A Case of Colorectal Liver Metastasis with Central Scar Mimicking Focal Nodular Hyperplasia

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ABSTRACT

The authors report a case of colorectal liver metastasis which is one of the uncommon causes of liver tumor with central scar in a young female. Our patient presented with right upper abdominal discomfort and palpable liver mass for about 2 months. She did not have underlying disease. She had used oral contraceptive pills for 14 years. Physical examination revealed only liver span 16 centimeters (cm). Multidetector-row computed tomography demonstrated 3 masses and the largest one measured 10.7x 8.3x 7 cm in diameter with lobulated contour, hypodensity enhancing pattern, and a central scar at segment II and IVa of liver. Magnetic resonance imaging (MRI) of the largest mass showed hyposignal intensity on T1-weighted and slightly hypersignal intensity in T2-weighted MRI. This mass also had a large central scar which was hyposignal intensity on T1-weighted and hypersignal intensity in T2-weighted MRI. Liver biopsy showed scattered infiltration of atypical epithelium with glandular formation. Immunohistochemical analysis was compatible with colorectal cancer. Colonoscopy was performed and revealed large mass at distal part of sigmoid colon. The patient was scheduled to undergo surgical operation and receive chemotherapy. To our knowledge, colorectal metastasis of liver should be considered as a cause of liver tumor with central scar.

Keywords: Colorectal liver metastasis; central scar; focal nodular hyperplasia (Siriraj Med J 2017;69: 151-155)

INTRODUCTION

A liver tumor with central scar is uncommon, but it is useful characteristic for diagnosing many types of neoplasm. Although the central scar is first described and well known in focal nodular hyperplasia (FNH), other types of tumor also have the scar such as hepatocellular carcinoma (especially fibrolamellar subtype), large hemangioma, peripheral type cholangiocarcinoma and metastatic tumor.[1] Radiologic features from computed tomography (CT) scan or magnetic resonance imaging (MRI) can help clinicians to diagnose and classify types of tumor. However, pathological diagnosis from liver biopsy is essential in some inconclusive cases.

CASE REPORT

A 41-year-old woman, who had no underlying disease, was referred to HRH Princess Maha Chakri Sirindhorn Medical Center (MSMC) due to a detection of large liver masses. The patient reported a history of right upper abdominal discomfort and palpable mass about 2 months earlier. She denied other gastrointestinal symptoms (such as hematochezia and bowel habit change), fever, anorexia and weight loss. Her family had no history of malignancy and liver disease. Current medication was oral contraceptive pills which had been used for 14 years. On admission, she had no sign of chronic liver stigmata. Her liver span was 16 centimeters (cm)

