

## Extraosseous accumulation of bone scanning agents in malignant brain tumors: Comparison to semi-quantitative evaluation with $^{99m}\text{Tc}$ SPECT/ $^{201}\text{Tl}$ SPECT and histological findings

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Although  $^{201}\text{Tl}$  chloride (Tl) SPECT has been used in the differential diagnosis between recurrence of malignant brain tumor and necrosis after treatment, it is not generally recognized as a definite modality to distinguish them. We conducted a preliminary study using Tl SPECT and  $^{99m}\text{Tc}$ -MDP or  $^{99m}\text{Tc}$ -HMDP (Tc) SPECT because it has been said that extraosseous accumulation was caused by calcium deposits in necrotic tissues. In our study, for the purposes of clarifying the mechanism of extraosseous uptake and the correlation between extraosseous accumulation of bone-scanning agent and tumor viability in malignant brain tumors, we compared whether Tc uptake was correlated with the histopathological findings and further performed semi-quantitative evaluation between Tc SPECT and Tl SPECT. The correlation coefficients between the ratio of tumor to normal skull count obtained from Tc SPECT (Tc-T/N) and those of tumor to normal brain count (T/N) and to normal scalp count (T/S) both obtained from Tl SPECT were calculated. Using contrast enhanced CT (CE-CT) or contrast enhanced MRI (CE-MRI), 8 of 10 cases showed intensely ring-enhanced tumor with necrotic lesion. Histopathologically, 7 of 8 cases whose tumor had been resected before treatment had necrosis with increased vascularity or bleeding. Of the remaining 2 cases one case, malignant lymphoma had only hypervascularity by biopsy, while the other one was excluded for resection after treatment. Three of these 8 cases whose CE-CT or CE-MRI showed necrotic lesions exhibited Tc and Tl accumulations in the area corresponding to necrosis. In contrast, 2 showed no Tc nor Tl uptake. Tc-T/N had no significant correlation with any of early-, delayed-T/N or T/S. In conclusion, there was no significant correlation between Tc and Tl uptakes by malignant brain tumors in semi-quantitative evaluation.

**Key words:** extraosseous accumulation, malignant brain tumor, semi-quantitative evaluation,  $^{201}\text{Tl}$ ,  $^{99m}\text{Tc}$ -(H)MDP