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Inflammation and infection imaging including PET

A. Signore (Rome): Overview on techniques and radiopharmaceuticals for imaging infection
J.C. Alonso (Madrid): Clinical cases and pitfalls using radiolabelled WBS
F. Jamar (Brussels): Clinical cases and pitfalls using FDG-PET

This continuing education session is directed primarily towards nuclear physicians interested in performing and interpreting infection imaging, but also towards trainees and nuclear medicine technologists.

It is well known that scintigraphy with radiolabelled white blood cells (WBC) is still considered the gold standard technique for imaging infections particularly at levels of peripheral bones (osteomyelitis), vascular grafts and joint prosthesis, brain abscesses, diabetic foot, inflammatory bowel diseases, etc. This is due to high level of standardization obtained all over the world as far labelling technique is concerned but also concerning the image acquisition modalities and the interpretation criteria (1-4).

Therefore, the first part of this session will focus on these three aspects. After a brief overview of the available methods for imaging infection we will describe how to correctly use WBC according to currently available standardized protocols including new guidelines according to GMP and SOP procedures. We will describe the relevant steps for WBC labelling with Tc-HMPAO and In-oxine, the routine quality controls that have to be performed in vitro, before injecting the cells into the patient, and in vivo. Interestingly, we will present for the first time a commercially available closed system for labelling WBC in sterile and apyrogenic conditions, without the need of a flow cabined. As for the image acquisition and interpretation methods are concerned we will briefly review the possibility to quantify the pathological uptake in sites of suspected infection as well as we will mention the use of bone marrow scan combined with WBC scan.

There are, however, some important considerations against the use of WBC scintigraphy that will also be discussed; (i) WBC scintigraphy is not easily performed by all centers and more and more centers are using anti-granulocyte MoAbs or FDG-PET or Gallium-citrate, and (ii) WBC scintigraphy has a low sensitivity for FUO, spondylodiscitis and, of course, inflammatory diseases such as Rheumatoid Arthritis and other autoimmune diseases. We will therefore describe also when to use radiolabelled WBC and when not. When to use monoclonal antibodies, HIG and other radiopharmaceuticals and when to use FDG-PET according to current data available in the literature. A very recent proposal for monitoring specific biologic therapies in autoimmune diseases by using radiolabelled anti-TNFa or anti-CD4 and anti-CD3 MoAb will also be discussed.

We will conclude by presenting a range of teaching clinical cases and pitfalls that will emphasize the importance of a correct acquisition procedure and interpretation criteria. In all cases indication must be well identified and in some cases PET or monoclonal antibodies may not substitute WBC scintigraphy or vice versa. The talks will also show examples of the usefulness of FDG-PET/CT fusion or WBC-SPET/CT fusion in inflammatory and infectious diseases with particular regard to vascular graft infections.

References

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