Eur J Nucl Med Mol Imaging (2010) 37:1432–1433
DOI 10.1007/s00259-010-1459-4

LETTER TO THE EDITOR

Reply to: FDG PET and PET/CT: EANM procedure guideline for tumour PET imaging

Ronald Boellaard · Mike J O'Doherty · Arturo Chiti · Bernd J. Krause · on behalf of the authors of the guideline "FDG PET and PET/CT: EANM procedure guidelines for tumour PET imaging"

Published online: 26 May 2010

Dear Sir,

In the letter to the editor regarding the EANM guideline for FDG PET and PET/CT tumour imaging [1] the authors raise two issues, i.e. partial volume effects (PVE) and use of total lesion glycolysis (TLG) as a quantitative parameter, which might not have been addressed in the guideline. PVE does indeed affect quantification of tumour uptake causing an increasing negative bias in smaller tumours. PVE has, however, been addressed in the guideline. Rather than promoting the use of PVC methods, the guideline aims at matching SUV contrast recoveries between different PET/CT systems and institutes, thereby matching partial volume effects, as a combined effect of scanner resolution, image reconstruction algorithms and settings (zoom, voxel size and filters). To this end a specific multi-centre image quality QC is suggested. This strategy is proposed as, unlike the authors of the letter state, there are not yet validated, accepted and widely available PVC methods for use in oncology FDG PET studies. Although there is much experience in using PVC in oncology and for PET brain studies, there is still large variability regarding methodology being used or explored [2]. For example, most frequently used methods for PVC of brain studies depend e.g. on a coregistered MRI image and grey and white matter segmentations, for which again many different algorithms exist. The quality of the acquired MRI data as well as the algorithms being used for coregistration of PET and MRI images, grey and white matter segmentations and PVC can have a large effect on the quantitative results of these studies, as was also observed by Zaidi et al. [3]. Likewise, use of PVC in oncology FDG PET studies is still in an exploratory phase. Yet, it should be noted that further development of PVC methods both for brain as well as for oncology studies is highly supported by the authors of the EANM guideline and, in fact, many are involved in the development and evaluation of these methods [2]. The EANM guideline does not discourage improvement of PET technology or (correction) algorithms, but aims at defining minimal standards to allow for multi-centre quantitative PET studies that should be feasible to be carried out in a clinical setting. Future guidelines will probably recommend use of PVC provided that these methods are validated, accepted and are widely available, i.e. can be routinely applied in a multi-centre setting.

As indicated in the letter to the editor, apart from SUV, other parameters such as TLG and/or metabolic

This reply refers to the letter to the editor at http://dx.doi.org/10.1007/s00259-010-1458-5

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volume can be derived from quantitative FDG PET studies. The EANM guideline does indeed not mention or address these parameters explicitly. Yet, admittedly, these biomarkers provide additional valuable quantitative information on FDG tumour uptake. The EANM guideline, however, does allow for the use of any 3-D volume of interest, in addition to 'max' and 'peak', and thereby allows for parameters such as TLG and metabolic volume to be further explored. The primary aim of the EANM guideline is to provide a firm basis for quantitative FDG PET studies in general and it should be realized that reliable and reproducible assessment of any quantitative parameter from FDG PET studies requires strict standardisation of imaging protocols and a common QC/QA procedure.

We therefore believe that the EANM guideline sets the standards and is a prerequisite for any quantitative assessment of FDG uptake.

References

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