Advice Statement 007/18 May 2018

Is the use of positron emission tomography/computed tomography (PET/CT) in investigating and/or assessing patients for diagnosis and/or staging of myeloma clinically and cost-effective?

Advice for NHSScotland

The evidence for diagnostic accuracy of PET/CT consists of limited clinical effectiveness evidence and PET/CT was also found not to be cost-effective for the diagnosis of myeloma across a wide range of possible sensitivity and specificity values (60-100%).

For disease staging in newly diagnosed myeloma patients, PET/CT detects a greater number of lesions than plain film radiography (x-ray) but there is insufficient evidence to determine if it can detect more lesions than MRI.

The current evidence suggests that PET/CT should not be routinely considered in the diagnosis and staging of myeloma.

NHSScotland is required to consider Scottish Health Technology Group (SHTG) advice.

Why is SHTG looking at this topic?

Guidelines on imaging technologies for myeloma have recently been reviewed. New information about the effectiveness of FDG PET/CT could see this being used more widely. By evaluating clinical situations where PET/CT could prove most effective, patients and the NHS can both benefit from investment in these machines. The topic was prioritised for inclusion on the SHTG programme following topic referrals from the Scottish Clinical Imaging Network PET/CT Group.

Evidence Note 79 was produced by Healthcare Improvement Scotland in response to this request

Background

- Myeloma is one of the most common haematological malignancies. It occurs more frequently in older patients (>65 years) and incidence is slightly higher in men than in women.
- In Scotland each year there are approximately 500 people newly diagnosed with myeloma or other malignant plasma cell neoplasms and approximately 200 people die of the disease.
- 18F-fluorodeoxyglucose (FDG) is the most commonly used radiolabelled tracer given to patients prior to PET/CT hybrid imaging. FDG PET/CT images, by combining information from both PET and CT technologies may offer enhanced capabilities beyond those of either FDG PET or CT alone.

- Diagnosis and staging of myeloma both require a range of laboratory confirmation tests, but supplementary imaging has been used in this disease care pathway. Whole-body x-ray has traditionally been used for diagnosis but newer imaging modalities, such as MRI, are now often being considered. PET and MRI have also recently become recognised imaging options in the Durie and Salmon Plus criteria for quantifying lesions.

Clinical effectiveness

- Three systematic reviews were identified comparing FDG PET/CT with at least one other imaging method for either the diagnosis or staging of myeloma. Three more recently published primary studies were also considered.
- Only one primary study was common to all reviews and the quality of reporting of systematic reviews was generally poor. A review conducted by NICE in 2016 provided the best available evidence.
- The evidence base for the diagnostic accuracy of FDG PET/CT for patients suspected of having myeloma was limited.
- For the detection of lesions in newly diagnosed myeloma patients, FDG PET/CT detected a higher number of lesions in 46% and 57% of patients when compared with x-ray (2 studies, n=74). The data comparing FDG PET/CT with MRI suggested that these imaging tests were comparable, identifying the same number of lesions in 50% to 70% of patients (3 studies, n=136).
- In one study reporting the effect of imaging outcomes on patient staging, eleven of twelve patients with newly diagnosed myeloma who showed discordant MRI and FDG PET/CT results had their staging down-graded as a result of the FDG PET/CT findings.

Safety

- One review reported in its methods that they would consider safety outcomes, but this review reported in its results that, of the primary studies they had included, none had reported any safety outcomes. None of the other reviews reported safety outcomes.

Cost effectiveness

- One included review compared the cost effectiveness of four imaging techniques (PET/CT, whole-body CT, whole-body MRI and spinal MRI) with skeletal survey for the diagnosis of myeloma.
- Results indicated that PET/CT was not cost-effective for the diagnosis of myeloma across a range of sensitivity and specificity values from 60% to 100%.
- For the newly diagnosed myeloma patient group, no relevant economic evaluations were identified.

Further research

- Current evidence on FDG PET/CT for myeloma patients appears to be at stage 3 (experimental design) or stage 4 (longer term registry data required) of the IDEAL-D framework. Future studies should therefore be prospective, blind, controlled, diagnostic studies or economic evaluations.

Advice context:

No part of this advice may be used without the whole of the advice being quoted in full. This advice represents the view of the SHTG at the date noted.

It is provided to inform NHS boards in Scotland when determining the place of health technologies for local use. The content of this Advice Statement was based upon the evidence and factors available at

the time of publication. An international evidence base is reviewed and thus its generalisability to NHSScotland should be considered by those using this advice to plan services. It is acknowledged that the evidence constitutes only one of the sources needed for decision making and planning in NHSScotland. Readers are asked to consider that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. This advice does not override the individual responsibility of health professionals to make decisions in the exercise of their clinical judgment in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

SHTG Advice Statements will be considered for review if new evidence becomes available which is likely to materially change the advice. Stakeholders may submit a request, highlighting new evidence to shtg.hcis@nhs.net

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Chair
Scottish Health Technologies Group

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