

Summary

Quantitative Assessment of ^{201}Tl -SPECT in Tumors of Bone and Soft Tissue

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^{201}Tl -SPECT was performed to diagnose the malignancy of bone and soft tissue tumors by visual and quantitative assessment in 48 patients (17 malignant lesions and 31 benign lesions). SPECT images were obtained in the early phase (15 min after injection) and the delayed phase (240 min). By visual assessment a tumor was considered malignant if high accumulation was found in the tumor in the early phase and the accumulation was confirmed in the delayed phase. Tumors which did not meet these criteria were considered benign. For quantitative assessment, the ROI (region of interest) accumulation ratios of the tumor to the contralateral normal tissue in the early phase (ER) and in the delayed phase (DR), the ROI accumulation ratio of the delayed phase to the early phase of the tumor (Td/Te), and the ROI accumulation ratio of the delayed phase to the early phase of the contralateral normal tissue (Nd/Ne) were obtained. Sixteen patients with malignant tumors each had a high accumulation each but 12 of 31 benign lesions had no high accumulation on visual assessment. Furthermore, the accuracy

was 85.4%, sensitivity 94.1%, and specificity 80.6%. Quantitative assessment was performed for 36 cases of high accumulation. The ER of malignant and benign lesions was 5.51 ± 3.73 and 2.75 ± 2.17 , respectively, and the ER of malignant lesions was significantly higher than that of benign lesions. The DR did not demonstrate a significant difference. If the tumor having an ER greater than 3.9 was assumed to be malignant, the accuracy for differentiating malignant lesions from benign lesions was 85.4%. The Td/Te of benign lesions (0.97 ± 0.28) was higher than that of malignant lesions (0.77 ± 0.09). The Nd/Ne of normal tissue which contained muscles in both lesions were higher than 1.4.

In conclusion, ^{201}Tl -SPECT was very useful for the differential diagnosis of benign or malignant bone and soft tissue tumors. The ER was important for quantitative assessment, but a delayed image was necessary for visual assessment.

Key words: ^{201}Tl , SPECT, Bone and soft tissue tumor, Quantitative assessment.