Australasian Association of Nuclear Medicine Specialists

Australasian Association of Nuclear Medicine Specialists Position Statement: Technetium-99m: Priorities and Substitutions June 2024

Preamble

Over the last few years, Australia has intermittently faced critical supply disruption of technetium 99m. This is a crucial component in 70% of nuclear medicine studies in Australia and 98% of non-PET studies. Nuclear Medicine is a branch of imaging utilising radioisotopes for imaging of functional processes in the body. For example, an X-ray shows the structure of a bone, a bone scan shows how, on a cellular level, the bone is reacting to disease allowing insights into the pathology and disease progress not readily available from pure anatomic modalities.

Technetium production has a number of steps. It is derived from molybdenum 99. The molybdenum is produced at the Lucas Heights OPAL reactor. After production, it goes to the ANSTO Nuclear medicine (ANM) facility to be processed. After processing it goes to the generator production unit to be packaged into a container that allows transport and access to the technetium for nuclear medicine facilities. These three steps all have no redundancy and so are all potential single points of failure. A new ANM facility at Lucas Heights is being developed in stages and when completed will improve the reliability of technetium supply in Australia.

Nuclear medicine provides services largely to oncology patients but has a significant role in all areas of medicine including infection and transplant patients. While we can defer some studies or use alternatives in the short term, none of these are true viable long-term options and re-establishment of supply is crucial. Over 900,000 studies are done each year or about 1700 per week nationwide. While isotope is limited, we will clearly prioritise emergency patients but the longer the shortage continues, the more scans become urgent as patient management and treatment cannot be indefinitely delayed.

The AANMS has considered that the following substitutions and priorities would be beneficial during times of supply disruption.

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Table 1 Technetium Studies WITHOUT good alternatives

These studies as per the indication below have no reasonable substitutions available. Where other technetium-based studies are being substituted, these indications should receive a higher priority for technetium supply.

Table 1 Priority Tc Studies

MBS Item (s)	Scan	Clinical scenario
61469	Lymphoscintigraphy	Sentinel node planning/lymphoedema
61313/14/16/17/56	GHPS	Prior to chemo/trial/where echo not available or appropriate
61360/61	Biliary scan	Acute pre op/biliary leak/paediatric-biliary atresia
61386-93	Renal imaging	Pre-op/paediatric/transplant assessment (early)
61364	GI Blood loss	Acute bleeding
	SIRT Work Up	Pre SIRT therapy
61328/40/48	V/Q scan	Young female/pregnant patient/contraindication to contrast/quantification pre surgery
61480	Parathyroid Study	Clinically urgent. 4D CT and US Unhelpful
	Trial entry studies requiring specific Tc studies	Allow access to trial drugs/therapies
61449/61505	Myocardial Amyloid Study	Assess for cardiac amyloid to guide and monitor treatment
61368	Meckel's diverticulum Study	Assess for occult gastro-intestinal bleeding
61413	CSF Shunt Study	Assess for CSF V-P shunt patency
61441	Bone Marrow Study	Correlation with labelled WBC scan for infection assessment

NOTES:

Any urgent Tc study should get priority in the absence of a viable alternative.

The general definition of an urgent study is one that will result in an immediate management change. Local nuclear medicine specialists will be placed to make determinations of priority in consultation with referrers.

Regional sites without access to PET will have to use Tc based radiopharmaceuticals if the alternative is PET based.

Ideally the use of PET alternatives where possible will increase the supply of technetium elsewhere, particularly in regional centres

Table 2 Potential Substitutions for Technetium based studies

MBS items	Organ or condition	Scan description	Replacement option (nuclear medicine)	Replacement option (non nuclear medicine)
61402	Brain	HMPAO/ECD brain perfusion	PET FDG	
61402	Brain	HMPAO brain death		Angiography
61302/61653	Cardiac	Stress/rest myocardial perfusion and viability	Tl-201 SPECT CTCA Cardiac PET	Stress echo/angio
61313-7	Cardiac	Gated heart pool scan		Echo
61328/40/48	Lung	V/Q		CTPA (if no contraindication)
61480	Parathyroid	Parathyroid adenoma		4D CT
61421-25	Skeleton	Staging malignancy	FDG-PET (PSMA-PET for prostate) or F18-NaF	MRI
61421-25	Skeleton	Other	F18-NaF	MRI
61473	Thyroid	Hyperthyroidism	I123 / I124	
61650	Labelled white cell scan	Infection	Gallium 67 or FDG-PET	MRI
61386-93	Renal	Renal imaging		
12524/12527	GFR	Quantitative renal function	C51-EDTA	
61373/76/83	Stomach	Gastric emptying/reflux		Gastroscospy, esophageal manometry, barium studies

NOTES:

Scans without good viable alternative are listed in table 1

The alternatives are not always preferable to the existing radiopharmaceutical and some will come with additional costs, time constraints and reporting times – particularly PET substitutions.

The use of PET and other substitutions will increase availability of Tc based radiopharmaceuticals for indications in table 2 and for areas without access to PET e.g. rural sites.

Some options are of limited availability requiring local expertise to make. These may have a role to play particularly if the shortage is prolonged. As an example, fluorocholine for parathyroid imaging requires

expertise to produce and interpret. The mainstream solution for urgent parathyroid imaging will remain Tc based pharmaceuticals.

Increased demand for Fluorine, thallium, gallium will require planning for increased supply.

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