remote control. The filling of the R.I. into the syringe in the amount for several patients and the devided injection for each patient are also performable. Mixing of R.I. such as MAA or colloidal suspension and the prevention of air injection can be done with the up and down motion of the injector itself. The speed of injection is 1 c.c. per sec. with a 19G needle.

The surface dose of a phantom containing 5 mCi ^{99m}Tc in the liver was about 20 mR per hour and the dose 50 cm apart from the source was 1.2 mR per hour, which is not negligible. To avoid this radiation, the remote controlled gamma imaging table was constructed. The range of movement of the table is 28 cm in the X direction and 135 cm in the Y direction. Scinticamera head movement can also be remote-controlled by extending the cable to a distant place. The dose in the working place before the console, 3 m apart from the phantom, was about 0.01 mR per hour.

The table can be turned around by 90° to get rid of the scinticamera stand base during the exchange of collimators.

After taking scintigraphy, the patient without relative movement can be turned around by 90° on the table and radiographed. Thus, the scintigraphed portion can be accurately demonstrated by X-ray films.

Radioisotope Cardioangiography Synchronized with Cardiac Impulse Using Slow Speed Video-Tape Recorder

H. Kinoshita and S. Kato

Radiology, Hiroshima prefectural Hiroshima Hospital

Z. Hombo and H, Maeda

Department of Radiology, Nagasaki University, Nagasaki

A. Kajihara

Toshiba Medical Hiroshima Inc., Hiroshima

Radioisotope (RI) cardiography is currently used in many large hospitals, but because of its relatively poor diagnostic accuracy, it is not employed as widely as it might be otherwise. This is generally due to the rapid cardiac movement which results in relatively unclear image. This study was designed to develop an apparatus capable of reproducing required phases of the cardiac cycle using small quantities of RI and at the same time yielding an image of good diagnostic quality.

Method

Contrary to the programming of the scinti-photo cardiograph, the scinti-camera output was digitalized and the pulse modulation of the ECG simultaneously recorded on a video-tape recorder's (VTR) image and sound tracks. Slow speed reproduction, is the most advantageous feature of our apparatus. The ECG's R wave activates two delay circuits, the delay time of which can be pre-set, and any phase of the cardiac cycle freely selected. The output controls the scinti-camera.

Results

Since our apparatus can reproduce the VTR recordings at slow speed, rapid cardiac beats can be recorded, at desired phases of the cardiac cycle at rates varying from 1 pulse for every 2 frames to 4 pulses per frame on 35 mm film. It has thus proved effective in studying abnormalities appearing only at certain phases of the cardiac cycle. By reproducing the VTR analyses of findings may be conveniently made at any time. The rate of technical accuracy using serial 35 mm photofluorography is less than 25% because of the time required for shutter operation and film advancement. Our slow reproduction system permits relatively fast camera action and a rate of technical accuracy over 90%. This also permits a corresponding reduction in quantity of

administered RI.

Conclusion

The authors have developed an apparatus for the simultaneous recording of the ECG tracing on the VTR and an apparatus for the slow-speed reproduction of the VTR and arbitrary selection of the cardiac cycle during 35 mm cinematography. Slow-speed reproduction has thus permitted relatively fast 35 mm camera action with an increase in technical accuracy from 25% to 95% and a corresponding reduction quantity of RI administration. With slow-speed reproduction, the 35 mm camera shutter remains open for a relatively longer period per cardiac puls, permitting two exposures per pulse, even in children with tachycardia.

A biomedical Telemetry System to Study the Function of Organs of Free Ranging Animals

T. KOBAYASHI, T. SUGITA and T. SASAKI

Toshiba Research and Development Center, Tokyo Shibaura Electric Co., Ltd., Kawasaki

T. IWASE and R. SASSA

The Institute of Adult Disease, Asahi Life Foundation, Tokyo

M. IIO

Department of Nuclear Medicine and Radiological Science, Tokyo Municipal Yoikuin Medical Center for Aged, Tokyo

A biotelemeter system has been developed to dynamically study the function of organs of free ranging animals. Its applications in nuclear medicine have also been studied.

The system developed consists of an implantable semiconductor radiation detector, a signal conditionar, FM signal transmitter, FM receiver and a data handling unit.

The system was evaluated by carbon-14 beta rays at room temperature. The detector reliability and signal transmitting characteristics were also studied by using dogs under the same condition as the experiment where the detector was implanted in a dog by abdominal surgery and a transmitting unit was attached to the dog's back.

The performance characteristics of this telemeter system are as follows; 1) The implantable semiconductor detector has a 20 mm^2 sensitive area and noise level of 15 keV (fwhm). 2) Total volume and weight of the transmitting unit are $2 \times 6 \times 9.5$ cm^3 and 170 grams, respectively. 3) Power consumption of the transmitting unit is about 100 mW. 4) Detectable minimum radiation energy deposited to the detector is 60 keV at body temperature. 5) Output power and frequency of the transmitting are 5 to 10 mW and 44.88 MHz, respectively.

In use, the transmitting unit is carried in a harness on the animal's back. It needs to be packed in foam rubber and the temperature allowed to stabilize during the experiment in order to minimize temperatureinduced drift for radioactivity counting statistics.

This system is currently being utilized to dynamically study the liver function of dogs. This system is also applicable to the study of other physiological information from free ranging animals.