261

CLINICAL STUDY OF RCT USING GAMMA CAMERA; USEFULNESS OF SUPERIMPOSING DISPLAY ON XCT CONTOUR IMAGE.

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Radionuclide computed tomography(RCT) has an advantage over X-ray CT, as it can display the regional distribution of physiological and biochemical function. On the other hand inferior spatial resolution and poor delineation of body contour and adjacent organs cause difficulty in evaluation of RCT images. To compensate this drawback of RCT, we attempted to display the RCT images superimposed on the contour images obtained from XCT.

RCT was performed using LFOV gamma camera and rotating chair method. Filtered back projection was used for reconstruction of RCT image. The contour image was constructed by Laplacian processing on stepweise isodensity image obtained from XCT image. The two images of same slice level were added after adjustment of size and position and displayed on the display unit of XCT.

We applied this method to RCT of thyroid lung, liver, kidney, blood pool and tumor scintigraphy. The method may prove useful in clinical diagnosis, especially in the complementary evaluation of RCT and XCT.

262

AUTOMATIC MEASURMENT OF LIVER RADIOISOTOPE IMAGES.---EXTRACTION OF CONVEX AND CONCAVE STRACTURE.

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This lecture described a image processing procedure for extraction of unusual contour shape in the radioisotope (RI) image which was attributable to the hepatoma in the human liver and the possibility of classification into normal and abnormal liver by using a computer.

Convex and concave stracture of a contour shape are designated quantitatively by distance D_ℓ (ℓ = 1,2,3,---,n) at each point P_ℓ (ℓ = 1,2,3,---,n; sampling number = n) on a contour line. D_ℓ are given perpendicularly to the straight line that was drown through the both points of P_ℓ. D_ℓ are correspond to the shape of contour line and contour shapes are extremely extracted. The result of rank test about 6 samples (normal:3,abnormal:3), it is able to classified at 25.38% level of sigificant.

Some abnormal livers have different intensity distributions from normal cases. Therefore we present the another technique for classification which construct to a contour map of a RI image, and calculate D_ℓ in each contour line.

263

A COMPARATIVE STUDY OF CT EXAMINATION AND RI STUDY IN CASES OF THYROID DISEASE.

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Measurement of thyroid volume was performed by CT examination and RI study in thyroid phantom and five operated cases of thyroid disease.CT examination was as accurate as RI study in normal-sized phantom, but it was more accurate than RI study in large-sized phantom and operated cases.Although our experienced cases were not enough, we think our method must be clinically very useful.

264

CT IMAGING COMPARED WITH RI IN THYROID NODULE.

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Thyroid nodules are classified papillary and follicular type pathologically. Papillary type nodules generally reveal non-homogeneous masses with irregular contrast enhancement on CT imaging. In calcified cases of that type, all calcifications are psammomatous. However, CT scan shows various patterns of internal texture and contrast enhancement about follicular thyroid nodules. In two of the four cases of metastasis to deep cervical lymph nodes recognized pathologically, CT scan could demonstrate metastatic lymph nodes. Compared CT with RI in one of the papillary type nodules CT made the correct diagnosis, though RI missed the diagnosis. In three of the follicular type nodules RI misdiagnosed as malignancy and in four of them CT also misdiagnosed both on RI and CT. As we can obtain cross sectional findings on CT examination, we can easily know internal texture of mass, the presence of calcification, the relationship to the adjacent tissue and so forth. Because they can not be obtained by RI scintigraphy, we should perform CT examination in cases which malignancy can not be ruled out.