Rapid regression of hepatic focal fatty infiltration

Computed-tomographic and ultrasound correlation[1]

David M. Paushter, M.D.
Robert K. Zeman, M.D.

The authors describe the computed-tomographic (CT) and ultrasound appearance of focal fatty infiltration of the liver which regressed completely in two weeks with nutritional supplementation alone. Initial diagnosis and recognition of possible rapid resolution of focal fatty infiltration are important, since CT and ultrasound changes may be ascribed to unrelated treatment and erroneously alter therapy.

Index terms: Case reports · Fatty liver · Liver, computed tomography · Liver, ultrasound studies

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Fatty infiltration of the liver is a well-recognized clinical and radiological entity with multiple etiologic factors including alcoholism, malnutrition, cystic fibrosis, obesity, diabetes mellitus, Reye's syndrome, parenteral nutrition, blunt trauma, Cushing's disease, corticosteroid therapy, and jejunoileal bypass. Although it is now generally recognized that fatty infiltration may be focal, simulating metastatic disease, it is only recently that rapid regression after treatment has been documented by computed tomography (CT).[1,2] We report a case of focal fatty infiltration due to malnutrition associated with malignancy, visualized by both ultrasound and CT, which resolved completely in two weeks with improved nutrition.

Case report

A 42-year-old man experienced two months of malaise and dysphagia with resultant decreased oral intake and a 10-pound weight loss. He was admitted with recent onset of upper abdominal pain, jaundice, and abnormal liver function tests consistent with cholestasis. The patient was also cachectic with a serum albumin level of 1.9 gm/dL on admission (normal range, 3.5–5.5 gm/dL). An ultrasound examination (*Fig. 1*) demonstrated dilated intrahepatic biliary radicals and a brightly echogenic band extending into the right lobe of the liver from the region of the porta hepatis. CT (*Fig. 2*) also showed a dilated intrahepatic biliary tree. A bandlike region of decreased attenuation involving the right lobe of the liver was present, suggestive of focal fatty infiltration. Dynamic images obtained during an intravenous administration of a bolus of urographic contrast material demonstrated no displacement or interruption of portal vessels within this region. A large gastric mass and portal adenopathy were also identified.

At laparotomy, gastric carcinoma was found with omental and porta hepatis metastases, but the liver was normal on both palpation and visual inspection. Gastrostomy, jejunostomy, and cholecystostomy tubes were placed, and the patient received progressive enteral feeding (Vivonex) postoperatively, eventually receiving 2,400 kcal and 39 g of protein per day. A liver biopsy obtained during surgery in the region of the abnormality is shown (*Fig. 3*). There was no evidence of malignancy. The patient did well postoperatively with improved nutritional status as evidenced by a rise in the serum albumin value to 3.5 gm/dL. Follow-up CT and ultrasound examinations (*Fig. 4*) 14 days after the initial studies and prior to the initiation of chemotherapy demonstrated complete resolution of the focal fatty infiltration.

[1] Department of Radiology, Georgetown University Hospital.
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A, B

