

## Evaluation of delayed $^{18}\text{F}$ -FDG PET in differential diagnosis for malignant soft-tissue tumors

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**Objective:** Positron emission tomography (PET) with 2-deoxy-2- $^{18}\text{F}$ fluoro-D-glucose ( $^{18}\text{F}$ -FDG) has been used for the evaluation of soft-tissue tumors. However, the range of accumulation of  $^{18}\text{F}$ -FDG for malignant soft-tissue lesions overlaps with that of benign lesions. The aim of this study is to investigate the usefulness of delayed  $^{18}\text{F}$ -FDG PET imaging in the differentiation between malignant and benign soft-tissue tumors. **Methods:** Fifty-six patients with soft-tissue tumors underwent whole body  $^{18}\text{F}$ -FDG PET scan at 1 hour (early scan) and additional scan at 2 hours after injection (delayed scan). The standardized uptake value (SUVmax) of the tumor was determined, and the retention index (RI) was defined as the ratio of the increase in SUVmax between early and delayed scans to the SUVmax in the early scan. Surgical resection with histopathologic analysis confirmed the diagnosis. **Results:** Histological examination proved 19 of 56 patients to have malignant soft-tissue tumors and the rest benign ones. In the scans of all 56 patients, there was a statistically significant difference in the SUVmax between malignant and benign lesions in the early scan ( $5.50 \pm 5.32$  and  $3.10 \pm 2.64$ , respectively,  $p < 0.05$ ) and in the delayed scan ( $5.95 \pm 6.40$  and  $3.23 \pm 3.20$ , respectively,  $p < 0.05$ ). The mean RI was not significantly different between malignant and benign soft-tissue tumors ( $0.94 \pm 23.04$  and  $-2.03 \pm 25.33$ , respectively). **Conclusions:** In the current patient population, no significant difference in the RI was found between malignant and benign soft-tissue lesions. Although the mean SUVmax in the delayed scan for malignant soft-tissue tumors was significantly higher than that for benign ones, there was a marked overlap. The delayed  $^{18}\text{F}$ -FDG PET scan may have limited capability to differentiate malignant soft-tissue tumors from benign ones.

**Key words:** positron emission tomography, soft-tissue tumor, 2-deoxy-2- $^{18}\text{F}$ fluoro-D-glucose