

Gamna-Gandy bodies: A sign of portal hypertension

Portal hipertansiyonun bir işareti: Gamna-Gandy cisimleri

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Gamna-Gandy bodies (siderotic nodules) represent organized foci of hemorrhage in the spleen that is caused by portal hypertension. Gamna-Gandy bodies contain hemosiderin, fibrous tissue, and calcium. Magnetic resonance imaging has been approved as the most sensitive imaging modality for the detection of these nodules due to their iron content. Computerized tomography and ultrasonography also help in the detection and characterization of these lesions. We report here a case of portal hypertension due to cryptogenic liver cirrhosis with Gamna-Gandy bodies, and characteristic features of ultrasonography, computerized tomography and magnetic resonance.

Key words: Portal hypertension, spleen, Gamna-Gandy bodies, ultrasonography, computerized tomography, magnetic resonance imaging

Gamna-Gandy cisimleri dalakta portal hipertansiyona bağlı olarak gelişen organize hemoraji odaklarını ifade etmekte olup, histolojik olarak hemosiderin, fibröz doku ve kalsiyumdan oluşmaktadırlar. Demir içeriklerinden dolayı bu nodüllerin görüntülenmesinde manyetik rezonans görüntüleme en hassas yöntem olarak kabul edilmektedir. Ayrıca, bilgisayarlı tomografi ve ultrasonografi bu lezyonların saptanması ve karakterizasyonunda yardımcı olmaktadır. Bu çalışmada kriptojenik karaciğer sirozuna bağlı portal hipertansiyonu olan olguda, saptanan Gamna-Gandy cisimlerinin ultrasonografi, bilgisayarlı tomografi ve manyetik rezonans özellikleri sunulmuştur.

Anahtar kelimeler: Portal hipertansiyon, dalak, Gamna-Gandy cisimleri, US, BT, MRG

INTRODUCTION

Gamna-Gandy bodies (siderotic nodules) represent organized foci of hemorrhage in the spleen that is caused by portal hypertension. They contain hemosiderin, fibrous tissue, and calcium (1, 2). There have been relatively few reports about the imaging of these lesions. Magnetic resonance (MR) imaging has been approved as the most sensitive imaging modality for the detection of these nodules due to their contents of iron (3). Computerized tomography (CT) and ultrasonography (US) also help in the detection and characterization of these lesions.

We report here a case of portal hypertension due to cryptogenic liver cirrhosis with Gamna-Gandy bodies, and the characteristic features of US, CT and MRI.

CASE REPORT

A 49-year-old female patient with cryptogenic liver cirrhosis and suspicion of hepatoma was refer-

red to us for MR examination. Previous CT examination revealed cirrhotic changes in liver, splenomegaly and excessive collateral vascular structures in portal and splenic hilus. There was a suspect hypodense area in the right liver lobe, and an MR examination was planned for further evaluation.

MR imaging was performed on a 1.5 T imager (Magnetom Symphony, Siemens, Erlangen, Germany), by using the phased-array body coil. The imaging protocol was T1- weighted gradient-echo (TR 100 ms, TE 5.1 ms) with and without fat saturation, and T2-weighted turbo spin-echo (TR 1500 ms, TE 123 ms) with fat saturation and breath hold.

Both the T1- and T2-weighted images showed multiple hypointense, sharply delineated, scattered nodules with a diameter of only a few millimeters within the spleen (Figure 1).

