

# NUCLEAR MEDICINE

## **BONE SCINTIGRAPHY**

Acute and chronic infections of the bone  
Acute pyogenic arthritis  
Extrapulmonary tuberculosis (TB of bone)  
Non-infective inflammation of the bone  
Osteoarthritis; Rheumatoid arthritis  
Assessing for and determining therapeutic response in Reflex sympathetic dystrophy syndrome (complex regional pain syndrome, CRPS)  
Avascular necrosis or Perthe's disease  
Traumatic and Sports injuries of bone  
Metabolic disease of bone  
Benign and primary malignant bone tumours  
Metastatic bone tumours

## **THYROID SCINTIGRAPHY**

Determine the size of the thyroid gland  
Differentiate forms of thyrotoxicosis (thyroiditis, factitious hyperthyroidism, Grave's disease, toxic multinodular goitre and toxic adenoma)  
Calculate specific doses for treatment of hyperthyroidism  
Localization and characterization of thyroid nodules  
Determine the function of thyroid nodules  
Determine functional status of the thyroid gland  
Evaluate presence of ectopic thyroid tissues, thyroglossal and substernal masses

## **V/Q SCAN (LUNG SCINTIGRAPHY)**

### ADULT:

Confirm or exclude pulmonary embolism  
Evaluation of lung function pre-operatively  
Evaluation of alveolar capillary permeability after smoke inhalation injury  
Evaluation of lung transplantation  
Evaluation of patients with bronchitis or obstructive forms of chronic pulmonary disease  
Venoscintigraphy to determine DVT

### PAEDIATRIC:

Primary abnormalities of the lung and pulmonary vessels  
Infective and post-infective lung damage  
Evaluation of regional lung function with bronchiectasis

Evaluation of postoperative regional lung function  
Cystic fibrosis  
Foreign body inhalation  
Detection and measurement of right-to-left shunts  
Evaluation of aerosol deposition before administration of nebulised drugs

## **RENAL SCINTIGRAPHY**

### Tc 99m MAG3 / Tc 99m DTPA

Differential Renal function (contribution of each kidney to global renal function)  
Evaluation of obstructive nephropathy and obstructive uropathy associated with hydronephrosis or renal stones, malignancy etc  
Evaluation of renal transplantation  
Investigation of unknown origin of lumbar pain  
Investigation of acute or chronic renal failure  
Renal trauma

### Tc 99m DMSA RENOGRAM

Assessment of parenchymal involvement in acute pyelonephritis  
Assessment of renal infarction and scarring post infective or post vasculitis  
Assessment of differential renal function and contribution of single kidney function toward global renal function.  
Detection of congenital abnormalities: abnormal duplex kidneys, small kidneys, dysplastic kidneys, horseshoe kidney and pelvic kidney.  
Distinguish pseudotumors/ benign space occupying lesions (e.g. prominent column of Bertini) from tumours

### CAPTOPRIL RENOGRAM

Determination of the presence of renovascular disorders as a cause of hypertension  
Malignant hypertension  
Hypertension difficult to control or resistant to medical therapy  
Hypertension occurring at extremes of age  
Deterioration of renal function during therapy with ACE inhibitors  
Deteriorating renal function of no obvious cause

### RADIONUCLIDE CYSTOGRAM

Direct/indirect  
Assess active reflux of urine

## **CARDIOVASCULAR SCINTIGRAPHY**

### MYOCARDIAL IMAGING

Diagnosis of coronary artery disease:  
Presence, location (coronary territory) and severity  
Assessment of the impact of coronary stenosis on regional perfusion  
Distinguish viable hibernating myocardium from scar  
Risk assessment and stratification  
Post myocardial infarction  
Pre-operative for major surgery in patients who may be at risk for coronary events  
Monitor treatment effect  
Monitor after coronary revascularization  
Medical therapy for congestive heart failure or angina  
Lifestyle modification

### EQUILIBRIUM RADIONUCLIDE ANGIOCARDIOGRAPHY (ERNA / MUGA)

Determine global and regional measures of ventricular function (primarily LV function)  
These measures of ventricular function may include evaluations of ventricular wall motion, ejection fraction (EF), and other parameters of systolic and diastolic function.

