

Radioscintigraphic Findings in Budd-Chiari Syndrome Due to Obstruction of Inferior Vena Cava

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Introduction

Budd-Chiari syndrome is a rare type of portal hypertension caused by obstruction of hepatic vein (s) and/or corresponding portion of inferior vena cava. The findings of radionuclide liver scan in classical type of Budd-Chiari syndrome is characterized by increased photon uptake at caudate lobe area with decreased uptake at the other area. However, the findings in Budd-Chiari syndrome due to obstruction of inferior vena cava is supposed to be different because there can be no direct drainage to inferior vena cava.

We report a case which showed photopenic zones in hepatic scintigraphy and was confirmed to have obstruction of inferior vena cava.

Case Report

A 46-year old woman visited outpatient clinic because of epigastric discomfort over 20 years. Her past medical history, family history and social history were all non-contributory. She had menorrhagia but there was no indigestion, hematemesis, melena, diarrhea and other gastrointestinal symptoms nor did she complain dyspnea on exertion, orthopnea & palpitation. She was apparently well, and on physical examination, firm liver of 3 finger-breadth with blunt margin and nodular surface was palpated but there was no other abdominal mass, palpable splenomegaly, superficial collaterals, nor shifting dullness. There was no cutaneous ulcer, pigmentation, varicose veins on

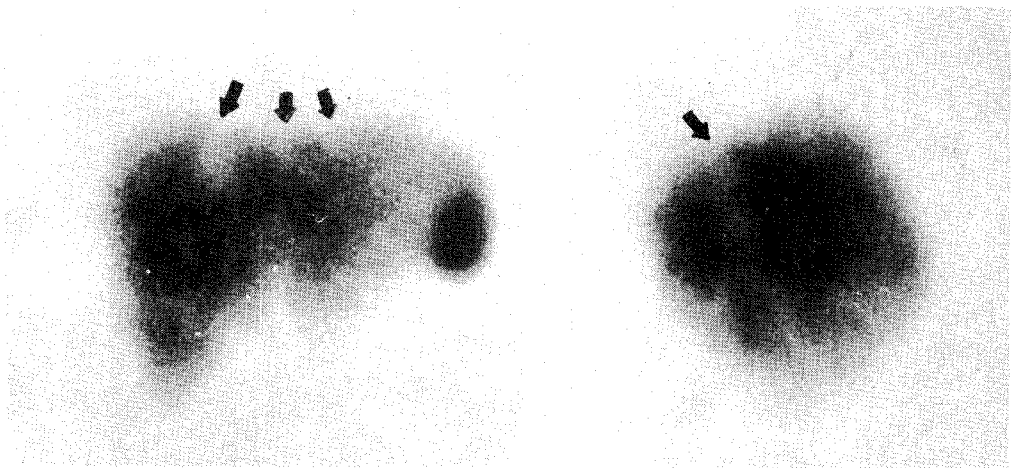


Fig. 1. Liver scan showing 3 photopenic zones (arrows) simulating 3 main hepaticveins (anterior) & tree-like arborizing photopenia (arrow) (right lateral)

her legs, either. CBC was 8.8-30-4,500 with slightly microcytic & hypochromic RBC on peripheral blood smear. Prothrombin time was 12 sec. ALT/AST levels were normal, serum bilirubin, 1.3 mg/dl, and serum protein/albumin levels were 7.9/4.2 g/dl, HBsAg was negative. Hepatic scintigraphy using ^{99m}Tc -colloid showed multiple photopenic zones which had tree-like arborizing

pattern on right lateral view, generalized mottled appearance of liver and increased splenic uptake (Fig. 1). Ultrasonography disclosed echogenic mass in the inferior vena cava but no intrahepatic mass was found (Fig. 2). Abdominal CAT scan was done to reveal long thrombus up to over 10 cm in the inferior vena cava but no intrahepatic mass was disclosed (Fig. 3). Radionuclide venog-