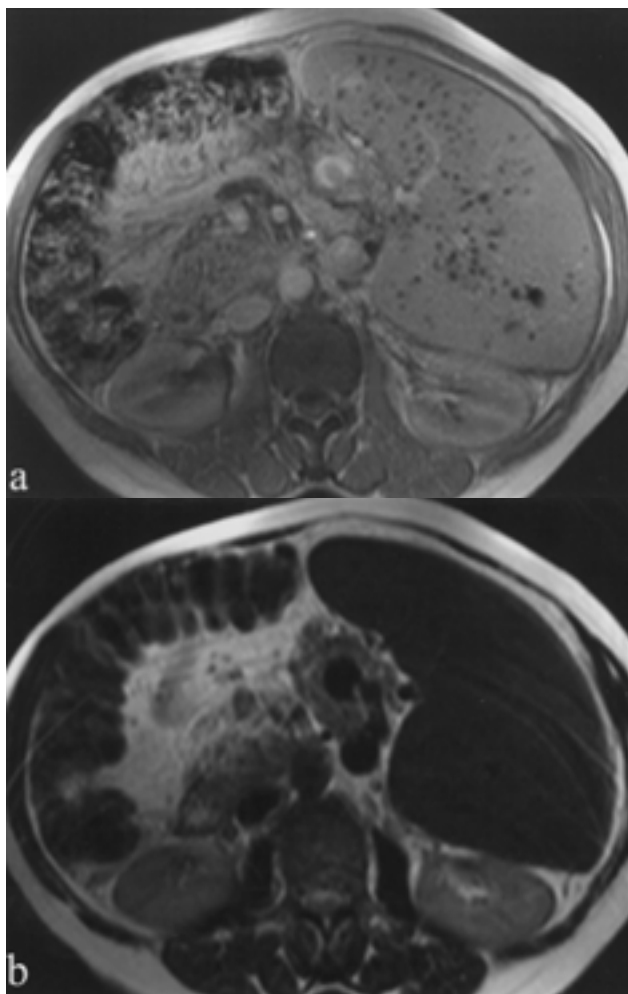


Figure 1a-b. Gamna-Gandy bodies within the spleen in a patient with liver cirrhosis. Small hypointense nodules (Gamna-Gandy bodies) within the spleen are depicted on both of T1 (a) and T2 (b) sequences

MRI also revealed a relatively hyperintense ill-defined area on T2-weighted images, corresponding to the suspected area on CT, which was not enhanced with ferumoxide (Endorem, Guerbet, France) and was consistent with hepatocellular carcinoma; biopsy was recommended.

On sonographic control examination of the spleen, multiple small foci of echogenic nodules which did not show acoustic shadowing were detected. The previous CT examination was reevaluated and multiple, hyperdense, discrete millimetric spots were noticed on non-enhanced CT images (Figure 2).

These lesions were therefore classified as siderotic nodules (Gamna-Gandy bodies) due to portal hypertension.



Figure 2. Non-enhanced CT image reveals discrete, millimetric hyperdense spots in the spleen

DISCUSSION

Gamna-Gandy bodies (siderotic nodules) represent organized foci of hemorrhage in the spleen that is caused by portal hypertension. Portal hypertension leads to splenomegaly with hyperplasia of the cells of the reticulo-endothelial system which cover the sinusoids. Prolonged transit time of the blood and pressure increase disintegration of cells, thus there may be bleeding into the red pulpa with deposition of siderin adjacent to thickened collagen tissue, forming so-called Gamna-Gandy bodies (3). These lesions contain fibrous tissue, hemosiderin and calcium. They are also seen in patients with portal vein or splenic vein thrombosis, hemolytic anemia, leukemia or lymphoma, acquired hemochromatosis, and paroxysmal nocturnal hemoglobinuria, and in those receiving blood transfusions (3, 4).

These nodules are characterized by signal-void on all pulse sequences, both of T1- and T2-weighted images, due to their hemosiderin content. It is well known that increases in iron will lead to decreases in proton relaxation times of the tissues, thus iron-accumulating foci can be easily detected using MRI (4). On MR imaging, the high magnetic susceptibility effect of hemosiderin typically renders the siderotic foci markedly hypointense on T2-weighted images. The gradient echo (GRE) sequence is considered the most sensitive imaging sequence in the detection of hemosiderin (3).

Unenhanced CT may detect Gamna-Gandy bodies as multiple faint high-attenuation spots in the spleen. These spots represent the calcifications in

nodules. If nodules contain sufficient calcium, they should be detected on CT. However, Sagoh *et al.* (1) evaluated 64 patients with portal hypertension, and detected Gamna-Gandy bodies in eight patients by MR. In all eight patients, CT did not detect such spots in the spleen. In our case, the hyperdense spots that represent calcification in the nodules were noticed retrospectively.

The ultrasonographic feature of multiple punctate hyperechoic foci in the spleen in the diagnosis of Gamna-Gandy nodules has been described. Chan *et al.* (5) found the sensitivity of US in the diagnosis of Gamna-Gandy bodies to be 70.6% and the

specificity 78.9%; positive predictive value was reported as 85.7%. The detection of punctate hyperechoic foci on ultrasonogram in the clinical setting of cirrhosis is sufficient for diagnosis of splenic siderosis complicating portal hypertension.

The presence of Gamna-Gandy bodies is one of the signs of portal hypertension. It is important to consider these nodules in the differential diagnosis of portal hypertension and the other diseases mentioned above. MR imaging will contribute to the demonstration of Gamna-Gandy bodies, probably with superiority, when compared with other imaging modalities.

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