

⁶⁸Ga-DOTATATE PET-CT Scanning Protocol UK

1. Introduction

Neuroendocrine tumours (NETs) are a group of neoplasms that arise from cells within endocrine organs (adrenal medulla, pituitary, parathyroid) or from endocrine islets in the thyroid, pancreas, respiratory or gastrointestinal tract. A vast majority of NETs express somatostatin (SST) receptors. ⁶⁸Gallium-DOTATATE (⁶⁸Ga-DOTATATE) has a high affinity for SST receptor-expressing tumours, and therefore can be used to target and image NETs.

This document is to be used when performing a ⁶⁸Ga-DOTATATE scan, for the guidance of GenesisCare ARSAC certificate holders in support of the requirement for them to authorise PET-CT imaging protocols under the terms of their ARSAC Certificate.

2. Scope

The procedure laid out applies to the Radiographer or Technologist Operator in PET-CT and should be carried out when performing a ⁶⁸Ga-DOTATATE scan with guidance of ARSAC certificate holders.

3. Responsibilities

The Radiographer/Technologist working in PET-CT is responsible for performing the examination in accordance with guidance from the ARSAC certificate holder. Authorisation of GenesisCare PET-CT imaging protocols and associated factors is the responsibility of the ARSAC Certificate Holders.

All staff must be trained by an appropriate, qualified staff member to an agreed level of competency and have read and understood this procedure and any other relevant procedures and documentation before they are allowed to carry out the procedure (as per the competency framework document for Radiographers/ Technologists).

4. Clinical Referral

The clinical referral for the scan must be from a General Medical Council registered medical practitioner. For full referral guidelines, please refer to the Molecular Imaging and Diagnostic Imaging Operations Policy and Patient Pathway (DIA-POL-358).

The referring practitioner must include sufficient clinical information and specific questions, a confirmed and/or differential diagnosis on the request form to establish the need for the Nuclear Medicine scan.

The medical exposure and administration of radioactive medicine products must be viewed, authorised, and justified by an appropriate ARSAC licence holder.

5. Indications

- The primary indication of ^{68}Ga -DOTATATE imaging is localisation and characterisation of Neuroendocrine Tumours which usually express high density of Somatostatin Receptors (SSTR)
- Diagnosis and staging: Localise primary tumours and detect sites of metastasis (staging)
- Re-staging: Follow-up of patients with known disease to detect residual, recurrent or progressive disease (restaging)
- Management decisions: Select patients with metastatic disease who may be suitable for ^{177}Lu -DOTATATE (Lutathera) Theranostic treatment, also known as Peptide Receptor Radionuclide Therapy (PRRT).
- Monitor the response to therapy (surgery, radiotherapy, chemotherapy or PRRT)

6. Contraindications

- **The patient MUST not have received a LANDREOTIDE or OCTREOTIDE injection within the 3 weeks prior to the ^{68}Ga -DOTATATE scan.**
- Pregnancy
- Although not a complete contraindication, strict guidance would be given for any patients breastfeeding infants following a ^{68}Ga -DOTATATE injection.

7. Patient Preparation

- If the patient is receiving SST therapy such as Lanreotide or Octreotide injections, the ^{68}Ga -DOTATATE scan may need to be discontinued or delayed, avoiding possible SST receptor blockade. It is suggested that the ^{68}Ga -DOTATATE scan is not performed at least 3 weeks post SST therapy injection, and ideally, as near as possible before the next scheduled date of SST injection.
- The patient should receive an appointment letter, explaining the procedure, risks and benefits of the procedure. A phone call will always be made on the day prior to the scan, to confirm attendance; ensure the patient understands all aspects of the examination and clarify any specific requirements.
- There are no fasting requirements. Patients can eat as normal prior to the appointment and encouraged to try to drink water for 2 hours before.

On the day of the scan:

1. On arrival, confirm the patient's correct identity as per GC policy DIA-SOP-265. Thoroughly explain the procedure to the patient and complete a PET-CT questionnaire form.
2. Confirm the patient is not pregnant or breastfeeding and complete a 10 Day Rule Form (DIA-TEM-009) if applicable.
3. Record the patient's weight.
4. The patient should remove any clothing with metallic components and should change into a patient gown if appropriate. The patient should remove all jewellery possible.
5. Ensure the patient is comfortable and establish intravenous access with a cannula following GC policies GCL-POL-003 and GCP-POL-003. Ensure that the injection site is chosen carefully so as not to interfere with any area on the scan which may be critical.
6. The ^{68}Ga -DOTATATE dose can now be prepared and administered. These procedures must be carried out in compliance with the GC protocol DIA-PRO-063.
7. Make sure the patient is warm and comfortable and allow them to rest quietly for the uptake period. Patients may listen to music, read, watch TV & use mobile phones/gaming equipment.
8. Patients are encouraged to keep well hydrated with water (unless contraindicated) and to empty bladder frequently.
9. They may go to the toilet at any time during the uptake time
10. The standard uptake period for ^{68}Ga -DOTATATE is 60 minutes, unless otherwise stipulated by the ARSAC Practitioner.

11. The patient must empty their bladder in the hot toilet prior to the start of the scan.

8. Diagnostic Reference Levels

GC Adult dose: 150MBq +/- 10% (ARSAC DRL: 250MBq)

- Effective dose: 4 mSv
- Isotope: Gallium-68
- Pharmaceutical: DOTA-(Tyr³)-octreotate (DOTATATE)

9. Siemens mCT Biograph Scanner Protocol

- GC_HB_DOTATATE_Adult

10. Instrumentation

- Scans are performed 60 minutes post injection.
- Patients <100kg – 3min/bed position
- Patients >100kg – 4min/bed position

11. CT Scan Parameters

Scan Range	kV	Ref mAs	Slice width	Rotation	Pitch
Full range of PET Acquisition	120	CARE Dose4D Activated	3mm	0.5 secs	1.2

11.1.

- Local DRL – refer to Diagnostic Reference Levels Policy (RP-SOP-096)

12. PET Reconstruction Parameters

Series	Recon Method	Scatter Correction	Iterations	Subsets	Output image type
PET WB AC PSF	TrueX + TOF (UltraHD_PET)	Relative	2	21	Corrected
PET WB NAC	Iterative + TOF	None	3	21	Uncorrected

13. Scanning Preparation and Technique

- Mid-thigh to Vertex (performed 60 minutes post injection)

13.1. Image Processing

- Create the following images:
 - MIP Range
 - FUSED AX
 - FUSED COR
- Send the above images to PACS
- Ensure all the above image reconstructions, PET & CT reconstructions have automatically been sent through to PACS
- Allocate the reporting to the ARSAC practitioner for reporting.

14. Approval

Document Title	Clinical Protocol: ⁶⁸ Ga-Dotatate PET-CT Scanning Protocol
Reviewed by	Paul Murphy – Lead Molecular Imaging
Checked by	Dr James Scuffham – PET MPE Matt Pryor – CT MPE
Approved by	Anita Harte – Head of Theranostics and Imaging
Authorised by	Dr Ruth Macpherson – Imaging Lead Oxford
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