307

COOPERATIVE STUDY ON CLINICAL EFFICACY OF SPECT IMAGES OF THE LIVER WITH SPECIAL REFERENCE TO THE DETECTABILITY OF SOL.

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This study was planned to evaluate the significance of SPECT images of the liver when they were added to the ordinary scintigrams with special reference to the detectability of SOLs. Since 1983, the Efficacy Committee collected liver scintigrams together with the SPECT images on 435 cases from 9 hospitals. This is to report the results of our first trial on 80 cases selected from 229 cases presented from 5 hospitals. Forty eight of 80 had SOLs and 32 were free of SOLs. Thirteen doctors joined to this trial, 11 of them had more than 5-year experience in nuclear medicine. At first planar images were read. Then SOL was definitely or likely present, its segment was asked to be checked. secondly, the planar images were again checked with SPECT images. The results (average value) were as follows: sensitivity (planar image only/with SPECT image), 46.2/46.8; specificity, 71.5/68.1; and accuracy, 63.1/62.2.

Although these values indicated that the efficacy of adding the SPECT images were not as good as we expected, there were cases in which SPECT images were definitely helpful in identifying SOLs. One of the reasons of such unfavorable results with SPECT images might be due to the fact that the participants were unfamiliar with the images offered from other hospitals. Next trial is now being planned to be performed on the rest of the patients group.

308

ESTIMATION OF THE LIVER VOLUME AND HEPATIC UPTAKE RATIO BY SPECT:PRELIMINARY RESULTS

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In order to evaluate clinical usefulness of the liver volume and liver uptake ratio as an index of liver function,the volume and RI activity of the liver was estimated by SPECT.Thirty two patients including 10 normal control, 7 liver cirrhosis, 14 various liver disease, were studied.SPECT images were obtained by MaxiCamera400T and Star program,after intravenous injection of 5-8mCi of 99mTc-phytate.A cut-off level and relationship between count and activity(mCi)were obtained from phantom study.In 8 cases,the liver volume was also measured with CT. 1)Since the mean liver volume over 60yrs. was 865grm.,the cut-off level of 37% was obtained at the volume of 900grm. from phantom study. 2)Correlation between liver volumes estimated by CT and by SPECT was good.(r= 0.87) But the liver volume determined by CT was considerably larger than that with SPECT 3)Mean RI uptake of 99mTc-phytate in normal controls was 100.7+13.3%, and remarkably reduced in liver cirrhosis(37.5%).Some cases of normal control showed more than 100% uptake. 4)No relationship between liver volume and RI uptake. Preliminary results showed potential usefulness of the liver volume and liver uptake as a new index of liver function.However further refinement of the method is necessary to obtain more reasonable values.

309

PHANTOM STUDY OF SPLEEN/LIVER VOLUME AND COUNT RATIO,AND INS CLINICAL APPLICATION USING SPECT

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The clinical significance of Spleen/Liver (S/L) volume and S/L count ratio in Tc-99m-Sn colloid SPECT was studied, Because of the variety of the spleen volume and anatomical location of the spleen, S/L ratio calculated from planar image has a limitation to examined liver-spleen phantom study using Tc-99m SPECT, and the volume of the liver and spleen was calculated and total counts in the liver and spleen were obtaind. On the strength of this phantom data, we investigated S/L ratio obtaind from Tc-99m Sn Colloid SPECT of patients with chronic hepatitis and liver cirrhosis.

310

X-RAY CT, SCINTIGRAM, ECT AND IMAGE COMPOSITION OF THE LIVER.

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In the studies of the liver, we made an attempt to display the images obtained by X-ray CT, scintigram and ECT on the same image plane of the CRT. We also made an attempt to composite these images.
The main apparatus we used is TVIP-2100 image processor and its peripherals. The image data were put into the system as video signal, using TV camera, and stored on the floppy diskettes. Various image data of the same patient were stored collectively, thus the loss and change of these data can be prevented and the spaces for storage can be reduced.
The recalling of the data and observation were capable whenever necessary.At the same time,the composition between the various images was thought to be usefull in obtaining definite diagnosis.
At present moment, the image composition still owe much of its process to manual burdens, intricate and lacking in reproducibility. Therefore automatic procedure by computer is expected in near future.