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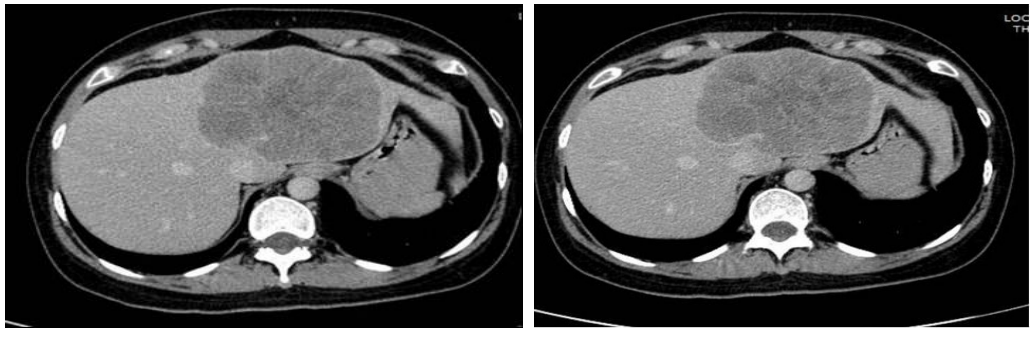
showing hard consistency. Other physical examinations were unremarkable. Laboratory test showed hemoglobin 11.4 g/dL, a leukocyte count of 8,300/ mm^3, a platelet count 301,000/ mm^3, albumin 4.4 g/dL, total bilirubin 0.52 mg/dL, serum aspartate transaminase 58 IU/L, serum alanine transminase 27 IU/L, serum alkaline phosphatase 78 IU/L, and prothrombin time 12.4 seconds. The patient was negative for hepatitis B surface antigen, hepatitis B core antibody, and hepatitis C antibody. Serum α-fetoprotien (AFP) was 4.33 IU/ml (normal range, 0-5.8 IU/ml). Serum carcinoembryonic antigen (CEA) was 445.4 ng/ml (normal range, 0-3.4 ng/ml for non-smoking patient). Multidetector-row computed tomography (CT) scan Fig 1 demonstrated a lobulated contour hypodensity enhancing mass with central scar which measured 10.7x8.3x7 cm in diameter located in left liver lobe (segment II and IVa), an ill-defined irregular hypodensity mass which measured 5.6x4.3x5.8 cm in segment IVb and an inhomogeneous hypodensity mass, with size 4.3x4.7x4.9 cm at the inferior tip of right lobe liver. There was neither intrahepatic bile duct dilatation nor invasion of portal vein seen in this CT study. Magnetic resonance imaging (MRI) as Fig 2 confirmed three large masses as described in the CT-scan. These masses



1A 1B

Fig 1. CT scan with contrast showed a lobulated hypodensity enhancing mass with central scar measured 10.7x8.3x7 cm occupied in segment II and IVa.

