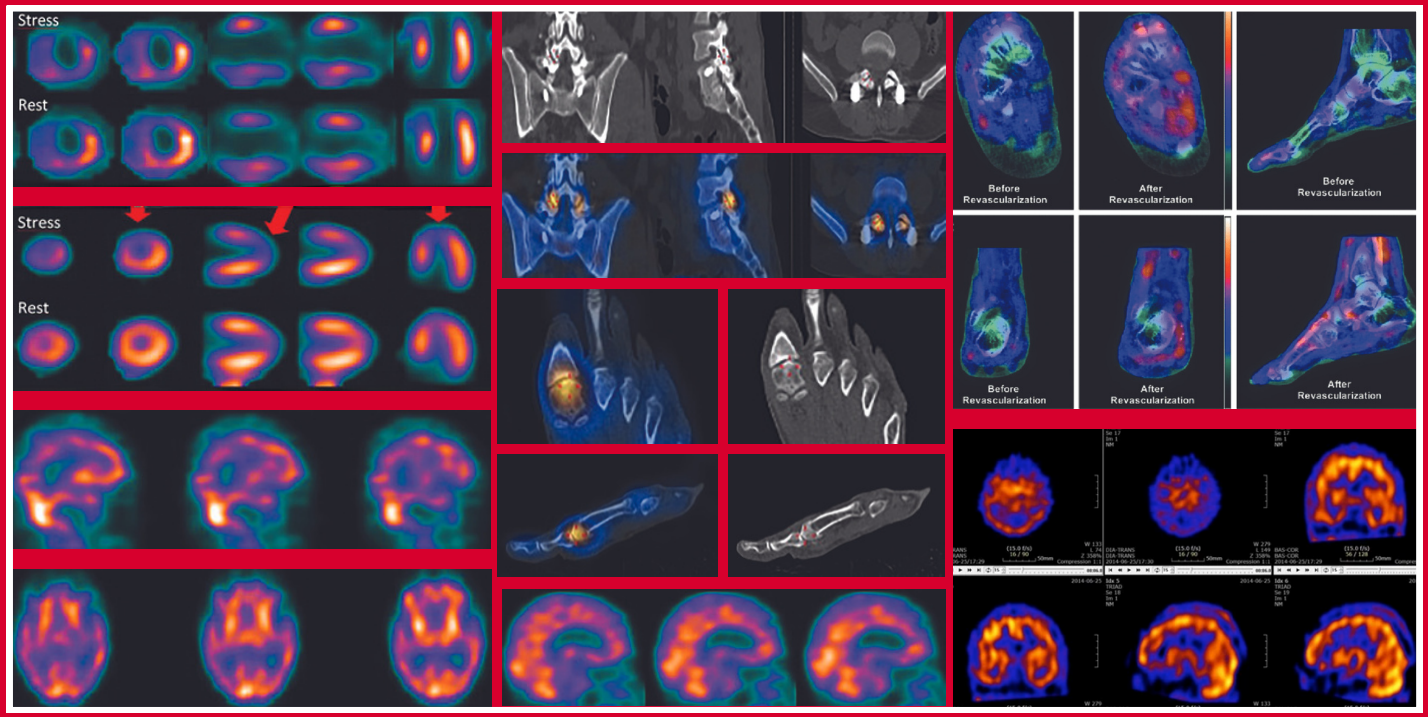
Referrer's Guide to
Nuclear Medicine Procedures

SUNSHINE COAST RADIOLOGY



Australasian Association of
NUCLEAR MEDICINE SPECIALISTS
www.aanms.org.au

The information published in this guide has been adapted from the Australasian Association of Nuclear Medicine Specialists (AANMS)

Acknowledgement

Referrer's Guide to Nuclear Medicine Procedures
This information has been prepared by the Australasian Association of Nuclear Medicine Specialists (AANMS) to:

- Outline the application of the more commonly performed Nuclear Medicine procedures,
- Assist you in requesting the most appropriate procedure for a given patient, or
- Use as a basis for discussion with Sunshine Coast Radiology's Nuclear Medicine technologist.

