

C. Measurement B (in vivo)

Optimum Angle of Inclination of Collimator Holes in Tomo-Scintigraphy

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Tomographic rotating collimator systems consists of a collimator containing inclined holes rotating about the detector axis on the face of a gamma-camera. The object, containing the activity to be investigated, is rotated in synchrony with the collimator. In general, for a full rotation of bed and the collimator, the integrated image is a circle. There is one plane parallel to the crystal called section plane, in which all points are imaged as corresponding points in the crystal image plane. Its depth h from the plane of the crystal image is given by $h=R \tan \theta$, where R and θ denote the radius of rotation of the bed and the angle of inclination of the collimator holes, respectively.

In order to find the optimum angle of inclination, we analysed the angular dependency of plane sensitivity, resolution area ($=\pi$

$(FWHM_c/2)^2$) in section plane, as well as the degree of depth discrimination defined by the distance $(FWHM_d/2)$ separating planes for which the displayed intensity of point source is one half that in the section plane. Here, $FWHM_c$ denote the full width of half maximum of point spread function in the section plane, and its angular dependency is given by $\propto 1/\cos\theta$. $FWHM_d$ denote the full width of half maximum of depth spread function, and is given by $FWHM_c/\tan\theta$. Plane sensitivity is theoretically shown to be proportional to $\cos\theta$. Performance criterion is defined by the ratio of plane sensitivity to resolution volume ($=FWHM_d \cdot \pi \cdot (FWHM_c/2)^2$), and its angular dependency is given by $\cos^3\theta \sin\theta$. By optimizing this performance criterion, we obtained 30° as the optimum angle of inclination of collimator holes.

Study on Methods of Scinti-Tomograms and Transmission Scinti-Tomograms

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The scinti-tomogram has been recently developed with a scintillation camera for separa-