15

WEIGHTING FUNCTIONS OF PROJECTIONS FOR IMPROVING QUALITY OF SINGLE PHOTON ECT IMAGES. H.Murayama,N.Nohara and E.Tanaka. National Institute of Radiological Sciences, Chiba.

Single photon emission computed tomography (SPECT) with converging collimator system was proposed to improve quality of reconstructed images. The collimator system was designed to enhance sensitivity at the center region of field-of-view, where the probability photons escape the attenuating medium is smaller than at the off-center region.

In order to evaluate efficiency of the improvement on image quality, the weighting function of projections, which is defined as relative sensitivity to the average on the lateral sampling of projections, was adopted to the image reconstruction algorithm of Radial Post Correction method. Statistical mean square noise in a reconstructed image was formulated in this method. Simulation studies using typical weighting functions showed that center-enhanced weighting functions bring effective improvement on image quality, especially, at the center region of cold area surrounded by annularly distributed activity.

16

Utility of an elliptical orbit on SPECT. K.Tamura,M.Kobayashi,T.Kato.Akita University School of Medicine.

With Toshiba GCA-601E gamma camera,an elliptical orbit implemented by a combination of rotational and translational motions in single photon emission computed tomography(SPECT) was compared with a circular orbit. In phantom images, the elliptical orbit showed improvement on image resolution FWHM,lesion detectability(hot and cold spot) and uniformity.Thirty patients were examined with SPECT on both elliptical orbit and circular orbit using Ga-67 citrate.The elliptical orbit improved significantly the image resolution and uniformity especially near the center,as well as the result of phantom study.And we described some problems of both elliptical and circular orbit.

17

IMPROVED IMAGE QUALITY WITH ELLIPTICAL ORBITS AND DISTANCE-WEIGHTED BACKPROJECTION RECONSTRUCTION. RL.Eisner,WA.Fajman, DJ.Nowak and RI.Pettigrew. Emory University School Of Medicine And Grady Memorial Hospital,Atlanta,Georgia. General Electric Company, Medical Systems Group, Milwaukee, Wisconsin.

Compared to results obtained with conventional circular aquisitions phantom studies have shown improved contrast and spatiel resolution when the rotating gamma camera describes an elliptical orbit: tomograms with the improved contrast and spatial resolution have been obtained from circular orbits when reconstructed with the distance-weighted filtered backprojection (DWT) algorithm instead of conventional (CONV) 360 degree reconstruction techniques ; purpose; to compare the image quality of ellipically acquired tomograms, and to evaluate them in combination with DWT in SPECT bone imaging results: among all the acquisition/processing alternatives, the elliptically acquired distance-weighted reconstruction with a 128 X 128 acquisition matrix size provided the best image quality

18

A SIMPLE AND EFFICIENT METHOD OF DATA ACQUISITION FOR SPECT. M.Kaneko, Y.Takehara, S.Sakamoto, M.Hosoba* and H.Wani*. Hamamatsu University School of Medicine, Hamamatsu and Shimadzu Corporation, Kyoto.

To economize the distance between head and scinticamera, 180° fronto-vertico-occipital rotation is performed (FVO scan), instead of rotating 360° around the head. By FVO scan, the more efficient data are obtained symmetrically at the same time for both hemispheres. This is useful to I-123-IMP brain scans in a short time without any additional softwares. Both phantom experiments and clinical application revealed greater advantage in detecting smaller lesions more distinctly.

For body scan, the method of di-axial rotation data synthesis(dardas) was devised. Data acquisitions were obtained rotating 180° in each half of the body around the 2 centers (di-axes), several cm apart each others. Then, the data synthesized by the special softwares. Shifting the camera in the distance between the di-axes is only extra-procedure during the scan. Dardas method was proved excellent by phantom experiments and simulation by computer. Final results with the software of absorption correction and out of field compensation showed image with higher resolution due to the less scattering. The clinical application was promising in the smaller lesion detectability and the more accurate contour demonstrability.