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Maltese Association of Radiologists and Nuclear Medicine Physicians

Nuclear Medicine

General information

Nuclear medicine encompasses a range of diagnostic tests that can be performed using radioactively-labelled tracers to assess the function of the body part of interest or identify potential disease as early as possible. The Nuclear Medicine Unit offers a range of diagnostic services which are listed below:

Scans using pharmaceuticals labelled with **Technetium (Tc-99m):**

- Bone Scan
- Heart (Myocardial) Perfusion Scan (MIBI Scan)
- Lung Ventilation/Perfusion Scan
- DTPA Kidney Scan
- DMSA Kidney Scan
- Thyroid Scan
- Parathyroid Scan
- Gastric Emptying (Milk Scan for paediatrics)
- Gastric Emptying (Adults)

Scans using pharmaceutical (FDG) labelled with **Flourine-18 (F-18):**

- Brain PET/CT Scan (FDG PET Scan)
- Whole Body PET/CT Scan (FDG PET Scan)

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Scans using pharmaceuticals labelled with **Radioiodine:**

- Thyroid Scan (I-131 Scan)
- MIBG Scans (I-131 or I-123 Scan for neuroendocrine tumour imaging)

Scans using pharmaceuticals labelled with **Indium (In-111):**

- Octreotide (for neuroendocrine tumour imaging)

How does the radioactive tracer work?

Depending on the specific type of scan you are about to have, you will be given the radioactive tracer by injection, to swallow or to inhale. You will then proceed to have the images taken by special cameras that detect radioactivity from the tracer that is circulating in your bloodstream. Images are obtained using either a Gamma camera or a PET/CT scanner. You may be asked to relax and not speak prior and during the procedure.

What are the risks of having nuclear medicine scans?

The radiation doses used are very small and the risk and benefits are weighed up by the physician in order to make sure you are having the best option yielding the most information.
Make sure to inform the Nuclear Medicine unit BEFORE you come for your scan if you are or think you might be pregnant; or are breastfeeding- due to the potential risks of radiation. If the scan is not urgent, it will be postponed.

Allergies to the radioactive tracers are rare but if you are known to have a reaction, please inform staff before coming for the scan.

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How to prepare for your scan

You will be given specific instructions with your appointment letter.
For most scans you can eat normally unless you are advised not to do so.
Please make sure to remove all jewellery and other metallic objects as these can interfere with the scan.

After the scan

Even after the scan has finished, the radioactive tracer that you were injected with will still be present in your body for a short amount of time. Depending on the type of tracer you were injected with, you may be asked to reduce contact with others for a specific time, in order to avoid posing risks to people around you. Unless advised otherwise, you may continue all your normal activities.

Your results will be ready in a few days and communicated to your referring doctor. Below is more specific information of the most commonly performed scans:

Bone Scan

What does it involve?
This is a whole body scan of the bones. You will be injected with a radioactive tracer after which you will remain in the waiting area for 2 hours until it is taken up by the bones. During this time you need to drink plenty of fluids of your choice (about 1 litre). You will then be told to lie on a bed while a Gamma camera stays close to your body to record images of your bones. The scan lasts between 25 to 30 minutes and you will be asked to stay still for this period.

What is it used for?
This is a test looking at the cells of your bones for signs of infection, fractures, damage or even cancer.

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Lung Ventilation/Perfusion Scan

What does it involve?
This scan may be in one part or two parts. One part assesses air flow (ventilation) and the other looks at the blood flow (perfusion) of the lungs. The first part will be the perfusion scan which involves injection of the radioactive tracer into a vein via a cannula. If you need to have the second part, another radioactive tracer will be given to you by asking you to breathe it in. You will then be told to lie on a bed and to stay still while a Gamma camera stays close to your body to record images of your lungs.

What is it used for?
The main use of this scan is to look for a pulmonary embolism (blood clot in the lungs) although other conditions can be investigated.

PET-CT Scan

What does it involve?
PET stands for Positron Emission Tomography and it can be combined with computed tomography (CT) to assess both metabolic activity in the body while providing anatomic images of the body, in order to precisely locate areas of abnormal metabolic activity. This is done using a radioactive tracer injected into a vein.

You will need to fast for 6 hours before the scan and you will be asked to avoid certain foods and drinks on the day of your scan. PLEASE CHECK THE LABELS OF ANY FOOD OR MEDICATION. If you are diabetic, it is important to inform the Nuclear Medicine Unit before coming for your scan.

What is it used for?
It is used to look for abnormal energy usage by uptake of the tracer in areas of infection or cancer.

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Heart Perfusion Scan (MIBI Scan)

What does it involve?
The scan is in two parts which are usually done on different days- a rest part and a stress part. The stress can be simulated with a treadmill but if you cannot do this, certain drugs can be used to speed up the heart rate. Whilst the stress test is happening, the radioactive tracer will be injected through a vein. You will then be told to lie on a bed and to stay still while a Gamma camera stays close to your body to record images of your heart. The rest part of the scan is similar without having to do any exercise but you will need to have a break of up to 3 hours after your injection.

You will be instructed to fast for 4 hours before and avoid foods, drinks and medications containing caffeine for a time before your scan. PLEASE CHECK THE LABELS OF ANY FOOD OR MEDICATION. You may be given a list of medications that you are allowed to stop before your scan.

Do not smoke cigarettes or drink alcohol from midnight till the time of your scan. Avoid strenuous exercise the day before the scan. Please ensure you attend the stress part of the test wearing suitable gym wear.

Men should shave their chest hair prior to the scan.

What is it used for?
This scan is used to look at the blood flow of the heart and how it functions under stress or exercise when investigating chest pain.

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References and more information

https://www.bnms.org.uk/patients/patient-information-leaflets/
https://patient.info/