Aim of Radioactive Isotope Imaging*

Shinji TAKAHASHI

Nagoya University School of Medicine, Nagoya

Any medical doctor will acknowledge a post mortem examination to be the most reliable diagnostic procedure for a disease. Is the philosophy of this examination also applicable to the examination of radioactive isotope (RI) imaging?

Kaneko, 1973, devised a improved means of taking an X-ray picture and a scinticamera image under an identical position of the patient. The patient photographed on an X-ray film by scinticamera was made to rotate through a right angle by remote control while lying in the same position on the table, and under this new position an X-ray film by an X-ray tube located directly above. Consideration was paid such that the magnifications of the two were similar. Kaneko named this RIXgraphy. It was found that this method was of value clinically. He worked further with Tanakas cooperation to improve the method whereby Sakura medical color X-ray film which was separately coated with color developing emulsions of cyanate and magenda on both surfaces of the film was used instead of the conventional medical X-ray film. By this method of chromatography it became possible to differentiate the images of the scinticamera and the X-ray. Obata (1973) devised next a photofluorography of the above method. Instead of the X-ray film a Polaroid camera was used. Thus the organ imaged with the radioactive isotope became possible to be interpreted with relation to the other organ.

For observation of the cut surface of parenchymatous organs RI axial transverse tomography which is for not only obtaining accurate views of the cut surfaces of their sections of viscera but also for knowing the exact depths of tissues and organs from the skin, would be better than the usual RI tomography. Kitabatake (1971) devised a transverse scinticamera imaging. Fujita (1973) attempted to obtain this by means of television. By the latter method it was possible to separate the television images if the number of television monitors was increased. This method had the advantage of enabling RI transverse images of numerous layers of the body to be obtained simultaneously. Further, when a standard line was set up and overlapping conducted, it was possible to prepare three-dimensional images of parenchymatous organs by RI imaging. This is what is termed RI-solidography or stereosynthesis by means of radioactive isotope.

Kaneko and Obara succeeded in preparing a converging collimator where the aperture on the patients side is 8 cm, on the scintillator side 14 cm and 21 cm long. This was constituted from

* The 13th Annual Meeting of the Japanese Society of Nuclear Medicine, Aug. 28, Nagoya

Presented by Medical*Online
270 pipes. By employing this it became possible to resolve images of up to 5 mm by macrography of test objects which were not possible by high resolution of existing parallel collimator.

Again, a high magnification scinticamera image was obtained even when a pin hole collimator was used. This radiography was applied to a patient with thyroid cancer uptakable radioactive isotope. Although with a existing high resolution collimator the details could not be known. By a 3 times magnification a strand of thyroid tissue was clearly seen and by 7.5 times magnification the situation was more clearly imaged.

The efforts for improvement of these methods would approach imaging by radioactive isotopes to the field possible by post mortem examination.