

## APPENDIX 4

### RADIONUCLIDE IMAGING

Pregnancy and breastfeeding are absolute contraindications to radionuclide imaging and should be excluded prior to radiopharmaceutical administration.

#### 1. Somatostatin receptor scintigraphy

Other than avoiding interference from somatostatin analogue therapy (see section 9.4.1, main text) no specific preparation is required. Patients should be advised to discontinue anti-diarrhoeals for the duration of the study to minimise physiological retention of activity in the gastrointestinal tract, which may degrade image quality.

Patients receive 110–220 MBq  $^{111}\text{In}$  pentetreotide by slow intravenous (IV) injection. Whole body gamma camera imaging is performed 18–24 hours later (medium energy high resolution collimators; typical scan speed 6 cm/min) with single photon emission computed tomography (SPECT) and/or SPECT CT of areas of interest for precise anatomical localisation (dual-headed camera, 64 projections, 40 secs/azimuth]. Ideally, planar and reconstructed SPECT images are reviewed using a workstation with optimised window settings.

##### 1.1 Image interpretation

The normal uptake distribution includes liver, spleen and kidneys with low-grade thyroid activity, and renal and gastrointestinal excretion. Additional areas of abnormal uptake are likely to represent abnormal somatostatin receptor uptake by tumour tissue. Tomographic imaging is useful to separate focal hepatic metastases when superimposed upon background physiological activity in the liver, for example, and for anatomical localisation.

#### 2. $^{123}\text{I}$ meta-iodobenzylguanidine (mIBG) imaging

Several drugs interfere with mIBG uptake and should be withdrawn for 3–7 days prior to mIBG injection. Common interacting medications include antidepressants (any class), labetalol and sympathomimetics. A full list of known and potential interactions is referenced.[1]

400 MBq  $^{123}\text{I}$  mIBG is administered by IV injection over five minutes. Immediate posterior abdominal gamma camera images are useful to demonstrate renal morphology. Delayed whole body planar images are acquired 18–24 hours later (low energy, high resolution collimators; typical scan speed 6 cm/min or overlapping static images 600 secs/view). SPECT and/or SPECT CT of areas of interest for anatomical localisation may also be acquired (dual-headed camera, 64 projections; 40 secs/azimuth).

Images are best reviewed using an optimised workstation, as above.

## 2.1 Image interpretation

mIBG is normally distributed to the salivary glands, myocardium, lungs (low-grade), adrenals and liver, with renal and gastrointestinal excretion. Focal abnormal uptake outside these areas is likely to represent a functioning NET. Comparison with early mIBG renal images reduces the likelihood of misinterpreting physiological pelvicalyceal retention as adrenal/retroperitoneal nodal disease.

## REFERENCE

- 1 Khafagi FA, Shapiro B, Fig LM, *et al.* Labetalol reduces iodine-131 MIBG uptake by pheochromocytoma and normal tissues. *J Nucl Med* 1989;**30**:481-9.