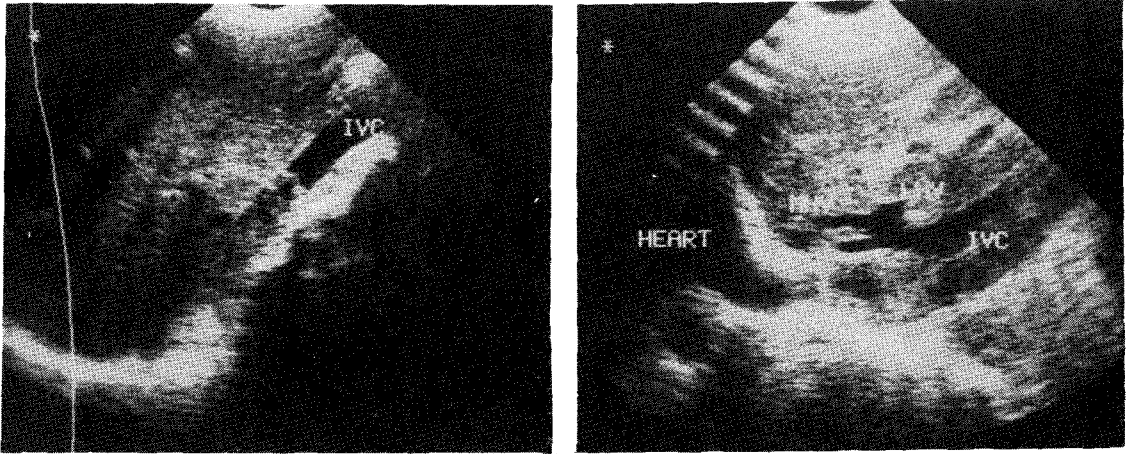


Fig. 2. Ultrasonographic findings showing echogenic mass in IVC extending up to right atrium & dilated branches of hepatic vein (MHV: middle hepatic vein, LHV: left hepatic vein)

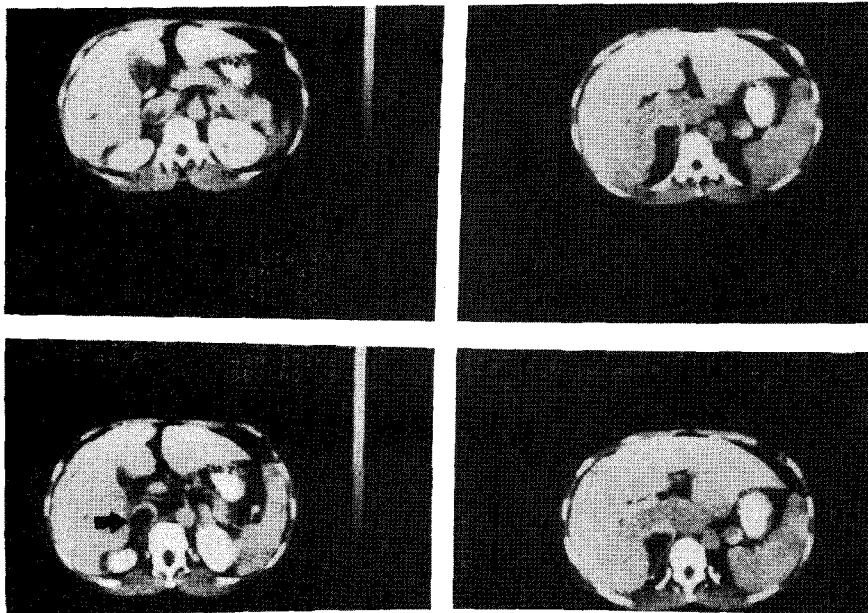


Fig. 3. Abdominal CAT scan showing long thrombus up to over 10 cm in IVC without intrahepatic mass (arrow)

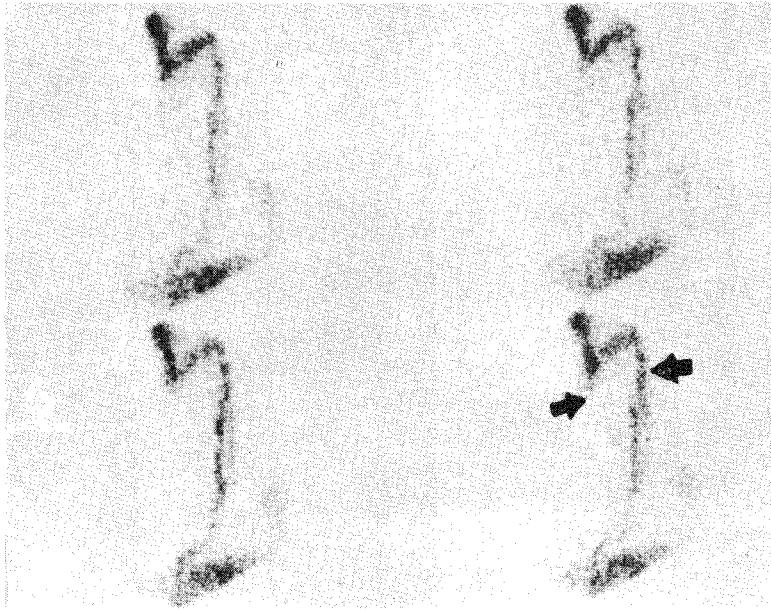


Fig. 4. R1 venography showing negligible flow above the bifurcation level(left arrow) & collateral from right ilio-femoral area(right arrow)

