

deposition of the label in the glandular and proliferative tissues, an increase in the contrast of tumor to thyroid ratio due to a wide variety of ^{201}Tl -uptake in the thyroid tissue, and the improvement of image due to a marked decrease of

^{201}Tl within cervical blood pool may be pointed out.

The accumulation into inflammatory focus was greater with ^{67}Ga in the ratio to muscle, while the ratio to blood was greater with ^{201}Tl .

Tumor Scintigraphy with Tl-201 Chloride

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We studied tumor scintigraphy using various nuclides and reported on various occasion. We attended to Tl-201 chloride which developed for myocardial perfusion agent and tried to label it to Bleomycin. But the labelling arrived at unsatisfactory result. We noticed that Tl-201 chloride was tumor affinity agent and used in clinical study. We obtained satisfactory result in tumor scintigram with Tl-201 chloride.

Before clinical application, the uptake of Tl-201 chloride in rat Ehrlich's ascites carcinoma implants was investigated in a pilot study. The animals were injected with $10\ \mu\text{Ci}$ of Tl-201 chloride intravenously via a tail vein and sacrificed 10, 30, 60 min 4 hrs after injection. The Tl-201 chloride concentration in tumor, liver, myocardium, pancreas, spleen, kidney and blood was determined.

In clinically, we injected a 2 mCi dose of Tl-201 chlorides into cubital vein of the patients with malignant neoplasm such as lung cancer, malignant struma, brain tumor, gastric cancer, malignant lymphoma, and skin cancer. A total of 91

cases were performed scintigram immediately, 1, 2, 3, 4, 6 and 24 hrs after injection. In certain cases, we carried out scintigraphy with Ga-67 citrate and Hg-197 chloride for the comparison with Tl-201 chloride.

The following result are obtained.

1) The Tl-201 chloride concentration rate in tumor tissues was about 1% per total injected dose in experimental animals. This rate is not so different comparing with Ga-67 citrate and Hg-197 chloride.

2) The positive rate in scintigram is 74.2% in all cases with malignant neoplasm. Especially, the high average were obtained in malignant struma and lung cancer.

3) Tumor scintigraphy was able to practise immediately after injection.

4) Comparing with the image of Ga-67 citrate and Hg-197 chloride, we experienced some cases that the image of Tl-201 chloride was better than of Ga-67 citrate or Hg-197 chloride.

$^{201}\text{TlCl}$ for Head and Neck Tumor Scanning

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Studies and development of radiopharmaceuticals having affinity for malignant tumors are being carried on, but we have no satisfactory drug at present. We used ^{201}Tl -Chloride for the

purpose of treating 11 cases of cephalocervical tumors and made a scanning study. The results are presented here.

Each patient was intravenously given 2mCi

of ^{201}Tl -chloride and scintiscans were made for 5 min after injection. The apparatus used was a Nuclear Chicago's Pho-gamma HP and the count was 200K.

Result: (1) In normal cases ^{201}Tl was seen incorporated into the nasal cavity, nasopharynx, oral cavity, salivary gland, and thyroid gland. (2) Among the 11 cases of cephalocervical malignant tumors, 7 cases, including cancer of the upper jaw, maxillary papillon, cancer of the tonsil, and cancer of the larynx, gave positive reactions to the scanning test. In these 7 cases a scanning test with ^{57}Co -BLM was also positive.

There were some cases in which the affected parts and the physiological accumulation parts of ^{201}Tl -chloride were overlapped and the judgement of scintiscans obtained were difficult.

The advantages of the use of ^{201}Tl -chloride are as follows:

- (1) ^{201}Tl -chloride does not accumulate in bones.
- (2) Scanning can be started 5 min after injection and the result can be obtained in several tens of minutes. ^{201}Tl -chloride is considered to be a nuclide applicable to malignant tumors in the cephalocervical part.

Clinical Evaluation of Tumor Scintigraphy with ^{201}Tl -Chloride

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Thallium-201 chloride scintigraphy was evaluated in 63 patients with various diseases in the chest region. (Primary lung cancer: 47 cases, malignant lymphoma: 5 cases, tuberculosis: 2 cases, other benign diseases: 9 cases).

Scintigraphy was performed 15~30 minutes after intravenous injection of 2 mCi of ^{201}Tl -chloride with a Nuclear Chicago scinticamera model Pho/Gamma III and minicomputer system.

Scintigrams obtained were classified as: (++) marked accumulation of ^{201}Tl -chloride in the tumor, clearly revealing its contours, (+) slight ~moderate, (−) negative. The following results were obtained;

1. A high positive rate was shown in cases of primary lung cancer and malignant lymphoma. primary lung cancer: (++) 35/47 (74.5%), (+)

7/47 (14.9%), total positive rate 42/47 (89.4%), malignant lymphoma: (++) 4/5, (+) 1/5, total positive rate 5/5 (100%).

2. A significant difference in positive rate was not in fact discerned with relation to patho-histological type of primary lung cancer.
3. In the case of primary lung cancer with atelectasis and/or pleural effusion, the accumulation of ^{201}Tl -chloride was only in the focal lesion. The invasion to the mediastinum and hilum by primary lung cancer and malignant lymphoma was often easily detected.
4. In the cases of benign diseases, all of them were negative.
5. None of the 63 cases scintiscanned with ^{201}Tl -chloride manifested side effects.

^{201}Tl -Chloride Scan for Various Uterine Tumor

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Up to date, no established simple and invasive radioisotopic procedure is reported for the detection of the uterine tumors, ^{201}Tl -chloride, widely

used for the myocardial imaging, was applied on patients with various uterine tumors. Two mCi of ^{201}Tl -chloride was injected intravenously in