

What is Nuclear Medicine?

Nuclear Medicine is a medical specialty that uses safe, painless and cost effective technique to diagnose various diseases in the form of scans and to treat diseases with a positive outcome.

It involves the use of tiny quantities of radioactive substances combined with specific pharmaceuticals administered either by injection in the vein, by mouth through a breathing device or by some other method which then travels to the intended organ.

A specialised camera i.e rotating Gamma Camera records these radioactivity in the form of images of the organ which is diseased on the computer screen. There are a number of different radiolabelled compounds used in Nuclear Medicine practice and depending on their composition, they concentrate in different organs.

Nuclear Medicine can provide:

- Accurate images that help health care professionals to understand the body's internal organs and tissues
- Valuable information and measurements of organ and tissue function
- Therapy to fight diseases

Nuclear Medicine is an important medical tool that is :

- Safe : Only small amounts of short- lived radioactive materials are used.
- Effective : It can detect a wide variety of diseases such as cancer, heart disease, kidney disease, brain disorder etc.

Waiting Time :

After the administration of radio labelled compound, patient may be asked to wait for a period of time before the actual scanning begins. The waiting time will vary for different types of scans. Some may be performed immediately while others may not take place for a number of hours or even days after the compound has been administered. This waiting time is necessary because the compounds used in nuclear medicine take different amounts of time to accumulate in the area of your body being studied.

Taking the scan or picture

When it is the time for your scan, you will be positioned next to a special detector of Gamma Camera which will be placed close to the part of your body being studied. A number of pictures with images will be taken. These images may be seen immediately on the computer screen and will be preserved on laser film / colour printout which is given to the patient with the report.

Scan Timing :

Each scan image timing varies from case to case. Usually each scan takes about 15 min- 2 hours. Occasionally the patient may be asked to come on the subsequent day for taking the delayed study.

Interpretation of the scan :

The Nuclear Medicine physician will analyse the various pictures taken. The result may be compared with the results of other tests such as X- ray, I.V.P., Treadmill Stress Test, 2D Echo cardiography, CT Scan, MRI Scan, Coronary Angiography to reach a more complete understanding of the particular medical/ surgical problem.

Patient Preparation :

No special preparation is required on the part of the patient. For each test some different preliminary preparation is required, which will be informed at the time your appointment is made.

Does nuclear scan hurt ?

Other than minor discomfort of a needle stick, all nuclear scans are painless and safe procedures. Adverse reactions are rare as radioactive substances do not react with the blood components.

Who should not get a nuclear scan ?

Women who are pregnant or breastfeeding are generally not permitted for nuclear medicine scans but nearly everyone else can have these scans.

Are daily routine activities hampered after undergoing the nuclear scan ?

Patients' daily activities are not affected at all. In other words, his/ her daily activities can be resumed immediately after the test.

How safe are Nuclear Medicine procedures performed in children & newborn ?

All Nuclear Medicine procedures performed in the newborns and children are safe. Usually the dosage of the radiolabelled compound administered is adjusted according to the child's height and weight.

Nuclear Medicine Scans

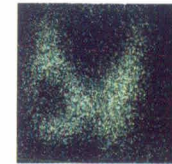
Most scans involve the injection of a small amount of radioactive material which is photographed by a camera that picks up the

radiation and produces a picture. Radiation exposure is very small - less than that of a chest X-ray.

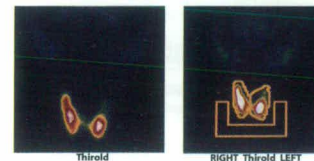
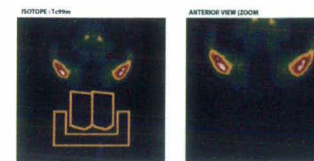
Some of the examples and its indication of type of Nuclear Medicine Scans:

• Thyroid Scan:

Gives important information regarding functioning of thyroid lobes and its type of enlargement in the neck, infection in the thyroid lobes, cysts in the thyroid lobes etc.



