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Multimodality imaging in paediatric oncology with emphasis on PET in lymphoma

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In adults, positron emission tomography (PET) has become an indispensable imaging tool in clinical oncology, especially in combination with computed tomography (CT) and magnetic resonance imaging (MRI). Compared with its widespread application in adults, however, clinical use of PET in paediatrics is still limited. Possible explanations include the small number of clinical and prospective studies concerning PET's potential in paediatric as compared to adult imaging. Furthermore, only a few PET scanners are available for paediatric imaging. The goal of this CME is to summarise reports in the literature and to share our experiences on the clinical application of PET in paediatric oncology imaging.

The management of a paediatric oncology patients depends on accurate assessment of the extent of the disease. In almost every case multiple imaging modalities are used with MRI, CT and ultrasonography being widely accepted. Recently, it has been shown that the additional use of PET in pediatric oncology alters management in a significant number, and even when the management is not altered, PET is often considered helpful by the referring clinicians (1).

In adult patients, FDG-PET has been successful in staging malignant lymphoma, in the evaluation of therapeutic effects and in the differentiation of post-therapeutic changes versus persistent or recurrent disease. At the Third German Interdisciplinary Conference, FDG-PET for staging and therapy control in Hodgkin's Lymphoma received a rating of Ib, indicating that clinical use is likely to be justified but that further studies are definitely needed (2). Although lymphomas are the third most common type of cancer in childhood, there has been only very few scientific publications on PET in Hodgkin's Lymphoma in children. An overview of the literature with regard to the value of PET for initial staging, assessment of response to therapy, and follow-up of Hodgkin's disease was published by Körholz et al. (3). In a recently published study Depas et al. compared PET to conventional diagnostic methods such as physical examination, laboratory studies, chest X-rays, computed tomography, magnetic resonance imaging, ultrasonography and bone scan in 28 children with lymphoma (4). At initial staging PET changed the disease stage and treatment in 10,5 % of the cases. In early evaluation of the response to treatment PET did not show any false positive results, but failed to predict two relapses and one incomplete response to treatment. At the end of treatment and during the systematic follow-up, PET showed a specificity above 90 %, compared to only 54 % (end of treatment) and 66 % (follow-up) for conventional diagnostic methods. Therefore, PET seems to be a valuable imaging modality that significantly improves the multimodality work-up of paediatric lymphoma patients.

References

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