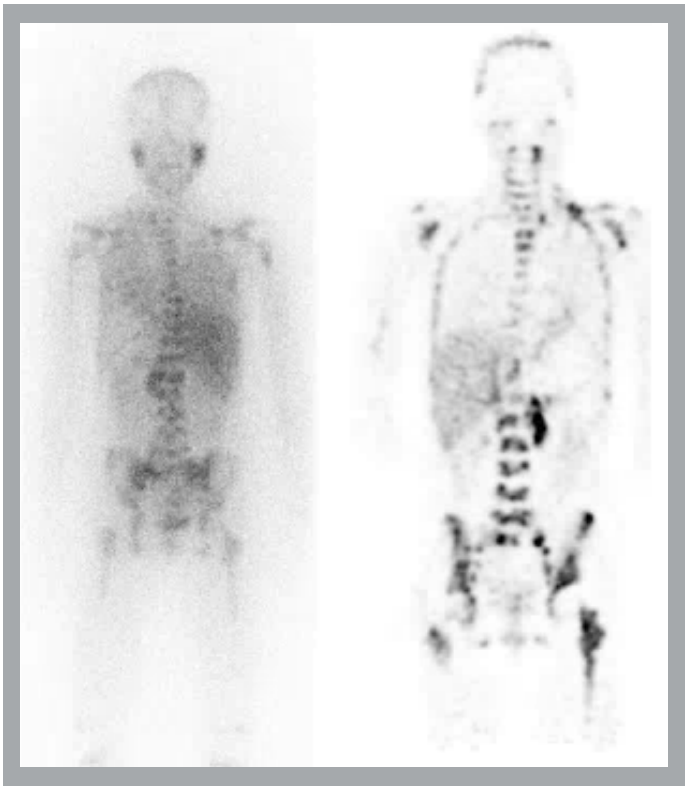

Image on the left obtained with[123I]mIBG and on the right with[124I]mIBG

REA study - Radiation Exposure Awareness from patients

This is a Questionnaire study designed to understand the current patient knowledge on ionising radiation exposure when having a bone scan or a FDG PET/CT scan and appropriateness of current information leaflets. Information will be used to develop better guidance for medical staff to assist patients in their understanding

Patient and Public Involvement (PPI)

PPI is a core element of our research. We have just opened a new study, simplification of low level internal dosimetry (SOLLID), that will determine the range of absorbed doses delivered to healthy organs from nuclear medicine procedures and so inform on radiation risks. It has a patient co-investigator who helped with the funding application, study design, patient information and consent forms and who is doing a 'dummy run' of the patient pathway through the study to ensure all runs smoothly and according to protocol. The main aim of the study, which is being carried out for the Department of Health, is to establish the methods by which we can assess the biological effects of low levels of radiation.