

Clinical Referral Policy

Cardiac PET-CT Myocardial Perfusion Imaging (PET MPI)

1. Policy purpose

This policy provides a framework for cardiologist, non-cardiac referring clinicians and non-medical referrers considering referral for cardiac PET-CT myocardial perfusion imaging (PET MPI). It is intended to support consistent and clinically appropriate referral, clarify the place of PET MPI within the wider cardiac diagnostic pathway and ensure that referrals contain sufficient information for clinical justification and authorisation.

- Identify patients who would benefit from PET MPI.
- Clarify inclusions, situations in which referral should not normally proceed and possible alternative investigations.
- Set out the relevant prior investigations and information expected before referral.
- Support appropriate use of available PET-CT capacity.

This policy relates specifically to PET myocardial perfusion imaging for suspected or established coronary artery disease. It does not cover PET-CT for other cardiac indications.

2. Scope

The policy applies to cardiologists, cardiac clinicians and other appropriately qualified clinicians referring patients for cardiac PET MPI. All referrals remain subject to clinical review and authorisation by the relevant Administration of Radioactive Substances Advisory Committee (ARSAC) practitioner.

3. Role of cardiac PET MPI

Cardiac PET MPI is a functional imaging investigation used to assess myocardial perfusion in patients with suspected or known coronary artery disease. Where available, PET MPI may be preferred to SPECT MPI because it offers high diagnostic accuracy, prognostic information and uniquely provide quantitative assessment of myocardial blood flow and more importantly lower radiation dose to patients and staff.

Current evidence supports PET MPI, particularly with myocardial blood flow quantification, for a range of patients undergoing investigation or follow-up for coronary artery disease.

A referral should be made only where there is a defined clinical question, and the result is reasonably expected to affect diagnosis, treatment, further investigation or ongoing management.

4. Referral criteria

A patient may be referred where myocardial perfusion imaging is clinically indicated and PET MPI is expected to provide additional clinical value. One or more of the following circumstances should normally apply. **Where the clinicians feel unsure, contact ARSAC practitioner to discuss the individual case.**

4.1 Previous inconclusive or non-diagnostic investigation

Symptoms suggestive of cardiac chest pain where previous assessment has not provided a sufficiently clear answer. This includes an inconclusive or non-diagnostic CT coronary angiogram, a high coronary calcium score that limits confident CT interpretation, SPECT and stress echocardiogram.

4.2 Suspected left main stem or multivessel coronary disease

Clinical concern about significant left main stem or multivessel disease where quantitative myocardial blood flow assessment may improve diagnostic confidence and risk assessment.

4.3 Suspected coronary microvascular disease

Persistent symptoms suggestive of myocardial ischaemia where coronary microvascular dysfunction is suspected and measurement of myocardial blood flow which currently is only offered by PET MPI.

4.4 Previous percutaneous coronary intervention

Previous PCI with recurrent or persistent symptoms, or where assessment of residual ischaemia, disease progression or response to treatment is required.

4.5 Previous coronary artery bypass grafting

Previous CABG where functional assessment of myocardial perfusion or disease progression is required and PET MPI is expected to add value over available anatomical or alternative functional imaging.

4.6 Cardiac transplantation

Post-transplant assessment where myocardial perfusion or myocardial blood flow information is required to exclude coronary allograft vasculopathy.

4.7 Younger patients requiring radionuclide MPI

Younger patients in whom radionuclide myocardial perfusion imaging is indicated and minimising cumulative radiation exposure is an important consideration. Age alone should not determine the choice of test.

4.8 Patients with high BMI

Patients with high BMI in whom other functional imaging are unlikely to provide accurate diagnosis.

5. General eligibility requirements

Before referral, the clinician should be satisfied that:

- There is a clear indication for functional myocardial perfusion assessment.
- The clinical question cannot be answered adequately from information already available.
- The result is expected to influence diagnosis, treatment, further investigation or follow-up.
- Relevant previous cardiac investigations have been reviewed.
- PET MPI offers meaningful additional value over an appropriate alternative investigation.
- The patient can undertake the investigation in accordance with the approved local imaging and pharmacological stress protocol.

6. Investigations to be completed or reviewed before referral

There is no requirement in the evidence reviewed for every patient to undergo the same sequence of tests before PET MPI. **PET MPI maybe the most appropriate first line investigation for suspected cardiac chest pain for certain patients.** The appropriate preceding investigations depend on the presentation and clinical question. However, relevant existing investigations should be reviewed and supplied with the referral.

6.1 Clinical assessment

The patient should have undergone an appropriate clinical assessment covering symptoms, likelihood of coronary disease, cardiovascular risk factors, previous coronary diagnoses or interventions and the management decision to be informed by PET MPI.

6.2 Electrocardiogram

Relevant ECG findings should be included where they contribute to the clinical question or affect the selection of functional imaging. This is supporting information rather than a universal evidence-based prerequisite.

6.3 Echocardiography

Available echocardiography findings should be reviewed where ventricular function, regional wall motion, structural disease or another cause of symptoms may influence interpretation or management. Echocardiography is not identified in evidence as mandatory in every case.