For any further information about Nuclear Medicine procedures, other clinical problems and less commonly performed procedures, please contact Sunshine Coast Radiology's Nuclear Medicine technologist on 1300 697 226.

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Nuclear Medicine Procedures

Referral forms may use different terminology for procedures. For example, myocardial perfusion scans are also known as myocardial perfusion stress tests or are sometimes listed according to the radiopharmaceutical used (e.g. MIBI, Myoview or Thallium scans). If the procedure you'd like to request seems not to be listed, describe the clinical indication(s) and region of the body that you're interested in and our Nuclear Medicine technologist will decide the most appropriate scan to undertake in discussion with you.

Times allowed and preparations are intended as a guide only to assist you and your patients when organising appointment times for scans. Please note that the approximate time is the time from the administration of radiopharmaceutical to the end of scanning. For many procedures, there is a gap of an hour or more between the administration of the radiopharmaceutical and the scan. Patients may be asked to leave the department and come back later.

This information is designed as a reference source for medical practitioners and is intended to supplement, not replace, particular patient information provided by individual Nuclear Medicine services. Your patients should ask the Nuclear Medicine service at Sunshine Coast Radiology on
1300 697 226 for specific information relevant to their procedure.

Please note that many procedures will be performed in conjunction with a low-dose CT scan for attenuation correction and anatomical localisation. This CT scan will usually take no more than 10 minutes.

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Bone Scanning			
Evaluate bony pathologies such as: • Bone tumours - primary and secondary • Arthritis • Osteomyelitis/ infection of the bone • Metabolic bone diseases such as Paget's disease • Sports injuries • Stress fractures • Suspected fractures with normal x-ray • Avascular necrosis	Bone scan - whole body or localised	No patient preparation Patients may be asked to drink 3 to 4 glasses of fluid after injection of radiotracer.	Up to 5 hours

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Brain/Neurological Disorders			
Detection and evaluation of cerebral disease including: • Dementia • Localisation of epileptic foci • Brain tumours including suspected recurrence • Stroke • Suspected brain trauma and brain death • Assess cerebral flow reserve	Brain scan (with or without Diamox provocation)	No patient preparation	Up to 1½ hours For some conditions, the scan may be repeated on another day.
CSF studies for: • Assessing ventriculo-peritoneal or atrial shunt patency	CSF shunt study	The area around the shunt reservoir may be shaved	2-24 hours
• CSF leaks	CSF leak study	The lumbar puncture site will be prepared according to the standard approach.	2-24 hours
• Hydrocephalus	CSF flow study	The lumbar puncture site will be prepared according to the standard approach.	Up to 48 hours

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Gallbladder/Biliary			
Assess biliary tract function including: • Acute and chronic cholecystitis • Common bile duct obstruction • Gallbladder ejection fraction • Post-cholecystectomy syndrome	Biliary (function) scan with or without a cholagogue or morphine	Nothing to eat or drink (other than water) for 6-8 hours before test	1-1½ hours Some patients may require a second injection and further scan - allow total of 2½ -3 hours
Lymphatic System			
Lymphoedema	(Peripheral) lymphoscintigraphy	No patient preparation	Up to 4 hours
Assess lymph drainage and identify sentinel lymph nodes, particularly in breast cancer and melanoma	Sentinel node scan/ lymphoscintigraphy	No patient preparation	Up to 3 hours

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Cardiac			
Assess cardiac function e.g. • In coronary artery disease • Cardiomyopathy • Before and after chemotherapy	Gated blood pool scan	No patient preparation	1½ hours
Assess myocardial perfusion: • For diagnosis of coronary artery disease and risk stratification • For efficacy post revascularisation (surgical or percutaneous) • For preoperative assessment of patients at risk of ischaemia/ myocardial infarction • In the presence of unexplained arrhythmia Functional studies: Assess significance of: • Known coronary artery disease not requiring immediate revascularisation • Possible stenotic lesions post revascularisation (surgical or percutaneous) • Lesions detected on CT coronary angiography	Myocardial perfusion scan or functional imaging		Up to 5 hours if done on a 1-day protocol. If a 2-day protocol, the initial study may only take 2-3 hours. The patient may be called back on the following day for the second part - 1-1½ hours.

