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EFFECTS OF NON-UNIFORM ATTENUATERS ON CARDIAC SPECT. M.Hosoba, H.Wani, H.Toyama*, H.Murata** and E.Tanaka***. Shimadzu Corp., Tsukuba Univ.*, Toranomon Hospital** and Natl. Inst. Radiol. Sc.***.

The effects of the non-uniform attenuaters on the cardiac SPECT has been evaluated by the computer simulation using the realistic models traced from the gated NMR images. Total of 15 slices in three normal volunteers were used to create the SPECT images with 64 linear samplings and 64 views over 360 degree. Two types of the models, the uniform attenuater model(UAM) and the non-uniform attenuater model(NUAM), were generated simulating both the Tc-99m blood pool SPECT(TC) and Tl-201 myocardial SPECT(TL). Images were then reconstructed with the various attenuation correction techniques including the pre-correction (Pre), the post-correction (Post), the Weighted Backprojection (WBP), and the Radial Post Correction method (RPC). The results were compared with the true images reconstructed from non-attenuater model and a relative percent error(%ERROR) was calculated in the cardiac region. The RPC has shown lowest %ERROR in UAM (11%). However twenty to thirty percent %ERROR increase has been observed for NUAM reconstructed with RPC, WBP, and POST method. They were considered to be caused by larger attenuation coefficient used in reconstruction. Introducing of an average attenuation coefficient decreased the %ERROR to the levels of UAM.

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THE BASIC STUDIES ON THE DUAL RADIONUCLIDE METHOD.
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We have been developed a dual radionuclide method for scintigraphic evaluation of reconstruction of the hepatobiliary tract. On this method, Tc-99m-PMT and In-111-DTPA are administered simultaneously. A water phantom of Mix-DP is used to perform the basic studies. Several conditions in vivo which may happen on the simultaneous administration of Tc-99m and In-111 have been analyzed on phantom studies. The effects of scattered radiation to both spectrum and mutual quantitative relationship in activity have been analyzed. The results are as follows:
1)The cross talk to the photopeak of In-111 from Tc-99m is negligible.
2)As the thickness of scattering medium increases, the effects to the photopeak of Tc-99m from In-111 become to be increasing.
3)The more, dosis of Tc-99m increases, the less effects to the photopeak of Tc-99m from In-111 decreases.
4)To reduce the effects from In-111 narrowing window of Tc-99m is needed. And even if the width of window of In-111 is widened, the resulting degradation of the image obtained can't happen.

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THE USEFULNESS OF SUPERIMPOSED GA-67 EMISSION CT AND X-RAY CT IMAGES OF THE HEAD AND NECK REGION. M.Nakazawa,T.Shiraishi, S.Kawa,Y.Nishiyama,H.Uehata,S.Natsuzumi, K.Matsumoto,A.Kobayashi,N.tanaka. Kansai Medical University, Osaka.

It is very difficult to determine the location and range of lesions using only simple Ga-ECT images. In order to compensate for this deficiency, computer processing was employed to superimpose X-ray CT images and SPECT images.

The authors have previously used this technique for the lung and mediastinum and reported the results to this society. However, when superimposing images of the head and neck region, we encountered problems in reproducing the patients exact position and in instability of the marker setting. Efforts were thus made to improve the accuracy of the superimposed images.

The result enabled us to detect lesions in deep regions which were difficult to read from conventional images. Furthermore, it was also possible to detect a lesion spreading to a normal part which was difficult to detect from a simple X-ray CT image.

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COMPOSITE IMAGE PROCESSING OF BRAIN CT AND SPECT USING I-123-IMP.
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The recent rapid progress in medical engineering has produced a large amount of information. We are now confronted with the problems of how to utilize these abundant medical images effectively.

Now,we developed a new useful system, which can display composite images of conventional CT and SPECT images simultaneously. Our new system consists of TV camera, zooming lenses,A/D converter,Image processor,color monitor and floppy disk drives.

The procedure is described as follows;
1)The digitalized image data of brain SPECT are stored at memory region of red color zone.
2)The reversed data of brain CT image are stored at those of green color zone.
3)The data of red and green zones are added to produce anatomical and functional image at the same time.

We studied brain CT,SPECT,using I-123-IMP,and composite imagings of 4 normal subjects and 9 cases of Alzheimer's disease. We are convinced that this method should allow the combined assessment of anatomy and metabolism in brain.

And so 9 cases with Alzheimer's disease are assorted of two types,one with ischemic lesion at the frontal lobe and the other with at the frontal lobe and temporo-occipital region.