

## Thallium-201 SPECT in prognostic assessment of malignant gliomas treated with postoperative radiotherapy

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**Objective:** This study was designed to investigate the value of preoperative thallium-201 ( $^{201}\text{Tl}$ ) SPECT as a predictor of outcome in malignant glioma. **Methods:** From January 1990 to September 2003, 109 patients with glioma were treated with postoperative radiotherapy. Of these, 36 patients with malignant gliomas who underwent preoperative  $^{201}\text{Tl}$ -SPECT were included in this study (grade 3: n = 14, grade 4: n = 22). On early (10 minutes) and delayed (2 hours) images after 111 MBq  $^{201}\text{TlCl}$  injection, we calculated radioactivity ratios of tumors to contralateral normal brain (T/N ratios) and retention indices (RIs). For early and delayed images, we compared outcome between a high T/N ratio group (T/N ratio equal or greater than the average) and a low T/N ratio group (T/N ratio less than the average). We also divided the patients into two groups on the basis of RI; a high RI group (RI equal or greater than the average) and a low RI group (RI less than the average), and similarly compared outcome between the two groups. **Results:** Median survival time was 12 months for both grade 3 and grade 4 tumors; however, two-year survival was 53% for grade 3 and 15% for grade 4. In both early and delayed images, outcome was significantly better for patients with low T/N ratios (early <4.71, delayed <3.96) than those with high T/N ratios (early: p = 0.030, delayed: p = 0.049). However, no significant survival difference was apparent between the low- (< -12.25) and high RI groups. In grade 3 glioma, patients with high T/N ratios demonstrated a tendency toward poorer outcome, although this trend was not significant (early: p = 0.079, delayed: p = 0.099). Overall outcome was poor for grade 4 glioma, and the difference in survival between low and high T/N ratio groups was not significant (early: p = 0.51, delayed: p = 0.53). However, long survival was seen only in patients with lower T/N ratios. **Conclusions:** Differences of  $^{201}\text{Tl}$  uptake in malignant gliomas could predict outcome.  $^{201}\text{Tl}$ -SPECT is potentially useful in the management of patients with malignant gliomas.

**Key words:** glioma, thallium-201, SPECT, radiotherapy, prognosis