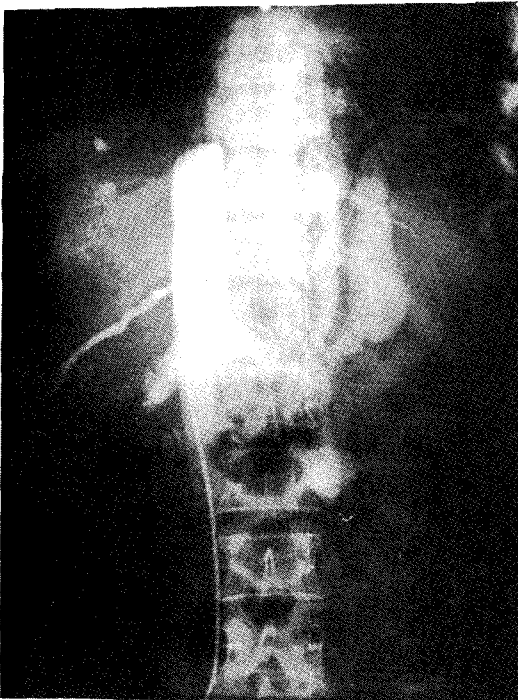


Fig. 5. Inferior vena cavogr showing complete obstruction & well-developed axial collaterals

raphy using ^{99m}Tc -colloid showed negligible flow above the bifurcation level and collateral originating from iliac-femoral vein area(Fig. 4). Inferior vena cavogram was done to reveal complete obstruction at the level of insertion of hepatic veins and well-developed central collaterals(Fig. 5). She was discharged with iron preparation.

Discussion

In contrast to Budd-Chiari syndrome due to hepatic vein obstruction, Budd-Chiari syndrome caused by obstruction of inferior vena presents several distinguishing features. This type occurs more commonly in the developing areas of the world, and congenital factor is seriously considered as etiology^{1,2)}. Clinically, this type of Budd-Chiari syndrome presents edema, pigmentation & stasis ulcer in addition to other manifestations of portal hypertension^{1,3,4)}.

In this case, multiple photopenic zones in the radionuclide liver scan was initially not considered to be caused by obstruction of inferior vena cava

because no symptom & sign attributable to obstruction of inferior vena cava was present except hepatomegaly itself. Scintigraphic findings of liver in the Budd-Chiari syndrome caused by obstruction of inferior vena cava have been sparsely reported in the literature as mottled uptake & splenomegaly⁴⁾ or large photopenic area in the right lobe of liver⁵⁾ in contradistinction to classical type of Budd-Chiari syndrome due to obstruction of hepatic vein which presents increased photon uptake at the caudate lobe area⁶⁾.

Generalized mottled appearance, splenomegaly or increased splenic uptake can be ascribed to cirrhotic change due to prolonged venous obstruction. But the mechanism for genesis of photopenic zone is not clear.

Focal necrosis or large intrahepatic thrombus can be excluded in our cases considering clinical, laboratory & radiological findings. Instead, dilation of hepatic veins & their tributaries can account for the "SOLs" in this case, considering three photopenic zones in liver simulating three main hepatic veins, and tree-like arborizing photopenia in the right lateral view of hepatic scintigraphy. And the absence of increased uptake in the area of caudate lobe represents absence of direct blood flow from caudate lobe of liver to inferior vena cava as is the case with classical Budd-Chiari syndrome due to hepatic vein obstruction. In this case, radionuclide venogram disclosed a infrarenal collateral channel that seemed to originate from iliac-femoral vein area and could not be observed in the inferior vena-cavogram⁷⁾. That collateral seemed to be the channel of the lowermost resistance because that was the only one which was

clearly visualized during the natural flow of radionuclide from lower leg veins, and the failure to visualize that collateral channel in the inferior vena cavogram is of course due to opposite direction of catheter & pressure brought during injection of contrast dye.

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