14

COMPATIBILITY OF DATA FILES IN DIFFERENT COMPUTER SYSTEMS FOR NUCLEAR MEDICINE.

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Recently digital data processing systems of various types and manufactures have become widely used in the field of nuclear medicine. However, the compatibility of data filles among these systems has not been considerd. In this paper, methods of the image data transfer, which were discussed in our laboratory facing a conversion of old and new systems were described.
The methods investigated were as follows; (1) data transfer via a punched paper tape, (2) via a magnetic tape, (3) via a direct I/O interface between the two systems, (4) via a RS-232 MODEM, (5) via a General Purpose Interface Bus, etc.
Among these, the 2nd, i.e. to make to have compatibility in the magnetic tape devices is most desirable. But for this the specifications of the devices have to be the same and the recording format are known. In our case, as the packing dencity was differ in the tow divices, we adopted the 3rd method and the I/O interfaces in the two systems were newly prepared. As a conclusion, we proposed to make a recording standard of the magnetic tapes and disc memories for the scintigraphic image data in the mini-computer systems.

15

DATA COLLECTION SPEED OF MULTICRYSTAL POSITRON CAMERA INTERFACE (INCLUDING HEAD RCT CAMERA)

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We described the data collection speeds of NIRS multicrystal positron camera concerning measured and logically estimated ones. This system has two data collection modes, DMA trunsfer and programmable I/O modes.
By the logical estimation using instruction times indicated by the computer manual, DMA transfer speed was 82 kilo counts perseconds of which the disc transfer occupied the main part. The measured counting rate of the camera itself reached as much as 100 kilo count per seconds. But when linked with the computer, it decreased into about estimated speed.
The estimated I/O transfer time was 50 kilo counts per seconds. The measured one was about 43 kilo counts per seconds.
This system was recently changed to control both multicrystal camera and Head RCT Camera. But the camera interface hardware structures are almost same among both cameras. The latter one is mainly used by a programmable I/O modes, and needs little more complex software when data collection into the computer. In other words, its rate is estimated as 33 kilo counts per seconds.
We showed several clinical images recently we got using N-13 ammonia injected, head and heart plane images from multicrystal camera and Bar phantom and Brain CT images.

16

PHANTOM STUDY ON THE SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY WITH THE TOMOGSCANNER II: 1. SENSITIVITY, COUNTRATE LINEARITY, UNIFORMITY, RESOLUTION AND SLICE THICKNESS.

M. Matsudaira, T. Maeda, K. Hisada and H. Shimazu. Kanazawa University and Tokushima University. Kanazawa and Tokushima.

Physical data on the Tomogscanner II, single photon radionuclide computed tomography unit, was examined. The radionuclide was Tc-99m which energy was setted at 140 KeV ± 10%. The sensitivity was 1.4 x 10^4 counts/sec/μCi with a homemade brain phantom which was 14.5 cm diameter wrapped with 3 mm thick alminium plate. The count rate linearity was very good. The uniformity was improved satisfactorily with absorption correction in the 14.5 cm diameter or the 20 x 29 cm ellipse phantom. The resolution and slice thickness was approximately constant in depth. In brain study condition, the FWHM of resolution was about 1.8 cm and the FWHM of slice thickness was about 1.5 cm. In body study condition, those results were about 2.2 cm and 1.8 cm, respectively.

17

PHANTOM STUDY ON THE SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY WITH THE TOMOGSCANNER II: 2.THE LESION DETECTABILITY AND THE QUANTITATIVE EVALUATION.

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This phantom examination of RCT was done with Tomogscanner II, homemade brain or body phantom and Tc-99m O_4^-, energy was setted in 140 KeV ± 10%. In brain phantom, the size of hot lesion, larger than 2 cm and higher activity than that of the peripheral rim, was able to correctly estimate from the FWHM of the recostructed lesion image. The activity of the hot lesion was able to estimate from the total count number but not peak count number of the reconstructed lesion image. The target/non-target counting ratio showed linearity in various conditions. This ratio was coincident with the true ratio only in air or water phantom but not in the condition added back ground or peripheral rim activity. The hot or cold lesion detectability was superior to the gamma camera. The cold lesion of 1.3 cm sphere in the Alderson liver phantom was clearly detected by Tomogscanner II.