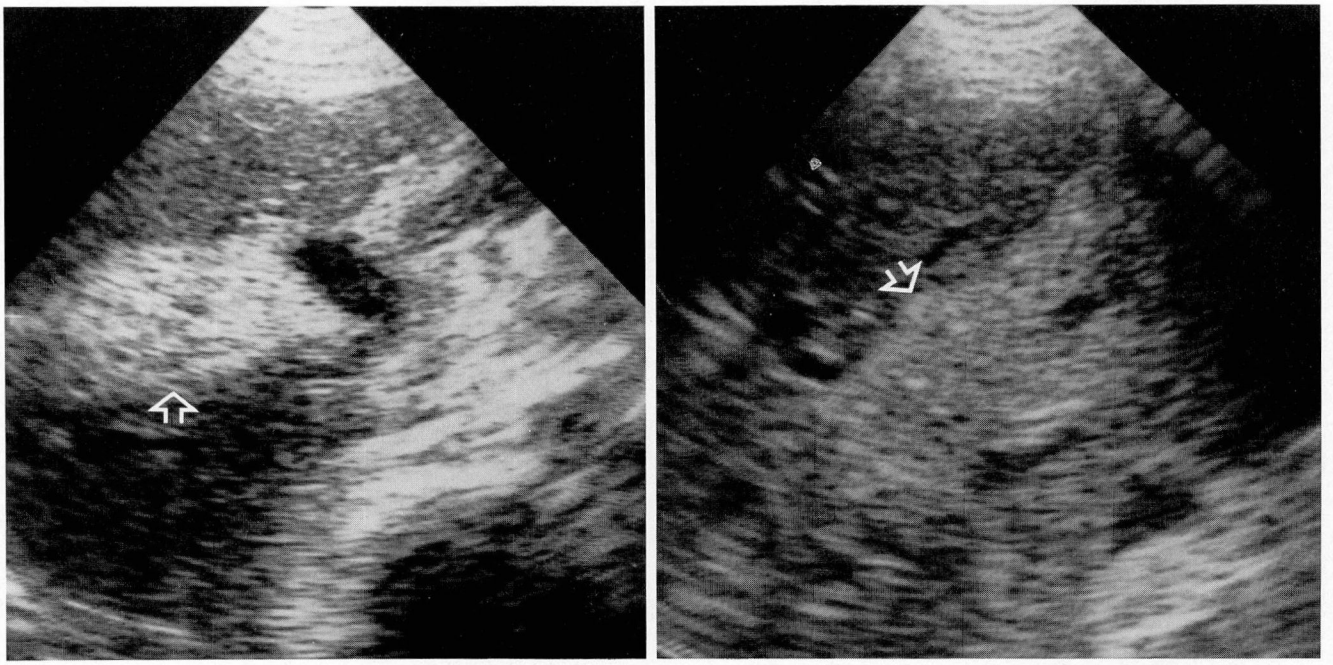


Fig. 1. Transverse (**A**) and longitudinal (**B**) ultrasound studies show a brightly echogenic region (*arrow*).

