

PET/MR Challenges, Research and Clinical Routine

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Integrated PET/MR systems open many new exciting possibilities for clinical as well as research applications. However, it is also a very complex technique resulting in new problems and challenges when compared to PET/CT, especially regarding workflow, scan protocols and data analysis. This applies in particular for examinations in oncology with partial or total whole body coverage and thus extending over several bed positions. Unlike in diagnostic PET/CT, where the clinical CT protocols could largely be copied from those from stand-alone CT, the design of a diagnostic MR protocol for (partial) whole-body coverage is more complex and has to be adapted to the special requirements of PET/MR to be both time-efficient and comprehensive. In this talk, basic considerations concerning workflow, imaging protocols and image analysis for whole-body PET/MR in oncology based on our experience with the first integrated PET/MR scanner will be discussed. The aim is to raise the awareness for the special problems, challenges and image artifacts of PET/MR in oncology and to present potential solutions to help future users of PET/MR to optimize their workflow.

The different parts of the talk will cover logistical topics like scheduling and preparation of patients for PET/MR. Next, issues concerning positioning of the patient and planning the examination will be covered, with a focus on the differences in PET/MR as compared to standalone MRI and PET/CT. An important aspect is imaging protocols, and here we will present some of our workflows for neurologic, cardiovascular and oncologic patients. Finally, the most common artefacts, which have to be considered, will be addressed, as well as quality control aspects and problems resulting from attenuation correction in PET/MR.

References

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