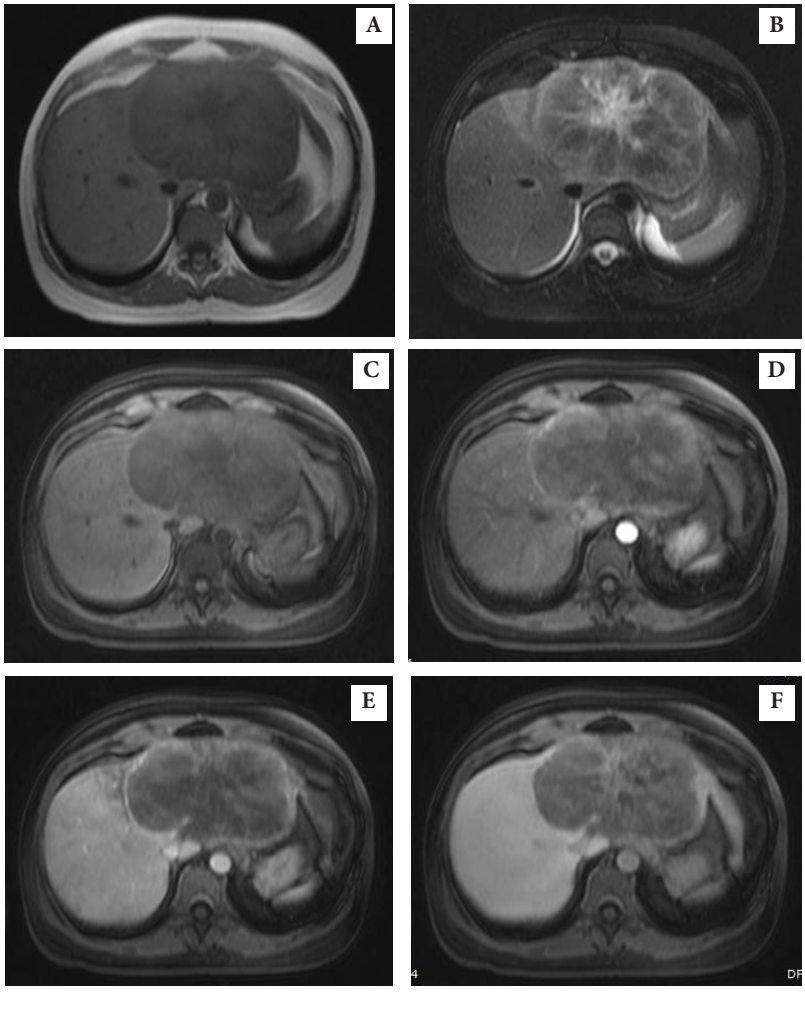


Fig 2. (A) T1-weighted gradient echo image and (B) T2-weighted fat saturation image show a large lobulated mass at almost entire left hepatic lobe. This mass has hyposignal intensity on both T1W and T2W images. Notice the central scar which has slightly hypointense signal intensity on T1W and hyperintense signal intensity on T2W. On dynamic contrast study (C)-(F), this mass shows irregular enhancement on the arterial (D) and equilibrium phase (E). No enhancement of the central scar is noted. No uptake of hepatocyte specific contrast agent is demonstrated on delayed phase (F).

showed hyposignal intensity on T1-weighted MRI and slightly hypersignal intensity on T2-weighted MRI. All masses showed arterial enhancement, contrast wash out in the portovenous phase while there was no uptake of the hepatocyte-specific contrast agent (Primovist®) in the hepatobiliary phase. The largest tumor also had a large central scar which was hyposignal intensity in T1-weighted, hypersignal intensity in T2-weighted and partial enhancement in delayed phase of MRI. The differential diagnosis of these liver masses included focal nudular hyperplasia (FNH), fibrolamellar type of hepatocellular carcinoma (HCC) and metastasis from other tumors. Many radiological characteristics from MRI in this patient were not compatible with the typical pattern of FNH. First, the tumors were not iso-signal intensity in both T1 and T2-weighted phase. Secondly, they were not isosignal or hypersignal intensity in portovenous and delayed phase. Finally, they did not show uptake of the hepatocyte-specific contrast agent (Primovist®). We could not exclude the possibility of hepatocellular carcinoma (HCC) or metastasis from other tumors, therefore the liver biopsy was scheduled. Microscopic appearance of the tumor showed scattered infiltration of atypical epithelium with glandular formation in fibrous stroma and liver tissue. Immunohistochemistry analysis revealed positive CDX-2, TTF-1, and focal CD20 activities. Moreover, the specimens showed negative activity of CK-7, ER and PR. Overall, the findings suggested colorectal cancer as a primary site. Colonoscopy was performed and revealed a large hemicircumferential mass at the distal part of sigmoid colon, approximately 15-20 cm from the anal verge. Colonic biopsies were done which confirmed moderately differentiated adenocarcinoma. Ultimately, this patient was scheduled to undergo surgical operation and subsequent adjuvant chemotherapy.

