Method of taking a transmission scintiphoto with gamma-ray point source and an exactly superimposable X-photo onto scintillation image enlarged by a converging collimator

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To clarify the localization of scintillation image in relation to the organ of image and others in the vicinity, transmission or other marking method has been performed. In taking transmission scintiphoto a moving line or area source has to be employed so far.

This is to report the method of taking a transmission scintiphoto with a gamma-ray point source by placing it at the focus of a converging collimator. Anger scintillation Camera, a 1261 hole converging collimator with a 56 cm focus, and a gamma-ray point source of ^{241}Am or ^{133}Xe were used for transmission. In addition, the exact superimposition of scintillation image onto X-photo was performed by taking an enlarged scintillation image through the converging collimator.

X-photo and scintillation image having the same rate of enlargement were taken on the X-ray film to superimpose the both images exactly.

An organ related scintillation image gives more detailed information than transmission scintiphoto and serves not only for diagnosis but for therapy.

The converging collimator is available for simple magnification of scintillation image, and also for stereo-scintiphotography.

The combined X-photo and scintillation images of various organs were demonstrated.

Study of the Simultaneous Double Isotope Tracer Method

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The simultaneous imaging or dynamic study of two different isotopes on various organs is in many cases clinically important and useful. Various combinations of two different isotopes were tested in order to detect whether their energies can be calculated seperately at the same time.

Method

19 combinations of two isotopes from 8 usually available isotopes were studied with the 400 Channel Pulse Height Analyzer to determine whether their energies can be seperately calculated and also tested to reveal the utility of such combinations in the phantom by gamma-camera, fitted with a 1000 holes collimator.

The Radioisotopes used in this experiment are the following: ^{99m}Tc, ^{133}Xe, ^{67}Ga, ^{75}Se, ^{203}Hg, ^{85}Sr, ^{131}I, ^{198}Au.

Result

The following combinations were found to be useful: ^{131}I—^{99m}Tc, ^{131}I—^{133}Xe, ^{131}I—^{75}Se, ^{198}Au—^{99m}Tc, ^{198}Au—^{133}Xe, ^{198}Au—^{75}Se, ^{198}Au—^{67}Ga, ^{203}Hg—^{99m}Tc, ^{67}Ga—^{85}Sr.

Clinical applications of these combinations were performed, revealing that they are useful in practice.

The ^{85}Sr—^{67}Ga citrate combination is useful in diagnosing Pancoast tumor.

The ^{99m}Tc—^{131}I Radiocup combination as the discharge test is found to be applicable for the differential diagnosis of thyroid disease.

The ^{133}Xe solution—^{131}I-MAA combination provides a good method for the patho-physiological study of the lung.

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