

Semi-quantitative assessment of oral cavity squamous cell carcinoma using ^{201}Tl SPECT for evaluating effectiveness of preoperative radiotherapy

Aya SUZUKI,^{*,**} Takashi TOGAWA,^{**} Junpei KUYAMA,^{**} Tadaki NAKAHARA,^{**}
Toshinao TAKENOUCHI,^{***} Kazuo HATANO^{****} and Ken OMURA^{*}

**Oral and Maxillofacial Surgery, Department of Oral Restitution, Division of Oral Health Sciences,
Graduate School, Tokyo Medical and Dental University*

***Division of Nuclear Medicine, Chiba Cancer Center*

****Division of Surgical Pathology, Chiba Cancer Center*

*****Division of Radiation Oncology, Chiba Cancer Center*

The aim of this study is to reveal the usefulness of semi-quantitative assessment using ^{201}Tl chloride (Tl) single photon emission computed tomography (SPECT) (Tl SPECT) to evaluate the effectiveness of radiotherapy in 15 patients with oral cavity squamous cell carcinoma (SCC). Fifteen patients were diagnosed with SCC by biopsy. All 15 patients enrolled in this study were planned to undergo preoperative radiotherapy with or without chemotherapy using carboplatin (CBDCA) and received reduction operation. Tl SPECTs were performed 15 minutes after intravenous administration of 111 MBq ^{201}Tl chloride. Regions of Interest (ROI) were set up around tumor (T), and non-lesion (N) at the part of contralateral scalp at the height of the cerebellum. The ratios of mean counts in ROI of the tumor to those in non-lesion were measured as pre- and post-treatment T/N ratios (pre T/N, post T/N). Furthermore, reduction rate (RR) was obtained by calculating $[(\text{pre T/N} - \text{post T/N})/(\text{pre T/N})] \times 100\%$. Each parameter (pre T/N, post T/N, and RR) was compared to histopathological grade of surgical specimen based on the Oboshi and Shimozato classification (grade I–IV). RR showed significantly higher values in grade III and IV than in grade I and II ($p = 0.0008$). In conclusion, semi-quantitative assessment using Tl SPECT, especially calculating RR, is useful to evaluate the effectiveness of preoperative radiotherapy.

Key words: ^{201}Tl SPECT, radiotherapy, semi-quantitative evaluation, oral cavity squamous cell carcinoma