6.4 CT coronary angiography

CTCA should be considered where anatomical assessment is the appropriate first investigation. PET MPI may be particularly useful when CTCA is inconclusive, severe coronary calcification limits interpretation, or anatomical findings require functional assessment. CTCA does not need to precede PET MPI in every patient; where it has not been undertaken, the referral should explain why a functional pathway is preferred.

6.5 Previous angiography, intervention or perfusion imaging

Where applicable, the referral should include relevant findings from invasive coronary angiography, previous PCI or CABG and previous myocardial perfusion imaging, sufficient to explain the known anatomy, previous treatment and reason for reassessment.

7. Alternative diagnostic investigations

7.1 CT coronary angiography

May be more appropriate where the main requirement is anatomical assessment. PET MPI may add value where CTCA is inconclusive, interpretation is limited by a high calcium score, or functional assessment is required after anatomical imaging.

7.2 SPECT myocardial perfusion imaging

Remains the most widely available radionuclide functional imaging modality and may be appropriate where standard perfusion assessment is sufficient. PET MPI may be preferred when myocardial blood flow quantification, improved assessment of possible multivessel disease or reduced radiation exposure is expected to add material value.

7.3 Stress echocardiography

May be considered where clinically suitable and capable of answering the functional question. Selection should follow the locally agreed cardiac diagnostic pathway.

7.4 Stress cardiac MRI

May be considered where the required information relates to perfusion, ventricular function, viability, scar or other myocardial pathology and the patient is suitable for MRI.

7.5 Invasive coronary angiography

May be more appropriate where definitive anatomical assessment is required and there is already a clear likelihood that invasive assessment or intervention will be necessary.

8. Exclusions and referrals that should not normally proceed

Evidence suggests that there are no clinical scenarios or patient subgroups that should be automatically excluded from PET MPI when the patient otherwise meets criteria for myocardial perfusion imaging. Decisions should therefore be based on clinical appropriateness, patient safety and whether the test will add value, rather than on a diagnosis or demographic characteristic alone.

As PET MPI is exclusively performed using pharmacological stress agents particularly using vasodilators, patients with uncontrolled asthma, severe COPD, higher degree heart block without a functioning pacemaker and those with severe claustrophobia may not be appropriate for PET MPI.

If in doubt, please contact Nuclear Medicine department to discuss.

9. Information required in the referral

The referral should contain sufficient information to support clinical justification, prioritisation and authorisation:

- The specific clinical question.
- Presenting symptoms and relevant history including previous relevant investigations and coronary interventions.
- Relevant current medication.
- History of Asthma, COPD or heart block.
- Any factor affecting the patient's ability to undergo the investigation.
- For women in the appropriate age group – pregnancy and breast feeding.

Incomplete referrals may be returned for further information before authorisation.

10. Clinical review and authorisation

All referrals should be reviewed by an appropriately authorised clinician or ARSAC practitioner. The review should determine whether myocardial perfusion imaging is justified, whether PET is the most appropriate modality, whether relevant prior assessment has been completed, whether an alternative test would answer the question adequately and whether the result is likely to alter management.

11. Radiation exposure

Cardiac PET MPI using rubidium-82 results in a radiation exposure of 1.9 mSv. The effective dose is quoted in mSv, to allow comparison with the average UK annual background radiation level of 2.4 mSv.

12. Urgent and unstable presentations

Cardiac PET MPI is an elective diagnostic investigation and should not substitute for urgent clinical assessment in patients with acute or unstable symptoms. Patients requiring immediate assessment for acute coronary syndrome or another urgent cardiac condition should follow the appropriate acute cardiac pathway. This is a proposed patient-safety provision for confirmation against the local clinical pathway.

13. Governance and review

This policy should be approved through the Nuclear Medicine governance arrangements and reviewed periodically to reflect societal guidance, tracer availability, local capacity, developments in myocardial blood flow quantification and changes in cardiac diagnostic pathways. The referral document should be disseminated to all referrers through the clinical leads in the hospitals within Greater Manchester.

14. References

- Bateman TM, Al-Mallah MH, Alnabelsi T, et al. Clinical indications for positron emission tomography myocardial perfusion imaging and myocardial blood flow quantification: An American Society of Nuclear Cardiology position statement. *Journal of Nuclear Cardiology*. 2026;57.
- Vrints CJ, Andreotti F, Koskinas KC, et al. 2024 ESC Guidelines for the management of chronic coronary syndromes. *European Heart Journal*. 2024;45:3415-3537.
- Virani SS, Newby LK, Arnold SV, et al. 2023 AHA/ACC/ACCP/ASPC/NLA/PCNA guideline for the management of patients with chronic coronary disease. *Circulation*. 2023;148:e9-e119.
- Sanghani R, deKemp R, Horgan S, et al. Laboratory considerations on the use of F-18 myocardial perfusion imaging radiotracers: An Information Statement from the American Society of Nuclear Cardiology. *Journal of Nuclear Cardiology*. 2025;48.
- Patel KK, Al Badarin FJ, Chan PS, et al. Randomized comparison of clinical effectiveness of pharmacologic SPECT and PET myocardial perfusion imaging in symptomatic coronary artery disease patients. *JACC: Cardiovascular Imaging*. 2019;12:1821-1831.