A, B

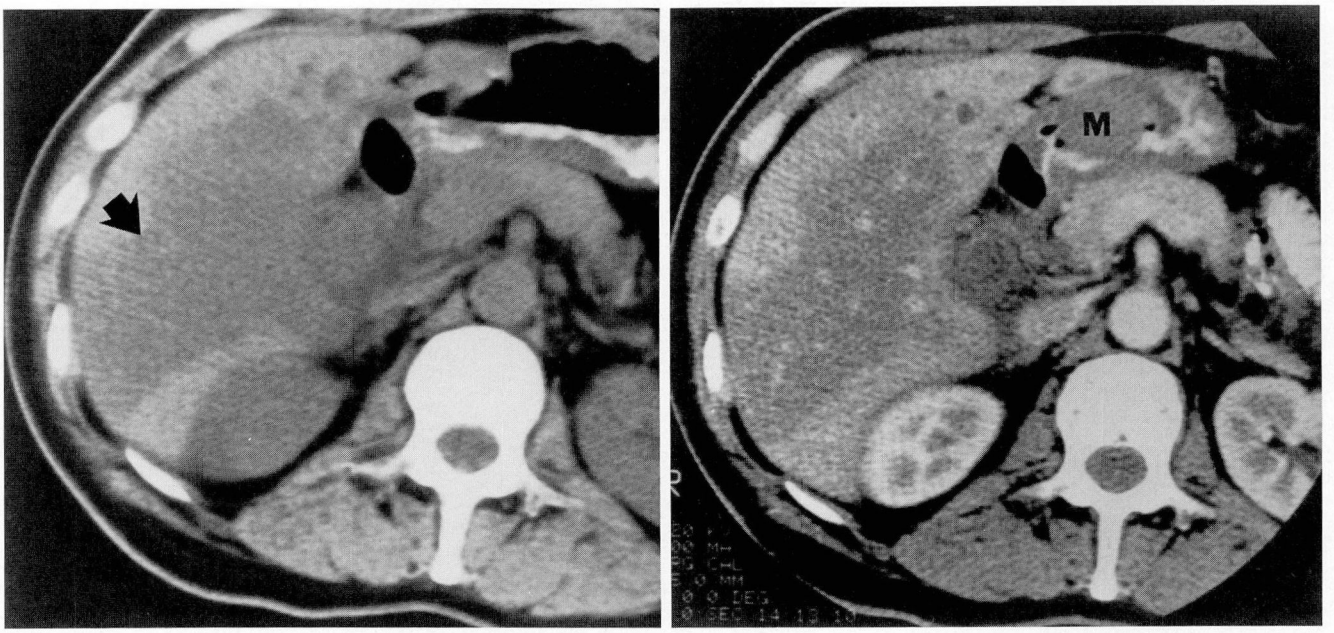


Fig. 2. A. CT, before administration of contrast media, demonstrates a band of decreased attenuation involving the right lobe of the liver (*arrow*).

B. On the intravenous bolus-enhanced study, normal portal vessels are seen within the focal fatty infiltration. A gastric mass (*M*) is present.

Discussion

The detection of hepatic fatty infiltration has increased in recent years due to the accuracy of CT, and to a lesser extent, ultrasound.[3–5] The hepatic fat content correlates with CT attenuation values, but less well with sonographic echogenicity.[4] Diffuse fatty infiltration may be recognized on CT when liver attenuation is less than

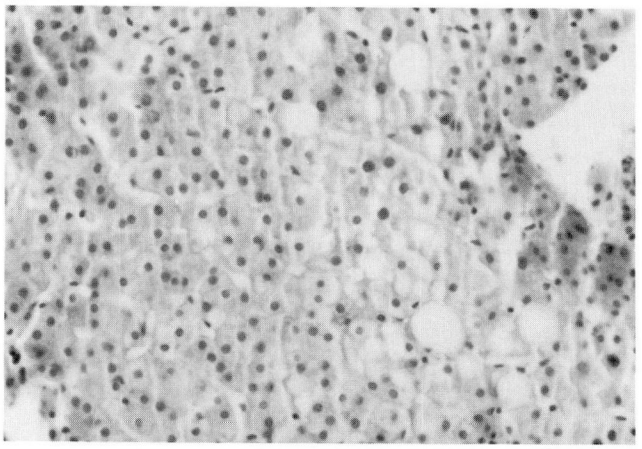
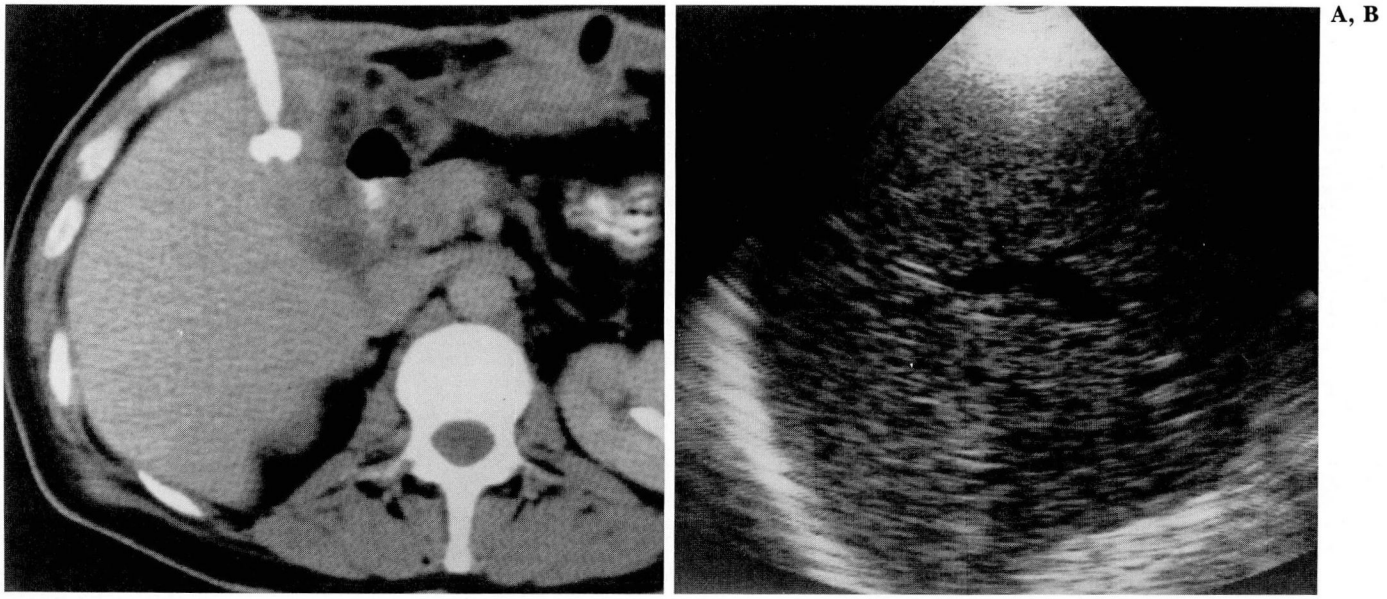


