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Focal Hepatic Fibrosis Characterized by Ultrasonography, Not Seen on CT and MRI: A Case Report

In Yong Whang, M.D., Bong Joo Kang, M.D., Seung Eun Jung, M.D., Jae Mun Lee, M.D., Ahwon Lee, M.D.*, and Seong Tai Hahn, M.D.

Department of Radiology, *Department of Clinical Pathology,
St. Mary's Hospital, The Catholic University of Korea

= Abstract =

The usefulness of CT and MRI in detection of confluent hepatic fibrosis in patients with chronic liver disease has been documented in several reports [1, 2]. However, to our knowledge, focal fibrotic change that was only detected on ultrasonography and missed by CT and MR imaging has not been reported. Therefore, we report a case of the pathologically proven focal hepatic fibrosis presenting as a hyperechoic mass that was detected only by ultrasonography and missed by CT and MRI.

Index Words : Liver, fibrosis
Liver, CT
Liver, MR

Case Report

A 60-year old female patient, diagnosed as chronic hepatitis C 15 months before, was admitted with abnormal findings on a follow-up ultrasonography. On laboratory examination, the anti hepatitis C antibody was positive, and other indicators showed normal levels including erythrocyte sedimentation rate 22mm/h, aspartate transaminase 39 U/L, alanine transaminase 47 U/L, alkaline phosphatase 225 U/L, and alphafetoprotein 2.66. There was no abnormal mass found on ultrasonography 5 months before hospitalization.

On ultrasonography, a 2 cm-sized well-defined wedge-shaped hyperechoic mass was found on the peripheral surface of the posterior inferior segment of the right hepatic lobe, while mass effect, outer contour bulging, or the displacement of vessel were not shown (Fig. 1A). Neither the signs of underlying cirrhotic liver nor capsular retraction was seen.

On dynamic CT scan showed no definite abnormal mass in the liver (Fig. 1D). Also, on MR imaging, definite mass was not detected on several sequences including in-phase and out-of phase FLASH (fast low angle shot) T1-weighted image, true FISP (Fast Imaging with Steady state precession) images, T2-weighted TSE (turbospinecho) image, HASTE(half-fourier acqusition single-shot turbo spin echo) image and dynamic FLASH T1-weighed image after administration of gadolinium (Fig. 1E). Technetium-99m RBC scan for discriminating hemangioma was normal.

After seven months, a follow-up ultrasonography

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Address for reprints : Seung Eun Jung, M.D., Department of Radiology, St. Mary's Hospital, The Catholic University of Korea
#62 Yeouido-dong Yongdungpo-gu, Seoul 150-713, Korea.
Tel. 82-2-3779-1327 Fax. 82-2-783-5288 E-mail: sejung@catholic.ac.kr

showed that the shape of the hyperechoic mass was changed, therefore, increasing the lobulation on the outer contour, that hyperechoic masses with contour bulging were newly developed along the peripheral surface of the posterior inferior and posterior superior segments, and that a 2.3 cm sized hyperechoic mass was appeared on the GB fossa (Fig. 1B, C).

