Clinical Evaluation of Scanning Images Processed by an On-Line Computer System

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An attempt to evaluate the clinical usefulness of computer processed scans was made by 3 radiologists and a radiographer in terms of detectability of focal lesions. Prior to interprete processed scans, 50 sets of photoscans and unprocessed CRT images of the on-line computer were independently compared without any clinical information to see the overall performance of the system, including display device. Polaroid films of the computer processed images were then compared with unprocessed images of same objects. Image processing methods included weighted smoothing, non-linear matched filtering and iterative deconvolution.

Results can be summarized as follows:

1) The results of interpretation by 2 experts in nuclear medicine showed good agreement each other, while 2 non-experienced persons often missed small or ill-defined lesions.

2) Photoscans were superior to unprocessed CRT images of the computer.

3) Computer processed images by smoothing and non-linear matched filtering revealed better detectability of lesions than unprocessed images.

4) Iterative deconvolution failed to show increased detectability.

Data acquisition and processing of an Anger camera by the NIRS on-line computer system

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We have previously reported that the NIRS computer system was used for the digital data processing of a scanner. Now, the same system is connected on-line to a new delay-line type scintillation camera. Here we describe an interface between the camera and computer and the software of data acquisition and image formation.

The scintillation camera has a several additional features to the conventional one: (1) it has a slanted hole rotating collimater and a rotating bed for tomographic imaging and (2) it has two channels of energy selectors for double radionuclide imaging. For the data collection by the computer, the camera generates X and Y positional signals, coincidence signal, energy signal for double radionuclide imaging and angular signal for tomographic imaging.

The X and Y signals are shifted to be unipolar pulses between 0 and 10 volts and coincidence signal is a unipolar pulse of +3 volts and 3.5 μsec duration.

The data acquisition are performed in 4 different modes: (1) static image in increment mode, (2) dynamic image in increment mode, (3) dynamic image of double radionuclides in sequential mode and (4) tomographic image in sequential mode. Programs for the data acquisition mentioned above are made as well as those for image formation and display. In addition, software for image processing and feature extraction are also being produced. The programs are stored in the magnetic disk and are called by their names from I/O typewriter at the camera room. The programs are proceeded in conversational mode.