Results:

1. Scanning of the liver detected intrahepatic space occupying lesion in 37 of 44 patients with hepatic metastasis (True positive 84%). Normal findings on the scan were obtained in 99 cases of 106 patients without hepatic metastasis (True negative 93%).

2. Of 7 cases in which scanning failed to detect the hepatic metastasis, 3 had only small metastatic tumors less than one cm in diameter. In other 4 cases, errors of interpretation were pointed out retrospectively.

3. Of 7 false positive cases, 2 were misdiagnosed as hepatic metastasis for low activity area due to gall bladder or kidney. In other 5 cases, suspicious of hepatic metastasis were still remained, because the perfect verification of the hepatic metastasis is impossible even at surgery.

4. Conclusively, we would like to say that scanning of the liver is very reliable in most of cases, though small metastatic tumors less than 1-3 cm in diameter are undetectable, and it was impressive that many hepatic metastasis had the size enough to detect by this technique.

A Clinical Value of the Liver Scintigram in Hepatic Surgery

M. Mito and Y. Kasai

First Department of Surgery

S. Shibata

Department of Radiology, Hokkaido University Hospital, Sapporo

The appearances of liver scintigram were assessed on comparison with those confirmed by surgical laparatomy or autopsy with regard to the diagnostic value of scan. A recent conception of the authors was presented about an accuracy of the diagnosis objectively made to analyse the scan interpretation in a semiquantitative manner for liver diseases.

Method and Material:

1. The tumor models from 1 to 5cm. in a diameter were replaced on various depths in phantom including radiactive solution with count rate from 160 to 180cps, and the scan was performed.

2. Liver scan was done with a Shimazu SSS 130W scanner having twin opposite detectors consisted of a 3-in. crystal in the patients with space occupying lesion; 32 with primary carcinoma, 69 with metastatic carcinoma, and 25 with benign tumor.

Result:

1. ^{99m}Tc sulfur colloid was so available to delineate even the tumor model of 1cm in a diameter on the surface of phantom, but was impossible to detect the tumor model of less 5cm in a diameter on the depth of 5cm. ^{198}Au colloid was not able to detect the tumor model of less2cm in a diameter on the surface, but was possible to detect the tumor model more 3cm in a diameter on the depth of 5cm.

2. Data blended scan using Gaussian filter was done in 100 cases with space occupying lesion, and compared with dot and conventional photoscans. An ability to detect a lesion of 3cm in a diameter was indicated as 100% in data blended scan, 71% in convetional photoscan, and 32% in dot scan. But the number of false positive and negative was 20%, and it was difficult to distinguish pseudotumor in the presence of diffuse liver diseases from true neoplasms.

3. Analysis with liver area and liver volume estimated from anterior and right lateral views of the scintigrams was helpful to make a diagnosis of the liver diseases. The differential diagnosis between intra- and extrahepatic lesion could be readily established by the analysis. Liver areas on the pre- and postoperative scintigrams were estimated in 8 cases with hepatectomy. The increase in liver area was shown a month after the hepatectomy in

no relation with the extent of resection, and almost came up to the preoperative liver area 3 months. However, 2 cases with the increase in liver area after the 3 months demonstrated a recurrence of the tumor without space occupying lesion. Therefore, the performance of serial scans was very important to predict the recurrence, and also may serve as a useful method for estimating the behavior of liver tumor in response to chemotherapeutic agents and surgical treatment.

Review of RI Diagnostic Procedures for Hepato-Biliary Tract Diseases from the Surgical Viewpoint

M. KODAMA and H. NISHIKAWA

The Second Department of Surgery, Hiroshima University School of Medicine, Hiroshima

Liver scintigraphy was performed on 185 cancer cases (of which 118 had gastric cancer) during the period of February 1967 to September 1971 with a Pho/Dot II Scinti-scanner and a Pho/Gamma III Scinticamera manufactured by Nuclear Chicago Co. using ^{198}Au-colloid, ^{99m}Tc-sulfur colloid and ^{131}I-rose bengal. Of those with positive scans, 33 cases of metastatic liver cancer were confirmed by laparotomy or autopsy while there were 13 false positive cases in whom metastatic liver cancer could not be found on laparotomy nor autopsy.

Further, of those with negative scans, there were 96 cases with true negative findings in whom metastatic liver cancer was not present on laparotomy nor autopsy, while there were 9 cases with false negative scans. Thus, the overall diagnostic accuracy was 95%. Of the 13 cases presenting false positive findings, 8 were normal, 2 had deformity of the left liver lobe due to pressure from a cancer of the cardia, and 1 each had enlargement of hepato-biliary duct due to obstruction of the biliary tract, hypertrophy of the left lobe and progressive gastric cancer with disseminated metastases. Of the 9 cases with false negative findings, 7 had disseminated metastases of less than 3 cm in diameter and 2 had infiltrative metastases of the left liver lobe from recurrent gastric cancer.

During the above mentioned period, there were 12 cases diagnosed as primary hepatic cancer, of whom 6 had hepatoma, 5 of whom had complication of hepatic cirrhosis. Hepatectomy was performed in 3 cases, of whom 2 died of hepatic insufficiency after surgery. The main causes for hepatic insufficiency following surgery are factors involving hepatic circulation. Therefore, the authors used a scinticamera connected to an analog-to-digital converter with 1600 word memory and computer compatible magnetic tape system to obtain the local concentration curve of radioactive colloid in the remaining portion of the liver based on the local K value. The average K value determined by readings at 37 sites in 10 normal cases was 0.344 (S.D. 0.096), which agreed well with the K vaule obtained by conventional single probe techniques. When there is a decrease in the K value of the remaining portion of the liver, it may be considered due to local circulatory disturbance in the liver.

In 3 of the 5 cases of primary hepatic cancer in whom exploratory laparotomy was performed, anti-cancer preparations were administered locally by intra-arterial cannulation. It is possible to determine the degree of distribution of the anti-cancer preparation and the state of the tumor by administrations of an injection of ^{131}I-MAA at the same time by observing the tracings of the positive scan.

Procedures for aleviation of jaundice by biliary tract intubation was performed on 4 cases with obstructive jaundice, and the post-