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Cardiac Cont'd			
Myocardial viability - mostly used where a decision needs to be made as to whether cardiac surgery/revascularisation will provide significant benefit or not	Myocardial viability scan	Nothing to eat or drink (other than water) for 4-6 hours before test	Up to 5 hours A further scan may be performed on the following day - 1-1½ hours.
Assess size and location of recent myocardial infarct	Myocardial infarct scan	Performed 2-8 days after an infract. No patient preparation	3-4 hours
Ventricular and atrial septal defects, patent ductus arteriosus (PDA)	(Qp:Qs) cardiac shunt scan	No patient preparation	1-1½ hours
Lymphoma			
Staging and monitoring therapy	Gallium scan Consider 18F-FDG PET scan as an alternative where available	No patient preparation Please contact your nuclear medicine service regarding timing of scan in relation to chemotherapy	At least 2 appointments: 1. For injection of radiopharmaceutical - allow 30 minutes 2. Return 24 or 48 hours later for scan - allow 1-2 hours. 3. Some patients may need to return for further scan - allow 1-2 hours.

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Gastrointestinal			
Gastric emptying disorders e.g. • Diagnosis and follow-up of gastroparesis • Rapid gastric emptying/dumping syndrome • Investigate epigastric discomfort and bloating • Post-gastric surgery assessment	Gastric emptying study	Nothing to eat or drink for 6-8 hours before test	up to 4 hours
Investigate function of the colon, assess the severity and type of constipation	Colonic transit study	Preparation instructions vary according to indications. Please contact the nuclear medicine service for specific information.	Day 1 - allow the whole day - radiopharmaceutical taken in the morning as a drink, scan 6 hours later Days 2-5 - repeat scanning - allow 30 minutes each day

Gastrointestinal Cont'd

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Oesophageal motility disorders • Achalasia • Dysmotility • Reflux/aspiration • Scleroderma	Oesophageal transit study	Generally, patients will be required to have nothing to eat or drink (other than water) for 4-6 hours before the test.	30 minutes. In some cases delayed views at 24 hours for assessment of aspiration may be acquired
Acute gastrointestinal bleeding	Gastrointestinal bleeding scan	No patient preparation	4 -6 hours. Repeat images may be required 24 hours later
Inflammatory bowel disease	Labelled white blood cell scan	No patient preparation	Up to 5 hours. Repeat images may be required the following day
Meckel's diverticulum	Meckel's scan	Generally, patients will be required to have nothing to eat or drink (other than water) for 4-6 hours before test. Patients may be asked to take an H2 blocker such as Ranitidine at specified intervals before the test.	1-1½ hours
Salivary gland dysfunction	Salivary scan/study	Generally, no patient preparation	1-1½ hours

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Infection/Inflammation			
Assess sites of possible infection and inflammation - a means of detecting infection or inflammation in bone, joints and soft tissue as well as inflammation due to other causes, such as inflammatory bowel disease (Ulcerative colitis and Crohn's disease) Occult infection/PUO	Infection scan (Gallium scan, labelled white blood cell scan or Leukoscan depending on indications)	No patient preparation	Up to 6 hours Repeat scan may be required the following day, up to 1 hour.
Assess bone marrow distribution - supplement a bone scan and/or a Gallium or labelled white blood cell scan when looking for infection in bones and joints	Bone marrow scan	No patient preparation	1-1½ hours

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Liver/Spleen			
Assess size, shape, position and function of liver and spleen helping to diagnose: • Focal disease (tumour, abscess, cyst, trauma) • Chronic liver disease • Portal hypertension	Liver/spleen scan	No patient preparation	1-1½ hours
Evaluate liver mass to diagnose (or exclude) haemangioma	Labelled red blood cell liver/ haemangioma scan (sometimes called a liver blood pool scan)	No patient preparation	3-4 hours
Examine the spleen or identify sites of residual splenic tissue if the spleen has been damaged, operated on or removed in the past	Heat damaged red blood cell scan	No patient preparation	2-3 hours
Lung			
• Suspected pulmonary embolism	Ventilation/perfusion (V/Q) lung scan	No patient preparation	1 hour
• Pre-operative assessment for lung volume reduction surgery	Lung perfusion scan	Helpful for patient who have had recent chest x-ray (within 24 hours of scan) - to come with patient	1 hour
• Ventilation lung clearance studies to assess activity of inflammatory lung disease	Lung ventilation study with dynamic images		1 hour

Renal/Urinary Tract

If uncertain which renal scan to request, please discuss with nuclear medicine specialist.

