Study of the Intracavitary Areascanner with a β-Ray Semiconductor Detector

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The development of a new area scanner has been tried by authors for the quantitative discrimination of the distribution of the uterine cancer.

It has a semicondoctor β-ray detector of side window type which has been made of p-i-n sillicon, and ^{32}P is used for the measurement by the scanner. The scanner has an arm which can move front-to-back and rotate in setting speed. Scanner arm rotates 10°-60° per one scanning line and rotates 360° in total. Movement of the arm is able to select between 1 cm and 15 cm.

Detector is attached to the top of scanner arm, and touches surface of uterus, and scans the area sylindrically. Two dimensional movement of the scanner arm is converted into electrical signals by two potentiometers attached to the scanner.

Ratemeter output and rotation axis signal are summed by the operational amplifier and are connected to a X-Y recorder's X terminal. The signals of the front-to-back are fed a X-Y recorder's Y terminal.

Uptake signals and front-to-back signals are recorded by the data recorder. After the measurement finished, recorded data are digitalized by the AD converter for the computer processings.

In order to test some performances, that is, resolving power, efficiency, and response curves, simulation by ^{32}P paper phantom has been tried by authors.

Clinical applications of this scanner are tried to some patients of cervix cancer, 300-400 μci of ^{32}P injected a patient, and scanned after 24 hr. Scanning time of one patient is about eight to fifteen minutes. Uptake in cervix of ^{32}P is very little; such data necessitate statistical processings including smoothing.

Results of the computer processings are displayed as iso-density curves by a grapic plotter with four color pens.

Two dimensional uptake pattern in the uterus is color plotted of the anatomical size.

Trial for Reducing the Radiation Exposure to the Examiners in Nuclear Medicine —Radioisotope Injector—

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In recent increase of the use of radioisotopes in nuclear medicine, especially in numbers of in vivo examinations with larger amount of radioisotopes, the radiation exposure to the examiners can not be neglected during the injection of radioisotopes and from the radioisotope injected patients.

It is ideal to use radioisotopes in every procedure with remote control. In this report, the remote control radioisotope injector was constructed and discussed.

Intra-venous injection of saline solution is

first carried out without any radiation exposure through the polyethylene tube from the drop infusion bottle and the tube is connected to the radioisotope injector with the three-way cock.

The radio-isotope injector consists of disposable injector containing radioisotopes with lead shield and the glass syringe for pressure transmission. Both syrniges are touched in the rear end and the tip of glass syringe is connected with long tube which carries the air from the electric air compressor. The air compressor is started with switch apart from the injector, that is, in remote. Therefore, when air is introduced to the glass syringe with pressure from the compressor, the radioisotope is pushed out to the polyethylene tube, if the three way cock is open to the vein. At this point, most of the radioisotope is injected into the vein, but small amount is left in the polyethylene tube, therefore, drop infusion from the bottle washes it out by opening the three way cock from the bottle to the vein. Thus, the radioisotope is injected from the injector by remote control.

If every radioisotope is filled in the ampule or syringes ready in use, this radio-isotope injector enables more effective protection for less radiation exposure to the examiner.