

¹⁸F-PSMA PET-CT Scanning Protocol

UK

1. Introduction and Purpose

This document is to be used when performing 18-F PSMA PET-CT imaging.

2. Scope

The procedures laid out apply to the radiographer/ technologists in PET-CT and should be carried out when performing an 18-F PSMA PET-CT.

3. Responsibilities

The radiographer/technologist working in PET-CT is responsible for performing the examination in accordance to this document.

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.

4. Policy and Procedures

4.1. Indications

- All referrals must be discussed with a Nuclear Medicine Practitioner/ARSAC Licence holder who will justify the examination.
- 18-F PSMA PET-CT is used to stage patients with intermediate and high-risk prostate cancer, restaging patients with biochemical failure following radical treatment and for prostate cancer detection in select patients e.g. those with contraindications to MRI.

4.1.2 Contraindications

- Not to be used for restaging disease prior to consideration for Lu-PSMA therapy or for assessment of treatment response to Lu-PSMA therapy.

4.2. Patient Preparation

- 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

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attendance; ensure the patient understands all aspects of the examination and clarify any specific requirements.

- Patients must fast from two hours prior to the injection and until the scan is complete. Usual medication can be taken as prescribed. There is no special procedure for diabetic patients.
 - If the patient is on hormonal treatment, there is no need to discontinue this.
- 18-F PSMA must be scheduled in close consultation with the PET-CT service lead.
- If a patient scan is cancelled please make sure that you also cancel the 18-F PSMA order for that patient, re-order and re-schedule as required.
- On the day of the scan:
 1. On arrival, check the patient's identity as per GC policy Explain the procedure to the patient and complete a PET-CT questionnaire form.
 2. Discuss any radiation protection concerns with the patient, this should include any restrictions and transportation considerations
 3. Measure the patient's weight and record it on the questionnaire form, and make note of the following:
 - Any prior surgical procedures/biopsies and dates
 - Treatment History (dates and details)
 - Radiotherapy/Chemotherapy/Hormonal therapy
 - Areas of pain and/or discomfort
 - Injuries/fractures
 - Recent cough, cold, sore throat
 - **Any other relevant clinical history**
 4. Patients are required to remove all metallic objects (rings, earrings etc).
 5. Patients will be provided with a gown to change into prior to the study.
 6. The patient will lie supine on the couch in the patient preparation room under observation, ensuring they are comfortable and have been informed of access to the emergency contact.

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Establish intravenous (IV) access using a cannula. Do not attempt more than 2 times – if required please seek additional assistance.

- Ensure that the injection site is chosen carefully so as not to interfere with any area on the scan which may be critical.
- Always follow the injection technique protocol. (Note the cannula should be removed following completion of the injection).
- When the cannula is inserted, check the line by flushing with 10mls of saline.
- The patient must empty their bladder in the hot toilet prior to the start of the scan.

4.3. Diagnostic Reference Levels

- Adult dose: 250 MBq +/- 10%
- Effective dose: 5.5 mSv [1]
- Isotope – F-18
- Pharmaceutical – PSMA-1007 (prostate specific membrane antigen)

4.4. Scanner Protocol

- Select GC_FPSMA_Adult

4.5. Instrumentation

- Siemens mCT Biograph 64 slice (PET-CT)

4.6. CT Scan Parameters

Scan Range	kVp	Ref mAs	Slice width	Rotation	Pitch	Safire
Upper Thigh to Skull Base	120	60	5@3mm	0.5 secs	0.95	3

4.7. 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
PET AC	Iterative + TOF	Relative	2	21	Corrected

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4.8. Scanning Technique

Upper thigh to skull base (performed 120 minutes post injection).

Patient positioning:

Position the patient on the scanning couch (supine, head first) with his/her head on the headrest. Patients should have the arms above their head; using the wings of the headrest for support and place a small pillow under each arm.

The upper thigh to skull base acquisition is acquired from upper thigh to supra-orbits.

Time per bed position is 4 min.

5. Reference

- [1] F-18 labelled PSMA-1007: biodistribution, radiation dosimetry and histopathological validation of tumor lesions in prostate cancer patient. Giesel, F. L. *et al.*, Eur. J. Nucl. Med. Mol. Imaging (2017) **44**:678–688.

Revision History

Document Title	Clinical Protocol: F-PSMA in Prostate Cancer	
Written by	Dr Neel Patel, Dr Manil Subesinghe and Dr Ruth Macpherson - Radiologists	
Checked by	Dr James Scuffham – PET MPE	02/07/2020
	Matt Pryor – CT MPE	01/07/2020
Approved by	Emma Spellman – Head of Imaging and Theranostics	09/07/2020
Authorised by	Dr Ruth Macpherson – Radiologist Imaging Lead @ Oxford	09/07/2020
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Summary of changes	New Protocol	

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2.1	July 2021	PET CT Service Lead	Annual review