The lesions were not changed on a follow-up ultra-

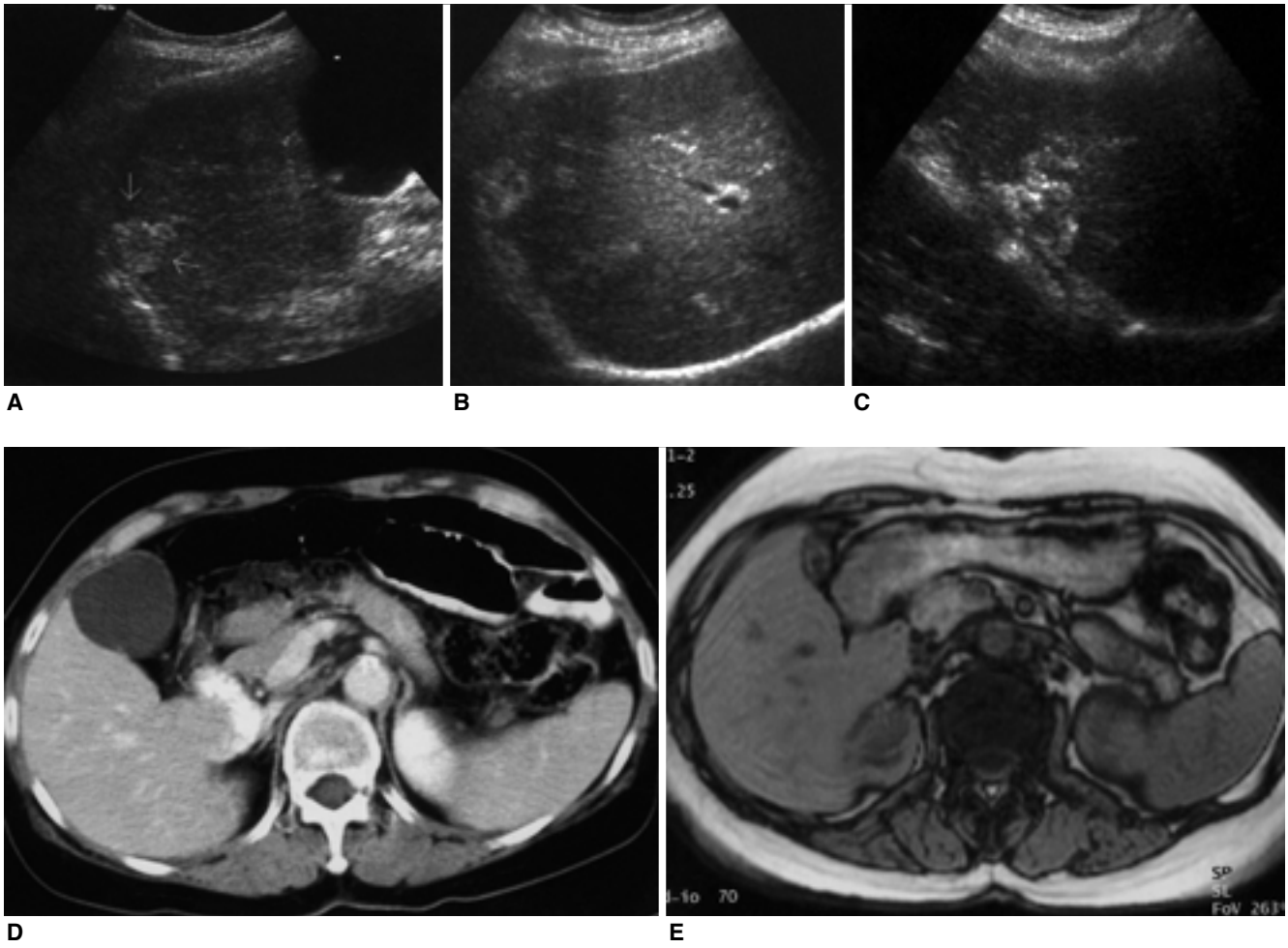

Fig. 1. A 60-year-old woman with routine follow-up of USG for chronic hepatitis C

A. USG of the liver shows well-defined wedge-shaped hyperechoic lesion (arrows) without mass effect, displacement of vessel, or capsular retraction. **B, C.** On follow up ultrasonography after 7 months, previously noted hyperechoic lesion (arrows) is changeable (B) and newly developing multiple hyperechoic mass lesions are seen (C). **D, E.** Areas of focal fibrosis are not seen on CT(D) and MRI(E). **F.** Microscopic findings of the specimen shows chronic hepatitis containing moderate lobular activity (grade 3), moderate porto-periportal activity (grade 3), and septal fibrosis (grade 3) (H & E, ×400).

sonography performed one month later. With a result of the biopsy on the lesions of the posterior inferior segment, the case, was confirmed as chronic hepatitis containing moderate lobular activity (grade 3), moderate porto-periportal activity (grade 3), and septal fibrosis (grade 3) (Fig. 1F) .

Discussion

There are numerous diseases showing focal increased echogenicity on ultrasonography [3].

When a patient with a chronic liver disease shows a new echogenic lesion on follow-up ultrasonogrpahy, hepatocellular carcinoma should be considered.

However, focal fatty infiltration and focal fibrosis serve as the most common and important lesions showing hyperechogenicity on ultrasonography performed on a patient with chronic liver disease [4]. Therefore, many researches have been performed in order to discriminate hepatocellular carcinoma from other lesions.