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
• Assess renal function, relative renal function. Can be very useful in assessing the function of renal transplant grafts. • Assess urinary drainage • Hypertension where narrowing of the renal arteries is suspected	DTPA or MAG3 renal scan with or without Frusemide DTPA or MAG3 renal scan with or without ACE inhibitor (usually Captopril)	Patients should eat as normal then drink 2-4 glasses of water in the hour before their appointment. Check with nuclear medicine service whether any medications such as diuretics or antihypertensives need to be stopped prior to the test.	1-3 hours 1-3 hours
Displays viable cortical tissue, allows measurement of relative renal function, very sensitive test to indicate the presence of renal scars or active infection (pyelonephritis)	DMSA renal scan	No patient preparation	Up to 5 hours
Renal function	Glomerular filtration rate (GFR)	No patient preparation	Up to 4 hours

Thyroid

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
• Hyperthyroidism (e.g. Graves Disease, thyroiditis, toxic adenomas) • Enlargement of thyroid gland (goitre) • Thyroid nodules	Thyroid scan	Generally no patient preparation Thyroid medication may need to be stopped before the test. Patients will be instructed accordingly when their appointment is made. When making their appointment, patients should advise staff if they have had a contrast injection (e.g. for a CT scan) in the previous 4 weeks.	1 hour
• Determine whether there is any residual normal thyroid tissue following thyroid surgery • Determine whether there is any residual, iodine-avid thyroid tumour	I-123 or I-131 whole body scan	Some medication needs to cease before the test. Patients will be instructed as to which medications when their appointment is made. Patients usually require blood tests on the day before the scan to check whether any thyroid tissue is stimulated or on the level of thyroid stimulation. Female patients may require a blood test prior to administration of the radioactive iodine to exclude pregnancy. An appointment should be made accordingly.	Blood test the previous day if required. At least 2 appointments: 1. To take I-123 (drink) or I-131 (capsule) - allow 30 minutes 2. Return 1-3 days later for scan - allow 1-2 hours.

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Other Endocrinology			
Assess for parathyroid adenoma or hyperparathyroidism, often when elevated blood calcium levels have been detected.	Parathyroid scan	No patient preparation	Up to 4 hours
Suspected phaeochromocytoma or other tumours composed of cells derived from, or related to, medullary cells of the adrenal glands.	MIBG (adrenal) scan	Many drugs can interfere with this study and may need to be stopped for up to a week or longer before the scan. Please contact the nuclear medicine service for specific information.	Up to 24 hours

Clinical Indication	Procedure to Request	Patient Preparation	Approximate Time
Tumours (other than, e.g. bone, brain, lymphoma, thyroid as listed above)			
Carcinoid (neuroendocrine) tumours	Indium-labelled octreotide scan	No patient preparation If the patient is receiving therapeutic octreotide injections, please contact the nuclear medicine service to discuss optimal scheduling.	Scans are generally performed 4-6 and 24 hours after injection of radiopharmaceutical. Allow 1-1½ hours for each scan. Occasionally, delayed views are required at 48 hours.
Other tumours	Gallium, Thallium, DMSA and MIBI scans can be useful in diagnosing a wide variety of tumour types.	Contact the nuclear medicine service to discuss the most appropriate scan for a given patient. Ask the nuclear medicine service for information regarding patient preparation and the approximate time required for the scan to be performed.	
Other Indications			
Blockage in lacrimal drainage system (excessive tearing)	Lacrimal scan	No patient preparation	Up to 1 hour
Assess presence/patency of Leveen shunt	Leveen shunt scan/ study	No patient preparation	Up to 4 hours

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