

## PET evaluation of fatty tumors in the extremity: Possibility of using the standardized uptake value (SUV) to differentiate benign tumors from liposarcoma

Ryoko SUZUKI,\* Hideomi WATANABE,\*\* Takashi YANAGAWA,\* Junko SATO,\* Tetsuya SHINOZAKI,\*  
Hideki SUZUKI,\* Keigo ENDO\*\*\* and Kenji TAKAGISHI\*

\*Department of Orthopedic Surgery and \*\*\*Department of Diagnostic Radiology and Nuclear Medicine,  
Gunma University Graduate School of Medicine

\*\*Department of Physical Therapy, Gunma University School of Health Science

**Objective:** The relative utility of various preoperative diagnostic imaging modalities, including PET (utilizing FDG and FMT), CT, and MR imaging, for evaluation of lipoma and liposarcoma, especially well-differentiated liposarcoma, was investigated. **Methods:** Imaging findings in 32 patients with histopathologically documented lipoma, including one with fibrolipoma and one with angiolipoma, and 25 patients with liposarcomas whose subtypes included 10 well-differentiated, 10 myxoid, and 5 other types were reviewed retrospectively. Pre-operative imaging included FDG-PET (n = 44), FMT-PET (n = 21), CT (n = 25), and MR imaging (n = 53). **Results:** Statistically significant imaging features of MR images favoring a diagnosis of liposarcoma involved lesions containing less than 75% fat ( $p < 0.001$ ) as well as the presence of septa ( $p < 0.001$ ). As compared with well-differentiated liposarcoma, benign lesions were differentiated significantly only by the presence of septa ( $p < 0.001$ ), which also provided significant differentiation on CT ( $p < 0.05$ ). The mean SUVs for malignant tumors were significantly higher than those for benign lesions in both FDG- and FMT-PET analyses ( $p < 0.0001$ ,  $p = 0.0011$ , respectively). By using a cut-off value for FDG- and FMT-PET set at 0.81 and 1.0 respectively, which provided the highest accuracy, benign lesions were differentiated significantly from liposarcomas ( $p < 0.001$ , and  $p < 0.02$ ). Furthermore, benign tumors and the three subtypes of liposarcoma were divided significantly into four biological grades by FDG- and FMT-accumulation rates ( $\rho = 0.793$ ,  $p < 0.0001$ ; and  $\rho = 0.745$ ,  $p = 0.0009$ , respectively). A cut-off value of 0.81 for FDG-PET provided significant differentiation between benign lesions and well-differentiated liposarcoma ( $p < 0.01$ ). **Conclusions:** The presence of septa on MR images differentiated lipomas from liposarcoma, even well-differentiated type. PET analysis, especially FDG-PET, quantitatively provided not only the differentiation but also the metabolic separation among subtypes of liposarcoma. Interpretation of the visual diagnostic modalities requires extensive experience and carries a risk of ignoring a critical portion of malignancy. PET metabolic imaging may be an objective and useful modality for evaluating adipose tissue tumors preoperatively.

**Key words:** lipoma, liposarcoma, subtype, FDG-PET, FMT-PET