Postoperative liver scan showed an enlargement of liver size in all cases. An increase in left to right lobe area ratio was observed in postoperative liver scan in 80% of cases. Left lobe enlargement which elongated in to the left upper quadrant, mimicking residual or accessory spleen was observed in 10 of 11 cases. Most of the patients in better clinical course showed little changes or slight decrease in hepatic uptake constant following splenectomy.

A Filing System for Diagnostic Observation of Liver Scintigram and Operation Finding of Liver by Computer

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The hepatoscintigraphy is a useful technique to diagnose not only tumor of liver, but also other diseases with diffuse region. However, there are some failure in detecting liver lesions by scintigraphy because of such factors as size and anatomical site of tumor, physiological and pathological shape of liver, etc. For the purposes of detecting Space Occupying Lesion (SOL) in liver scintigrams more exactly, we are developing a filing and retrieval system for the information of liver scans with cooperation of the Department of Surgery, Chiba University Hospital. Two kinds of work sheets are used in this study, one of them is filling up the information of diagnostic observation from the hepatoscintigram, such as a deformation, a disorder of histological site and swelling or atrophy of liver, number of detected SOL on each site of liver, a disorder and swelling of spleen, etc. at the Hospital of NIRS, named scinti-sheet. The other is for filling up the information of surgical operation finding contain almost same items corresponding to the scinti-sheet for the same patient to be operated at Chiba University Hospital, named surgery-sheet. Moreover, at the same time, static digital images of 64 × 64 matrix are gathered by a on-line acquisition interface of the computer and rolled out onto a magnetic tape.

The medical records are punched into IBM cards from the work sheets and rolled out onto magnetic tape using input file program that processed various error check and rearranged linkage of scinti-sheet and surgery-sheet respectively with the same patient by his identifications.

Thus, this filling system would be used for (1) the analysis of failure factors for detecting SOL, (2) the development of digital processing method to the images contained undetectable SOL and (3) the medical training by means of scintigraphic computer data-base with confirmed diagnosis.

Statistical Studies on Carcinoembryonic-Antigen (CEA) Level in Relation to Liver Function

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The discovery of Carcinoembryonic antigen (CEA) by Gold et al, which is specific to some digestive cancers originated from endoblast, has enabled us to diagnose some digestive cancers by measurement of CEA level in serum. However, a high level of CEA in serum is reported even in some cancers except the digestive cancer, and in benignant digestive diseases, hepatic disorders and heavy smokers.

The author reported the basic studies on the measurement of CEA and the relationship between CEA level in serum and smoking.

This report describes the studies on CEA level in relation to hepatic disorders and the statistical analysis of the measured values.

(Subject)

The subject is the patients with suspected hepatic disorders among the out-patients and the hospital-
ized ones in Nippon Kokan Hospital, with whom GOT, GPT, A1-P, and LDH had been measured. The malignant cancers diagnosed by operation, autopsy, or pathologic findings and the benign disorders with high level of CEA in serum were excluded.

(Method)

GOT and GPT were determined by the U.V. method, A1-P by a modification of KIND-KING method, and CEA level in serum was measured by a radioimmunoassay in which free and bound CEA were separated by means of a second antibody.

(Results)

1. No correlation was found between the CEA level in serum and liver function.
2. There was a significant difference in the average value of CEA between the group with normal value of GOT and the one in abnormal GOT level (t<0.01).
3. There was no difference in S.D. in each group.
4. The average value of CEA in the group showing the abnormal GOT level has been arranged in order of decreasing CEA level, the GOT, A1-P, GPT, and LDH group.

The ROC Analysis of Scintigram Observation Using IAEA Simulated Phantom

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Various image processing techniques are available for transforming scintigraphic image quality. However, it is not so easy to determine the best processing method in view of diagnosis of disease by physicians. In order to know the effect of image quality on the physician's interpretation, 24 images of computer simulated phantom which was established in the first coordinated programme on the "Intercomparison of Computer-assisted Scintigraphic Techniques" sponsored by IAEA, are processed by using the Gaussian filter with simple smoothing effect and the "Optimum filter" with medium frequency enhancing effect, and are displayed as a contour map with same displaying factors by a curve plotter of computer system. The processed and displayed 48 images with mixed up are viewed by four physicians who are specialists in scintigraphic diagnosis, with the suggestions as follows:

(1) The images are consisted of 48 pictures.
(2) Each image is divided into four quadrants, each of which could contain either one lesion or none. Therefore, each image could contain from 0 to 4 lesions.
(3) All lesions in the phantom are either cold or hot, but there are no mixed lesions of both in a picture.
(4) The probability of presence of a lesion in a given quadrant are taken to be about 2/3, and
(5) The lesions observed should be entered with following figure of rating from 1 to 4; 1: definitely positive, 2: probably positive, 3: possibly negative and 4: definitely negative.

The results of their answers are analyzed with the receiver operating characteristics (ROC) curve and other methods by computer. Among the results, the "Optimum filter" are given significantly better results compared with the Gaussian filter. The cold lesions are more detectable compared with hot lesions of the phantoms which are similar to a scintigram of human liver administrated 99m-Tc-colloid. Moreover, the results suggest that the physicians are very careful to observe the scintigram such as not increasing number of false positive when the probability of the true positive is limited up to 50% of all lesions.