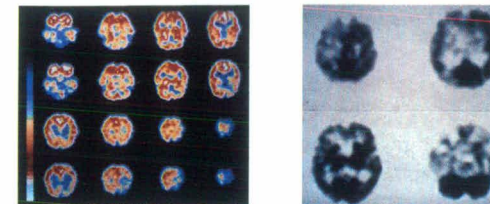
Thyroid scan showing cold area containing blood / fluid in right lobe



Infection of thyroid lobes before & after treatment

• Brain Scan:

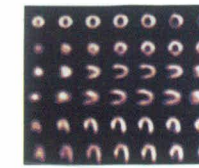
Gives information regarding the blood flow to either side of the brain structure. It is an important diagnostic tool of patients suffering from Stroke, Epilepsy, degeneration of brain cells etc.



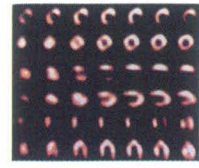
Brain spect scan showing less blood supply to one half of brain tissue in a patient of TIA

• Cardiac (Heart) Scans:

Gives information regarding the past heart attack, future treatment planning, detects the severity of heart disease, bypass graft functioning following heart surgery, heart's pumping action, heart's motion, selecting heart patients before subjecting for Coronary Angiography.



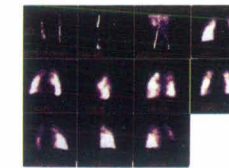
Normal blood supply to the heart muscle as seen in various slices



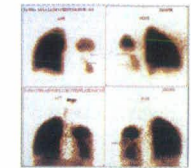
Absence of blood supply to the heart muscle with evidence of live tissue in the affected muscle

• Lung Scan :

Can help to detect blood clots and congenital narrowing of artery supplying to the lung tissue and other problems of the lung.



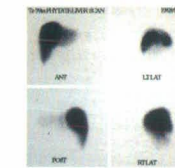
Normal lung perfusion scan



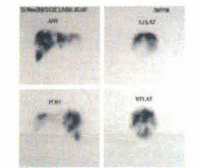
Absence of blood supply to one side of the lung with normal ventilation.

• Liver Scan :

To detect tumor in the liver, cirrhosis, hepatitis, abscess, cysts, cancer spread.



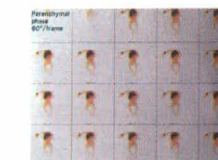
Normal liver scan



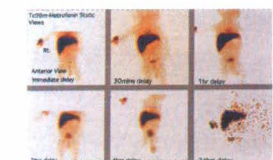
Multiple areas of cancer spread in the liver tissue from a patient of cancer breast.

• Gall Bladder Scan :

Infection of the Gall Bladder, congenital blockage inside the biliary tree of the liver tissue, stone in the gall bladder and common bile duct.



(a)

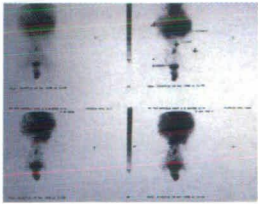


(b)

a) & b) congenital blockage of biliary tree of the liver tissue in a new born child.

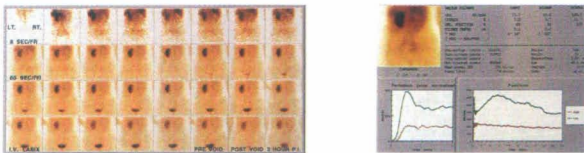
G.I. Bleeding detection :

Detects bleeding point in the small bowel and large bowel of the GI Tract.



