Annals of Nuclear Medicine Vol. 17, No. 6, 463-467, 2003

Thallium-201 brain SPECT to diagnose aggressiveness of meningiomas

Keiko Kinuya,* Masahiro Ohashi,** Syotaro Itoh,** Sohtaro Sakai,** Kenji Yamamoto,** Kiyoshi Kakuda,*** Koji Nobata,*** Shintaro Terahata,**** Suzuka Taki***** and Seigo Kinuya*****

*Department of Nuclear Medicine, Tonami General Hospital **Department of Neurosurgery, Tonami General Hospital ***Department of Radiology, Tonami General Hospital ****Department of Pathology, Tonami General Hospital *****Department of Radiology, Kanazawa Medical University *****Department of Biotracer Medicine, Kanazawa University School of Medical Sciences

This investigation was conducted to determine the ability of ²⁰¹Tl brain SPECT with respect to preoperative prediction of lesional aggressiveness of meningioma. Fifty-nine lesions in 42 patients were examined. Early (15 min) and late (3 h) SPECT were obtained. Early uptake ratio (ER; lesion to normal brain average count ratio), late uptake ratio (LR) and the ratio of LR to ER (L/E ratio) were calculated. Twenty-three lesions exhibited malignant features based on histologic or clinical course such as recurrence or skull invasion. Both ER and LR of malignant meningiomas were significantly higher than those in thirty-six benign lesions. Benign lesions were classified into two groups for further analysis: meningotheliomatous type, which is the most common histology, and benign lesions other than the meningotheliomatous (other benign) type. ER in other benign type was lower than the meningotheliomatous and the malignant type. LR afforded differentiation of the malignant type from the two benign types. These two benign types could be distinguished on the basis of the L/E ratio. These results indicate that high pre-operative ER and LR values in patients with meningioma are indicators of the aggressiveness of lesions, i.e., malignant meningioma, recurrence or skull invasion.

Key words: thallium-201 imaging, brain SPECT, meningioma