

F. Tumor Diagnosis

Clinical Evaluation of Tumor Scanning with Ga-citrate

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Ga-scintigrams in 48 patients with lung diseases were reviewed. Two to 3 days after an intravenous administration of 1~2 mCi of Ga-citrate (or malate), scintigrams were obtained by whole body scanner. 42 patients were examined before radiotherapy. (lung cancer : 35 cases, mediastinal tumor : 3 cases, miscellaneous : 4 cases.)

In lung cancer patients positive scans were obtained in 33 cases (94.3%). Thirteen patients

more than 6 months after irradiation with 6,000~7,000 rads, Ga scans were positive in 8 cases and negative in 5 cases. Tumor recurrence was suspected in the former, and the second course of radiotherapy was effective.

Ga-scan was quite useful both for planning of radiotherapy follow-up of lung cancer patients.

Clinical Evaluation of ^{57}Co -Bleomycin for Malignant Disease of Head and Neck

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Scintigraphy after intravenous injection of 500 μCi of ^{57}Co -Bleomycin was performed on 104 cases before radiation treatments, and 22 cases were performed 3 times, before, during and after radiation treatments.

In 104 cases, the positive results were obtained in 100 and 85% of primary and metastatic lesions respectively. In 22 cases, the positive results during the course of radiation

therapy were obtained in all cases, but in 19 cases the images became smaller and 2 were not changed and a case became larger and more clearly. These results were well corresponded to the clinical findings.

Then, the scintigraphy after the course of radiation showed almost no accumulation of radioisotope.

As a conclusion; 1) This ^{57}Co -Bleomycin

scintigraphy were excellent in delineation of site of tumor in the head and neck before the radiation therapy. 2) After the radiation therapy, the accumulation of the ^{57}Co become

obscure or almost none, and then these findings were considered to be valuable for the evaluation of radiation therapy.

Development of $^{99\text{m}}\text{Tc}$ -Labeled Tumor Imaging Agents: Comparative Studies on Various Derivatives of Bleomycin and Other Antitumor Antibiotics

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Commercially available bleomycin (BLM) used in tumor scanning as $^{99\text{m}}\text{Tc}$ labeled compound is known as A_2 and B_2 derivative in 2:1 ratio. In the present work, the following derivatives of BLM such as A_2 , dimethyl A_2 , A_5 , and B_5 have been labeled with $^{99\text{m}}\text{Tc}$, respectively, in the same way as the conventional $^{99\text{m}}\text{Tc}$ -BLM and a comparative analysis has been made with the above mentioned complex BLM.

Thin layer chromatography (Methanol: Ammonium acetate 1:1) analysis showed that in each case, a pure labeled compound was obtained with negligible free $^{99\text{m}}\text{TcO}_4^-$. Studies on radioactivity distribution in tissues and organs of tumor-bearing mice was comparatively described. Although B_2 derivative has presented a better blood clearance and A_5 a higher liver uptake, no significant difference has been estimated among each other. Within 1 hr after i.v. injection the radioactivity in the tumor reached 1–1.5% dose/g tissue and it tended to decline gradually but 5–6 times the activity of control muscle was observed by 24 hrs.

Colaborating with the Daiichi Radioisotope Lab., development of an instant labeling $^{99\text{m}}\text{Tc}$ bleomycin kit has been studied. With or even without ascorbic acid, provided kit has been shown a rapid and easy way of labeling this polimical and complicated complex with a reliable reproducibility on quality control and distribution study in mice. However, the addition of ascorbic acid into the reaction mixture seems to contribute to the stability of $^{99\text{m}}\text{Tc}$ -BLM both in vitro and in vivo.

On the other hand, the preliminary study with other oncostatic agent "VINCRISTINE" labeled with $^{99\text{m}}\text{Tc}$, with the same procedure as $^{99\text{m}}\text{Tc}$ -BLM, has revealed only 0.7% activity in the tumor and this activity was 2 and 5 times higher than that of blood and muscle, respectively. The reticuloendothelial system has shown a higher uptake than that observed with $^{99\text{m}}\text{Tc}$ -BLM. An improved method for labeling this compound or a development of other desirable tumor detection agent is in progress.