Renal (Kidney) Scan :

Can detect the kidney function secondary to kidney or ureteric stones, swelling of the kidney such as hydronephrosis / cysts, obstruction in the urine flow in the ureter to find out degree of obstruction and to calculate individual kidney function, to detect the cause of blood pressure secondary to the narrowing of the artery in the kidney and rejection of transplanted kidney



a) & b) Non-functioning right kidney in a renal scan

Bone Scan :

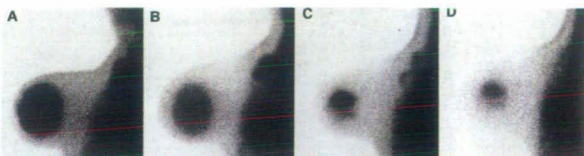
Detects bone tumor, cancer spread in the bone, Arthritis, Sports injury, sudden stoppage of blood supply to the head of the long bones



a) Normal bone scan
b) Multiple areas of cancer spread in the bone in a patient of cancer breast.

Breast imaging scan :

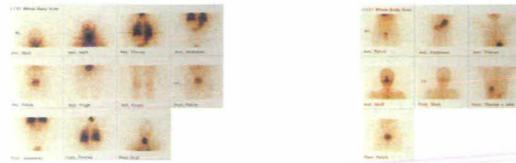
To detect early breast cancer when mammography finding is inconclusive.



Showing cancerous nodule in the breast.

Nuclear Medicine in treatment of various ailments :

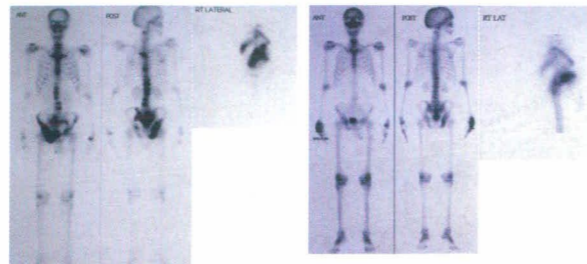
• Treatment of thyroid disorder such as hyperfunctioning of thyroid gland (toxic goitre), thyroid cancer etc.



Patient of thyroid cancer having extensive spread into both lungs.

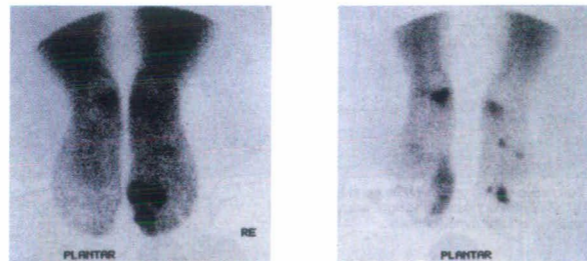
After administering I-131 therapy, significant recovery in the form of complete absence of lung uptake

• Treatment of distant cancer spread from cancer breast and cancer prostate etc. to the bone



Before After
Prostate cancer spread to the bone treated with strontium before & after showing significant recovery.

• Treatment of Arthritis particularly rheumatoid arthritis, blood disorder arthritis, early Osteo arthritis by local administration to the joint space.



Treatment of arthritis of small joints with erbium before & after treatment.

Fast Facts :

Nuclear Medicine is an integral part of patient care and saves countless lives

- Nuclear Medicine procedures are unique, safe and cost-effective.
- Nuclear Medicine uniquely provides information about both the function and structure of virtually every major organ system in the body.
- Nuclear Medicine procedures are among the safest diagnostic imaging tests available.
- The amount of radiation in a Nuclear Medicine procedure is comparable to that received during an X- Ray and is within safe limits.
- Nuclear Medicine procedures are painless and do not require anesthesia.
- Children commonly undergo Nuclear Medicine procedures to evaluate bone pain, injuries, infection or kidney and bladder function.
- Although Nuclear Medicine is commonly used for diagnostic purposes, it also provides valuable therapeutic applications such as treatment of hyperthyroidism, thyroid cancer, blood imbalances, pain relief from certain types of bone cancers and pain relief from Arthritis.
- Nuclear Imaging is also useful for conditions like unexplained fever, chronic inflammatory bowel disease, infection of prosthesis, implants and lymphomas etc..

For any further information, please contact Department of Nuclear Medicine

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NUCLEAR MEDICINE
PATIENT INFORMATION GUIDE



your precious health in safe hands