

Comparing the Diagnostic Performance of Integrated 18F-FDG PET-MRI and MRI for the Identification of Local Recurrences of Soft Tissue Sarcomas

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Abstract

Objectives: To assess the diagnostic accuracy of PET-MRI and MRI alone for the detection of local recurrences of soft tissue sarcomas (STS) after initial surgical resection of the primary tumors.

Methods: A total of 41 patients with a clinically suspected tumor relapse of STS underwent an 18F-FDG- PET-MRI examination for assessment of local recurrence. Two experienced physicians interpreted the MRI data and subsequently the PET-MRI datasets in two separate reading sessions and were instructed to identify potential local tumor recurrences. Additionally, the diagnostic confidence in each reading for the identification of malignant lesions was determined. A McNemar test was applied to test for differences of both ratings and a Wilcoxon signed-rank test was used to identify differences of the confidence levels. Histopathological verification as well as follow-up imaging was applied as the standard of reference.

Results: A tumor relapse was present in 27 / 41 patients. Calculated sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy for the detection of local tumor recurrence was 81%, 85%, 91%, 70%, 82% for MRI and 96%, 75%, 89%, 91%, 90% for PET-MRI ($P > 0.05$). Furthermore, PET/MRI showed significantly higher confidence levels ($P < 0.05$) for the determination of malignant lesions.

Conclusions: Our results demonstrate 18F-FDG PET-MRI to be an excellent imaging method in the evaluation of recurrent STS after surgical excision, as it displays superior detection accuracy as compared to routine MRI follow-up examinations.

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