Fibrosis shows hyperechogenicity on ultrasonography because of its collagen content which is 4 to 7 times denser than that of normal liver parenchyma and the strands of inner fine fibers [4]. Ultrasonographic findings of confluent hepatic fibrosis are similar to those of hepatocellular carcinoma. Some of the researches dealt with the image findings of confluent hepatic fibrosis and they have established the usefulness of CT and MRI for diagnosis of confluent fibrosis [1, 2]. The most common finding of confluent hepatic fibrosis found on non-contrast enhanced CT scan is a wedge-shaped area with lower attenuation than that of adjacent liver parenchyma, extends from the porta hepatis to the hepatic periphery. The area is usually located in the anterior segment of the right lobe or the medial segment of the left lobe, and accompanies the retraction of surrounded liver capsule in fibrotic area; while rarely followed by bulging contour or calcification or the dilatation of intrahepatic biliary duct. On contrast-enhnaced CT scan, isoattenuation or slightly lower attenuation is observed, and, although infrequently, totally lobal or segmentally involved lesions are reported [1]. On MR imaging, confluent fibrosis records lower signal intensity than adjacent liver parenchyma on T1-weighted images, higher signal intensity on T2-weighted image, and delayed enhancement on T1-weighted image after administration of the gadolinium. Because those signal intensities are not specific to fibrosis, their distinctive locations and shapes serve to the accuracy of diagnosis [2].

In our case, the focal fibrosis is hyperechoic, wedge shaped and peripherally located. The lesions could not be detected on CT and MR imaging.

Focal fatty infiltrations are another common echogenic lesions. According to Suzuki et al, the attenuation of ultrasonographic waves is increased by rather fatty infiltration than fibrosis because fatty infiltration contains less water than fibrosis. On ultrasonography, fatty infiltration showed angulated, geometric margins and interdigitating margins with slender fingers between normal liver and fatty tissue [5]. On MR imaging, if fat content is high enough to alter signal intensity, the signal intensity of this area is hyperintense on T1-weighted and T2-weighted images. The most sensitive MR method to detect intracellular fat deposition in hepatocytes is the use of an out-of phase gradient-echo pulse sequence [2]. The GRE out-of phase imaging technique uses the destructive interference of opposing signal intensity from lipid and water protons, most prominent in a voxel containing neither pure fat nor pure water. Therefore, focal fatty infiltrations are shown signal loss on out-of phase GRE image. We might rule out the possibility of fatty infiltration not only because there were no such specific findings on ultrasonographic examination but also because there were no abnormal findings in MR imaging.

In this study on the patient with chronic liver disease, the possibility of focal hepatic fibrosis or fatty infiltration was primarily considered because the lesion shows hyperechogenisity on ultrasonography, no mass effect or bulging, no vessel displacement and peripheral location. However, malignancy was suspected because of no typical findings of fibrosis or fatty infiltrations on CT and MR imaging and the changes found on serial ultrasonographic examinations. Therefore, biopsy was performed, confirming the case as a prominent focal fibrosis.

This study suggests that ultrasonography can be more useful than CT or MR imaging to characterize benign fibrotic tissue, occasionally. If a patient with chronic liver parenchymal disease shows rapid changes without abnormal findings in other images, focal fibrosis can be suspected. Also, the disease showing increased echogenicity on ultrasonography contains the possibility

to be confirmed as focal hepatic fibrosis.

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=초록=

CT와 MRI에서 보이지 않은 국소 간 섬유화의 초음파 소견: 1예 보고

가톨릭의과대학 성모병원 진단방사선과, 임상병리과*

황인용 · 강봉주 · 정승은 · 이재문 · 이아원* · 한성태

만성 간 질환 환자에서 간 섬유화의 발견에 있어 CT와 MRI의 유용성은 여러 논문을 통해 알려져 있으나, CT와 MRI상 이상소견을 보이지 않으며 초음파 소견상으로만 이상소견을 보인 융합성 간 섬유화의 보고가 없다 [1, 2]. 저자들은 MRI와 CT에서는 이상 소견이 없었으나 초음파 검사에서만 고에코의 종괴로 발견되었고 조직 검사상 섬유화로 확인된 증례를 경험하였기에 보고한다.