Fig. 3. Liver biopsy findings reveal mild, patchy microvesicular and macrovesicular fatty changes.

that of the spleen.[3] An enlarged liver with fine, diffusely increased echogenicity has been considered suggestive of the diagnosis sonographically. There may also be decreased visualization of the intrahepatic vessels and right hemidiaphragm.[3] Diffuse fatty infiltration cannot always be differentiated from other diffuse liver diseases with ultrasound.[3–5] In particular, early cirrhosis may have a similar appearance, and fatty infiltration frequently coexists with cirrhosis.

The focal form of fatty infiltration has been noted more recently, and there are difficulties associated with its diagnosis. Using CT, focal fatty infiltration may be misinterpreted as metastatic or cystic disease due to a wide variation in attenuation values. Lesion homogeneity, a nonspherical contour and lack of mass effect or distortion of portal vessels, has been described as being more consistent with focal fatty infiltration than metastatic disease.[6,7] A detailed patient history may also aid in this distinction. Although normal portal vessels in a region of focal fatty infiltration may be visualized with an intravenous contrast drip, this diagnostically useful finding is often better demonstrated using dynamic (rapid) CT scanning in conjunction with a bolus of intravenous contrast media. Ultrasound demonstration of a regional bright echo pattern in focal fatty infiltration may be nonspecific. It is also possible, in an attempt to decrease the echo amplitude



A, B

Fig. 4. Examinations after nutritional supplements.
A. CT scan with contrast media demonstrates no hepatic parenchymal abnormality. A choleystostomy tube is present anteriorly.
B. A longitudinal ultrasound examination also documents regression of focal fatty infiltration.

arising from the fatty infiltration, to cause remaining normal liver parenchyma to appear abnormally hypoechoic by manipulation of the time-gain compensation curve.[8]

Focal fatty infiltration may resolve rapidly with treatment as demonstrated in this case report. Unless this is recognized, disparate results may be obtained from temporally separated radiological studies. Also, if fatty infiltration is not diagnosed initially, or if it coexists with metastatic disease, regression may be ascribed to unrelated treatment such as chemotherapy. This is particularly so since treatment may not be obvious, consisting primarily of improved nutrition. Rapid regression of suggestive CT or sonographic findings should raise the possibility of focal fatty infiltration in the appropriate setting.

David M. Paushter, M.D.
Department of Radiology
The Cleveland Clinic Foundation
9500 Euclid Ave.
Cleveland, OH 44106

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