## **LIVER AND SPLEEN**

### HEPATOBIILIARY SCINTIGRAM (HIDA SCAN)

Suspected acute cholecystitis  
Suspected chronic biliary tract disorders  
Suspected common bile duct obstruction  
Bile extravasation  
Atresia of the biliary tree (Neonatal jaundice)  
Enterogastric reflux

### LIVER

Hepatic Hemangioma/s  
Cirrhosis

### SPLEEN

Assessment for splenunculus or residual splenic tissue post splenectomy

## **SENTINAL NODE LOCALIZATION AND MAPPING**

Breast cancer  
Malignant melanomas  
Penile Cancer  
Cancer of the Cervix  
Cancer of the prostate

### **INFECTION/INFAMMATION**

Fever of unknown origin (FUO) for localization of the primary site of infection  
Assessment of region/s for residual ongoing or occult infection  
Assessment of severity and extent of infection  
Assessment of response to therapy

### **PARATHYROID SCINITIGRAM**

Localization of parathyroid adenomas  
Localization of ectopic parathyroid adenomas

### **TUMOUR IMAGING**

#### GALLIUM-67 CITRATE AND SESTAMIBI

Tumour of Primary Unknown  
Disease burden (Extend of tumour) with whole body imaging  
Residual tumour activity post therapy  
Recurrent tumour activity in the midst of post-surgical/ therapeutic changes  
Determine sites of biopsy (most metabolic active site)  
Lymphomas  
Benign – Sarcoidosis; Idiopathic lung disease

#### NEUROENDOCRINE TUMOURS

Radiolabelled MIBG (meta-iodo-benzyl-guaindine) and radiolabelled Octreotide for diagnostic imaging and for therapeutic purposes.

#### WELL-DIFFERENTIATED THYROID CARCINOMA

Radioiodine has 3 main indications in the postoperative management of patients with thyroid cancer:  
Ablation of residual thyroid tissue with 131-I,  
Imaging for possible recurrent disease with 123-I or 131-I,  
And treatment of residual or recurrent thyroid cancer with 131-I.  
Chylothorax

### **SCINTIMAMOGRAPHY**

Identifying multicentric, multifocal or bilateral breast cancer in patients with a diagnosis of breast cancer  
Breast lump in patient with:  
Dense breast  
Previous breast biopsy  
Previous lumpectomy  
Previous radiotherapy in breasts

### **GASTROINTESTINAL SYSTEM**

GIT bleed  
Meckels Diverticulum  
Gastro-Oesophageal transit and reflux in children (Milk scan)  
Gastric emptying and transit  
Small and large bowel transit

### **TESTICULAR SCINTIGRAPHY**

Useful to differentiate the cause of a swollen or painful testicle – distinguish acute testicular torsion from inflammation  
<24 hours acute torsion  
>24hours late/missed torsion  
Epididymitis

### **LYMPHOSCINTIGRAPHY**

Lymphoedema of the limbs  
Lymphatic leakage  
Lymphagiectasia  
Chylous ascites

### **CEREBRAL PERFUSION IMAGING**

Evaluation of patients with suspected dementia  
Pre-surgical localization of epileptic foci  
Determine brain death

### **RADIONUCLIDE CISTERNOGRAPHY**

Investigating suspected communicating hydrocephalus (normal pressure hydrocephalus)  
Detect the site and severity of a CSF fistula or leakage  
To assess the patency of a shunt or pathway in surgical treatment of hydrocephalus

### **DACROSCINTIGRAPHY**

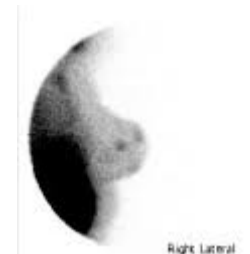
Determine functional obstruction of lacrimal ducts  
Causes include obstruction of the lacrimal excretion system, xerophthalmia, foreign bodies, and drug induced tear overproduction.

### **SALIVARY GLAND SCINTIGRAPHY**

Sensitive and valid method for evaluation of the function of the salivary glands.  
Relatively safe, well tolerated and easy to perform, and enables an assessment of the function of all major salivary glands.



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