

LETTER / *Gastrointestinal imaging*

Hepatic metastases from gastric hepatoid adenocarcinoma: An unusual cause of capsular retraction of the liver



Keywords Liver capsule retraction; Gastric hepatoid adenocarcinoma; Hepatic metastases; MR imaging; Malignant liver tumor

Dear Editor,

Hepatoid adenocarcinoma is a rare tumor that predominantly originates from the stomach [1]. This tumor conveys a poor prognosis because of a late diagnosis at an advanced stage [1]. On imaging, the majority of hepatoid adenocarcinomas present with liver metastases that display patterns similar to those of multifocal hepatocellular carcinoma or other hypervascular metastases [2]. To our knowledge, the magnetic resonance (MR) imaging features of this tumor

have not been reported previously. In addition, capsular retraction due to liver metastases from hepatoid adenocarcinoma has not been reported yet. We report herein the MR imaging presentation of a case of hepatoid adenocarcinoma of the stomach that presented with liver metastases responsible for retraction of adjacent liver capsule.

A 60-year-old woman with prior history of infiltrating ductal breast carcinoma was referred to the emergency department for abdominal pain and worsening of the general clinical status. Physical examination revealed an enlarged painful liver. The results of initial routine blood tests were within the normal range. Computed tomography (CT) and MR imaging showed hemicircumferential thickening of the cardia along with enlarged paracardial and periportal lymph nodes. Multiple, heterogeneous, nodular hepatic lesions were present in the right and left liver (Figs. 1 and 2). They had a predominantly peripheral location and some of them were associated with retraction of the adjacent liver capsule (Fig. 3). On CT, hepatic lesions showed a peripheral rim of enhancement during the arterial phase

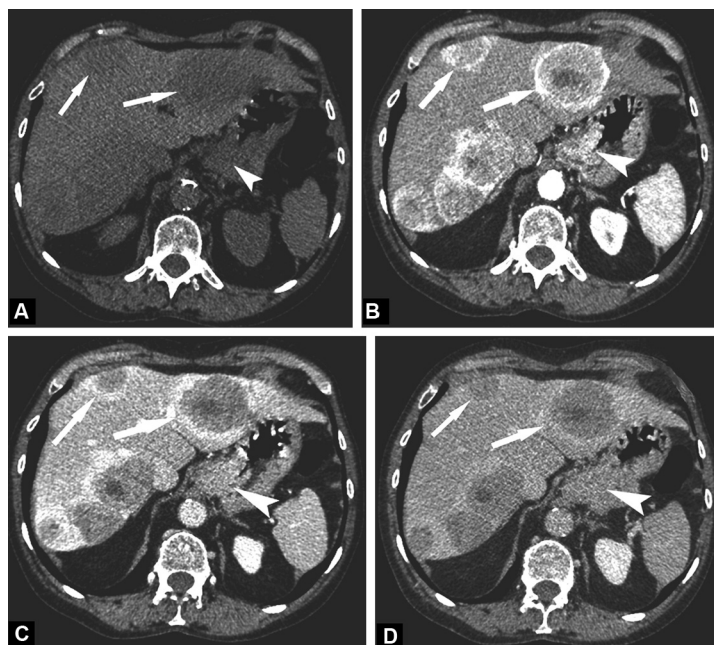


Figure 1. Computed tomography (CT) images of the abdomen in the transverse plane shows multiple liver lesions and asymmetric cardiac thickening. A. Before intravenous administration of iodinated contrast material CT shows hypoattenuating areas (arrows) and asymmetric thickening of the cardia (arrowhead). B. During the arterial phase (40 s) following administration of iodinated contrast material CT shows peripheral rim of enhancement of the liver lesions (arrows) and hyperenhancement of the cardiac thickening (arrowhead). C. During the portal phase (70 s), a decreased enhancement of the liver lesions (arrows) and cardiac thickening (arrowhead) is observed, with persisting peripheral rim of enhancement of the liver lesions. D. On the late phase (3 min), a wash-out phenomenon is observed within the liver lesions (arrows). The cardiac thickening becomes isoattenuating to the adjacent gastric wall (arrowhead).