DISCUSSION

A liver mass with central or eccentric scar is relatively an uncommon radiologic finding, but a useful feature for making diagnosis in many types of hepatic tumor. A central scar was first described in the focal nodular hyperplasia (FNH).[2] However, other liver masses may contain a central scar such as fibrolamellar HCC, and large hemangioma. Moreover, the central scar can be found in rare conditions, for example, conventional nonfibrolamellar HCC, peripheral type cholangiocarcinoma and some hepatic metastasis.[1] Characteristics of the central scar; including size, enhancing pattern, and associated findings, are essential for the specific diagnosis of liver mass.[3] FNH is one of the common benign liver tumors which occurs in relatively young female patients.[4] In CT-scan imaging, a typical FNH has lobulated contour, hyperenhancement of liver on the arterial phase, and isoenhancement of liver on delayed phase.[5,6] The scar is observed in 50% of FNH cases.[5] The typical FNH is iso- or hyposignal intensity on T1-weighted MRI and iso- or slightly hypersignal intensity on T2-weighted images while its central scar shows hyposignal intensity on T1-weighted images and hypersignal intensity on T2-weighted images.[7-9] After administration of gadolinium agent, the enhancement pattern is similar to one observed in the contrast-enhanced CT.[6,10] Distinguishing between FNH and other tumors such as fibrolamellar HCC or metastasis is important because the others require aggressive surgical resection. Many typical features of FNH can be found and diagnosed from CT-scan or MRI. First, the tumor lacks its capsule which often demonstrates in lobulated contour. Second, the lesion is homogeneous and slightly different from the adjacent liver on pre-contrast as well as strong enhancement on arterial phase. Third, a central scar of FNH is hypointense on T1-weighted images, strongly hyperintense on T2-weighted images and becoming hyperintense on delayed phase. Finally, most FNH are isointense- or hyperintense on hepatobiliary phase with hepatocyte-specific contrast agent injection. Following hepatocyte-specific contrast agent administration, the sensitivity for diagnosis of FNH is increased up to 90%.[11,12] A central scar is observed in fibrolamellar HCC in 20%-71% of cases and often larger than central scar in the FNH.[13-15] The scar is relatively hypodensity when compared to the tumor on both unenhanced and arterial phase CT imaging. On MRI, the central scar is typically seen as low signal intensity on both T1- and T2- weighted images with heterogeneous enhancement on the contrast-enhanced images.[16] In contrast to FNH, calcifications are very common in fibrolamellar HCC and are always located in the central scar.[14-16] In our case, this patient presented with large liver masses with central scar and the largest tumor had multiple atypical features, unlikely for a diagnosis of FNH, so tissue biopsy was required for a definite diagnosis. A pathological report from the liver tissue showed a metastatic adenocarcinoma, which favored colorectal site which was confirmed by immunohistochemical analysis. Colorectal liver metastasis (CLM) is an uncommon cause of liver mass with central or eccentric scar. This scar is caused by both necrosis and fibrosis. Necrosis is often spontaneously visualized in CLM. Fibrosis mainly occurs as a response to chemotherapy[17], but may be seen in an untreated tumor, especially when the tumor size is more than 3 cm.[18] A typical imaging finding in CLM is moderate hypersignal intensity on T2-weighted

images. Necrosis is usually seen as high signal intensity on the T2-weighted MRI and it does not enhance on the delayed phase sequence, while fibrosis leads to an uncommon cauliflower-like appearance with scalloped margins and central enhancement.[18] The comparison of MRI characteristics in FNH, fibrolamellar HCC and CLM is described in Table 1.[11,12,18]

In conclusion, we have demonstrated a rare case of colorectal liver metastasis which presented with multiple liver masses and a central scar in the largest mass. Many radiological features of the mass with scar from MRI resembled both focal nodular hyperplasia and fibrolamellar hepatocellular carcinoma. Tissue pathology should be considered for the definite diagnosis in suspected benign tumor with atypical pattern such as large tumor size, multiple lesion, tumoral calcification and abnormal enhanced pattern of both tumor and scar in the MRI images.

TABLE 1. Comparison of radiologic features of focal nodular hyperplasia, fibrolamellar HCC and colorectal liver metastasis (adapted from reference 11, 12 and 18).

Type of tumor	Findings from MRI study
Focal nodular hyperplasia	- Iso-SI in T1 and T2-weighted phase - Enhancement in arterial phase - Iso-or hyper-SI in portovenous and delayed phase - Uptake with HSCA - Central scar : hyper-SI in T2-weighted and enhanced in delayed phase
Fibrolamellar HCC	- Iso-or hypo-SI in T1 and T2-weighted phase - Heterogenous enhancement in arterial, portovenous and delayed phase - Not uptake with HSCA - Central scar: Iso-SI or hypo-SI in T1 and T2-weighted phase Note: calcification also seen
Colorectal liver metastasis	- Hypo-SI in T1-weighted, hyper-SI in T2-weighted phase - Enhancement in arterial phase and washout in portovenous and delayed phase - Not uptake with HSCA - Central scar : hyper-SI in T2-weighted phase Note: Scalloped margin of tumor or cauliflower-like especially in tumor diameter more than 3 cm

Note: The table includes only common signal intensity and radiographic pattern.
Abbreviations: SI = signal intensity, HSCA = hepatocyte-specific contrast agent (Primovist®)

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