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CLINICAL CORRELATION OF HEPATIC FLOW STUDIES

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In 100 consecutive hepatic flow studies, 84 were read as negative. Of these, 73 (87%) also had negative static images. Knowing the nature of the primary tumor did not definitively aid in predicting whether hepatic metastases would have detectable early flow. Five cases showed early flow without defects seen in the static images. Three of these were probably related to lymphomas or allied disorders with altered flow. Two cases were in individuals with gastric carcinoma who had abdominal radiation. One extrahepatic tumor was detected in the series.

The usefulness of liver flow studies has been discussed by several authors (*1,2*). Dynamic images search for "early flow"; that is, for increased entry from the hepatic artery before there is influx from the portal venous system. We have studied 100 consecutive liver flow procedures in order to obtain a correlation with the final clinical impression.

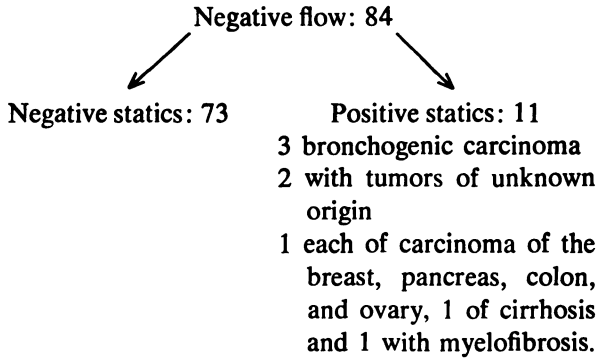
MATERIALS AND METHODS

One hundred consecutive patients were positioned so that the right lower-most portion of the thorax and the abdomen were in the field of view of a gamma-ray camera with a parallel-hole collimator. Technetium-99m-sulfur colloid (55 μCi/kg body) was injected intravenously. After a delay of 8 sec, Polaroid films were hand-pulled at intervals of 4 sec. A final picture was obtained to correlate the flow images with the static picture. After a delay of 10 min, a full series of static liver views was obtained (anterior, posterior, and right lateral as well as images of the spleen). The dynamic images were interpreted independently of the full static views and read as either positive (early flow) or negative. By a positive, we mean clear visual evidence of focal or diffuse hepatic filling, simultaneous with the first pass of radioactivity down the aorta.

The static images were then interpreted. Followup information was obtained in each case by a review of the patient's record 6 or more months after completion of the study. Nearly every case had hepatic biopsy data available. Many of the patients also had laparotomies or angiographic studies.

RESULTS

Of the 100 liver flow studies, 84 were read as negative.



Received June 3, 1974; revision accepted Aug. 2, 1974.

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Thus 73/84 (87%) of the patients with a negative flow had a subsequent negative static image. Eleven cases (13%) of negative flow had positive static images.

In the 100 consecutive hepatic flow sequences, 16 were read as positive (1 extrahepatic, 15 in the liver).

Positive flow: 15 (plus one extrahepatic: postpartum uterus with a tumor).

Positive statics: 9	Negative statics: 6
3 bronchogenic carcinoma	2 with carcinoma of the stomach and abdominal irradiation
2 carcinoma of the breast	1 Hodgkin's disease with a mediastinal mass
1 each of carcinoma of the colon, basiloid carcinoma of the anus, Hodgkin's disease, and a tumor of unknown origin.	1 acute lymphatic leukemia 1 unclassified lymphoma with superior vena cava obstruction 1 artifactual due to massive breast shielding.

DISCUSSION

The incidence of positive flow studies in this series (16%) is probably higher than that seen in many centers but lower than that expected in hospitals which follow patients with known tumors. The dose of radioactive colloid used, although lower than that in other investigations, usually gives a clear answer. There are at least three interesting findings in this series:

1. Knowing the type of primary tumor was not of definitive help in determining whether a hepatic metastasis would have a visually detectable early flow. For example three cases of metastatic bronchogenic carcinoma had positive flow studies whereas three cases had negative results. Further work is needed to determine whether this is related to position in the liver, to cell subtype, or to other factors.
2. The cases of positive flow but negative static images were of particular interest. Three were probably related to altered flow patterns in lymphomas and allied disorders. Two instances occurred in individuals with carcinoma of the stomach who had abdominal irradiation. We might hypothesize that the left lobe had decreased reticuloendothelial function because of the irradiation, while flow in the major vessels was still intact. The presence of cases of positive flow without positive static images must be pursued in terms of the dissociation of reticuloendothelial function and gross blood flow.
3. The case of early flow in a uterine tumor points out the usefulness of hepatic flow studies in detecting other intra-abdominal pathology (*3*).

As soon as a larger series of cases is available, we will be able to analyze how tightly "coupled" the flow and static studies are, and how much information is added by the combined study.

ACKNOWLEDGMENT

This work was supported in part by USPHS CA 14969 and GM 2094 and by DT-34D from the American Cancer Society.

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