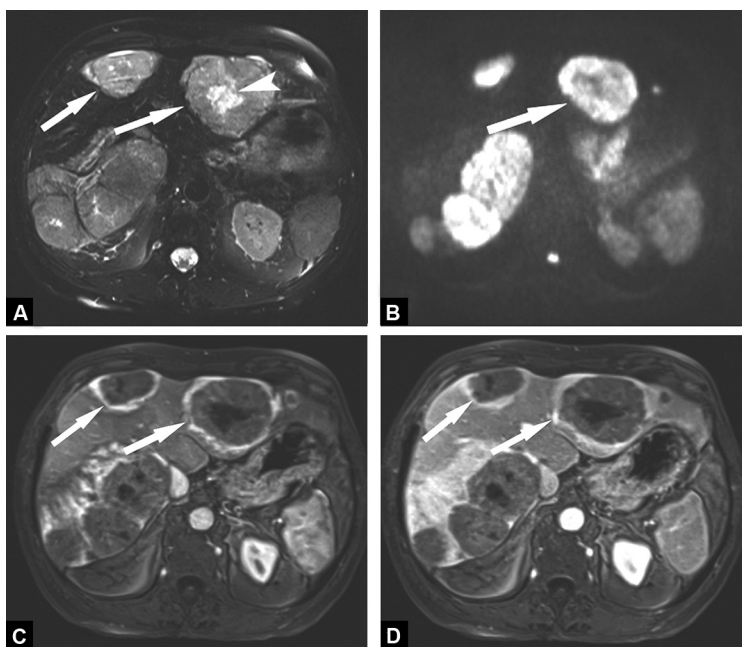


Figure 2. Magnetic resonance (MR) imaging examination of the liver in the transverse plane. A. T2-weighted fat suppressed fast spin echo MR image (TR/TE = 2913/91 ms) shows multiple, heterogeneous, hyperintense liver lesions (arrows) with a more intense central portion (arrowhead) for some of them. B. Diffusion-weighted MR image (echo planar imaging, TR/TE = 6100/105 ms, $b = 800 \text{ s/mm}^2$) shows multiple hyperintense liver lesions, indicating restricted diffusion. Some of them have a more marked hyperintense center displaying the target sign (arrow). C. Three-dimensional T1-weighted VIBE MR image (TR/TE/ $\alpha = 4.17/1.67 \text{ ms}/15^\circ$) obtained during the arterial phase following intravenous administration of a gadolinium chelate (Gadoterate meglumine, Dotarem[®]; Guerbet, Roissy-Charles de Gaulle, France) shows multiple liver lesions with a peripheral rim of enhancement (arrows). D. Three-dimensional T1-weighted VIBE MR image (TR/TE/ $\alpha = 4.17/1.67 \text{ ms}/15^\circ$) obtained during the portal phase of enhancement shows persisting peripheral rim of enhancement (arrows).

after intravenous administration of iodinated contrast material that persisted during the portal and late phases. The largest hepatic lesions contained a hypoattenuating center. On MR imaging, some hepatic lesions exhibited a central hyperintensity on T2-weighted images, displaying the target sign (Fig. 2). All lesions were hyperintense on diffusion-weighted MR images obtained with a high b value ($b = 0, 200$ and $800 \text{ mm}^2/\text{s}$). Apparent diffusion coefficient (ADC) measurement showed an ADC value of 725 s/mm^2 for the solid component of liver metastases. MR imaging showed hyperintense cardiac thickening on both T2- and diffusion-weighted MR images. The gastric lesion had an ADC value of 737 s/mm^2 . After intravenous administration of a gadolinium chelate (Gadoterate meglumine, Dotarem[®]; Guerbet, Roissy-Charles de Gaulle, France), the liver lesions showed a peripheral rim of enhancement on dynamic, T1-weighted three-dimensional VIBE MR images (Fig. 2). Upper endoscopy confirmed the presence of a gastric tumor involving the cardia and the lower esophagus. The α -fetoprotein serum level was $30,000 \text{ ng/mL}$ whereas the carcinoembryonic antigen (CA) 15.3 serum level was normal. Histologically, the gastric mucosa was involved by an undifferentiated adenocarcinoma carcinoma (Fig. 4). Immunohistochemically, the tumor cells were positive for α glypican 3 and glutamine synthetase, with strong positive staining for KL1. Tumor cells presented low positive staining reaction to CK20 and CK5/6 ($< 5\%$). The search for CK7, synaptophysine, p63 and estrogen receptors was negative.

Hepatoid adenocarcinoma is a rare tumor with an incidence of $0.17\text{--}1\%$ [3]. There is a male predominance and

the mean age of the patients is 64 years [4]. Seventy-five percents of patients have hepatic metastases at the time of diagnosis [1,3]. The median survival rate is 9 months for patients with metastatic disease [4]. As in our patient, elevated α -fetoprotein level is a characteristic finding but the definite diagnosis is made histopathologically and immunohistochemically [1,3,4]. To our knowledge, the presence of retraction of the liver capsule adjacent to metastases from hepatoid adenocarcinoma has never been reported so far. On contrast-enhanced imaging, hepatoid adenocarcinoma is typically hypervascular with a marked peripheral rim of enhancement during the arterial phase and a wash-out phenomenon during the portal or late phase, resembling multifocal HCC [2]. Internal areas of hemorrhage and necrosis are often present [2]. Of note, in our patient, the liver did not show findings suggestive for underlying chronic diffuse liver disease. In addition, hepatic metastases from breast carcinoma were less likely because of a normal CA 15.3 serum level . Retraction of the liver capsule adjacent to hepatic tumor has been reported in a variety of primary malignant (intrahepatic cholangiocarcinoma, epithelioid hemangioendothelioma) and secondary hepatic tumors (neuroendocrine tumors) [5–8]. This finding can also be observed in untreated liver metastases from breast cancer that may result in lobulated contours and morphologic changes of the liver, displaying the so-called “hepar lobatum” pattern [9]. Hepatic angiosarcoma can also present as multifocal macronodular infiltration with heterogeneous enhancement [10]. Rarely, retraction of the liver capsule can be observed in sclerosing cavernous hemangioma and

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