

Comparison of ^{201}Tl -chloride SPECT with $^{99\text{m}}\text{Tc}$ -MIBI SPECT in the depiction of malignant head and neck tumors

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Objective: Comparison of ^{201}Tl chloride SPECT (TI-SPECT) with $^{99\text{m}}\text{Tc}$ -MIBI SPECT (MIBI-SPECT) in the depiction of malignant head and neck tumors was prospectively studied. **Methods:** Forty-one patients with various tumors of the head and neck were included in this prospective study. Histologically, 36 patients had squamous cell carcinomas, 3 undifferentiated carcinomas, 1 transitional cell carcinoma, and 1 MALT lymphoma. All patients underwent a simultaneous dual-isotope SPECT of the head and neck with ^{201}Tl and $^{99\text{m}}\text{Tc}$ -MIBI. Dual-isotope SPECT for early ($n = 41$) and delayed acquisition ($n = 21$) was performed. Qualitatively, 3 observers evaluated both TI-SPECT and MIBI-SPECT individually. The interpretation criteria were graded as grade 1 (no abnormal increased uptake) to 5 (definitely increased uptake of a degree equal to or greater than that of normal salivary gland). Statistical analysis of the comparison of TI-SPECT and MIBI-SPECT was performed. The interobserver difference was evaluated using the κ -coefficient. Quantitatively, T/N ratio (the ratio of the counts in the tumor divided by that in the normal nuchal muscles) and retention index were compared between TI-SPECT and MIBI-SPECT. **Results:** On both the early and delayed images, the grades of uptake of the tumor in TI-SPECT were significantly higher than those in MIBI-SPECT by three observers. The grade of Tl-uptake of the tumor on the delayed images was 5 for all observers (κ -coefficient = 1); however, the κ -coefficient varied from 0.39 to 0.84 in early TI-SPECT, and in early and delayed MIBI-SPECT. Statistical differences in T/N ratio were noted between early TI-SPECT (2.87 ± 1.19) and MIBI-SPECT (2.48 ± 1.06), and between delayed TI-SPECT (2.11 ± 0.70) and MIBI-SPECT (1.20 ± 0.48). The retention index of TI-SPECT (0.81 ± 0.24) was significantly higher than that of MIBI-SPECT (0.52 ± 0.15). **Conclusions:** The present study qualitatively and quantitatively showed that ^{201}Tl had higher accumulation in the tumor than $^{99\text{m}}\text{Tc}$ -MIBI in both early and delayed images.

Key words: head and neck neoplasms, ^{201}Tl chloride, $^{99\text{m}}\text{Tc}$ MIBI, SPECT