President's Lecture

Contribution and Development of Radioisotopes to Diagnosis of Malignant Neoplasm

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In 1961, I charged the assignment lecture of Japan Society of Nuclear Medicine on the subject of "Clinical application of radioisotopes, especially on malignant tumor scanning" using a creative method of Kurume system color scanning, which was first developed by myself. In this lecture, I reported the first clinical cases of brain tumor scanning in our country. Since then, I have taken an interest in malignant tumor scanning in the domain of nuclear medicine.

Radioisotopes that I first carried out as tumor scanning agents were $^{131}$I-fibrinogen, $^{131}$I-fibrin and $^{131}$I-fibrin antibody, which revealed a satisfactory results in an animal experiment. $^{131}$I-antihuman-rabbit-fibrinogen-antibody was successful in the detection of malignant tumor in clinical use. However, I could not help giving up the usage of it by way of a commercial products by reason of a difficulty of refining and hyperactivity in blood. So I, in view of easy refining, used RISA, $^{197}$Hg-, $^{203}$Hg chloride to brain tumor scanning and established the diagnosis methods. Subsequently, it was reported that $^{67}$Ga citrate was useful in the detection of malignant tumor.

While I used $^{67}$Ga citrate, I, seeking for more effective substances, studied on $^{197}$Hg-, $^{203}$Hg chloride in animal and clinical experiment, resulting that in the detection of malignant tumor, $^{*}$Hg chloride could favorably compared with $^{67}$Ga citrate. (the positive rate of $^{*}$HgCl$_2$ in lung cancer was 84.7%).

By assistance from Dr. Maeda and Kono who discovered that $^{57}$Co labelled Bleomycin was effective in the detection of malignant tumor, I tried labelling of short half life substances, for example $^{131}$I, $^{99m}$Tc, $^{113m}$In, to Bleomycin but the labelling arrived at unsatisfactory results.

I attended to $^{201}$Tl which developed for myocardial scan agent and tried to labelled to Bleomycin. But $^{201}$Tl chloride was not combined with Bleomycin of 1 or 3 valence. Then I investigated minutely the possibility of tumor detection of $^{201}$Tl chloride and obtained the impression that $^{201}$Tl chloride may be no way inferior to $^{67}$Ga citrate and $^{*}$Hg chloride. (the positive rate of $^{201}$Tl chloride in malignant neoplasm was 84.2%). Scintigram of $^{201}$Tl chloride could be obtained from immediately after to 24 hours after injection and then was not necessary for taking interval of several days such as $^{67}$Ga citrate and $^{*}$Hg chloride. So $^{201}$Tl chloride was convienent for tumor scanning.