diagnosed as having celiac disease because of symptoms other than diarrhea or iron deficiency [2]. In light of this information it is important to consider celiac disease in patients with atypical symptoms. In the 1960s and 1970s, when small bowel barium meals were routinely used to evaluate patients with celiac disease, intussusception was reported in up to 20% of cases [3]. Outside the radiologic field, however, there is a lack of awareness of this association. Only a few case reports have been published, most of them in the pediatric literature. In adults, in 70–90% of cases, intussusception is secondary to an identifiable lead point such as a polyp, metastatic deposit, or Meckel’s diverticulum [1]. Although adult intussusception at presentation can be acute, it is usually subacute or chronic. A longer mean duration of symptoms has been reported in benign lesions than in malignant lesions and in enteric compared to colonic lesions [1]. Gastrointestinal dysmotility and intestinal wall abnormalities such as edematous thickening probably cause the intussusception in untreated patients with celiac disease [4]. In adults with untreated celiac disease, muscular hypotonia and fecalidity of the small bowel may explain the non-obstructive nature of the intussusception. Adult intussusception is usually treated with surgery. Most authors agree that laparotomy is necessary, based on the likelihood of identifying a pathologic lesion. In our patient the intussusception resolved after 3–4 months of a gluten-free diet, which partly reversed the dysmotility and hypotonia of her small intestine. Our patient's liver test abnormalities also resolved after 4 months of this diet. Bardella et al. [5] recently reported that about 40% of celiac patients have hypertransaminasemia at diagnosis. The same group reported a prevalence of 9.3% of occult celiac disease in patients with unexplained hypertransaminasemia, which resolved with a gluten-free diet.

In conclusion, celiac disease should be strongly suspected when intussusception is diagnosed in an adult in the absence of an overt lead point, especially when the presentation is chronic or subacute. When celiac disease is suspected and the signs and symptoms do not indicate a life-threatening situation, conservative management should be undertaken and further investigation carried out before any surgery is planned.

References

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Perihepatic Lesions Mimicking Primary Liver Tumors

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Key words: perihepatic tumor, magnetic resonance imaging, computed tomography

With the increasing use of ultrasonography for evaluation of vague abdominal pain, “incidental” hepatic lesions are more often encountered. Although computed tomography arterial portography is most commonly used and is highly sensitive to assess liver tumors before resection [1], it is not always helpful to distinguish extrahepatic lesions from primary liver tumors, especially when the tumor is hypovascular. Here we describe three patients in whom perihepatic masses were initially misdiagnosed as primary hepatic lesions due to misinterpretation of the preoperative imaging studies.

Patient Descriptions

Patient 1
A 66 year old woman was referred for resection of a “liver mass” found incidentally on ultrasonography 5 years prior to her referral. This mass had not changed in size during the follow-up period and was considered to be a benign liver tumor. Because of its location in proximity to the hilar structures, biopsy was not performed. Indications for surgery included the recent onset of symptoms, including weight loss and fatigue associated with anemia (6.2 g/dl hemoglobin) and elevated serum liver enzymes (alkaline phosphatase 445 IU/L, gamma-glutamyl transpeptidase 235 IU/L) and serum bilirubin (2.8 mg/dl). Serologic tests for hepatic viruses and tumor markers

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(alpha-fetoprotein, CA 19-9 and carcinoembryonic antigen) were negative. CT scan and MRI showed a large (5 x 6 x 6 cm) caudate lobe mass encasing the vena cava and compressing the hilar structures. At surgery, the mass was found to be a large aggregation of lymph nodes at the hepatoduodenal ligament extending posteriorly to enwrap the vena cava. The mass was removed and histologic examination revealed a malignant B cell lymphoma composed of diffuse anaplastic large cells within lymph node hyperplasia.

**Patient 2**

A 62 year old man was admitted to the hospital with anemia (9.8 g/dl hemoglobin) associated with weight loss and upper abdominal discomfort. The patient was aware of a “benign” liver mass that had been present for at least 3 years. On physical examination, a large irregular mass below the sternum could be palpated. Laboratory studies, including serum liver enzymes and αFP levels, were normal. CT with contrast (Figure) and MRI demonstrated a large vascular liver mass at the left lateral segment compressing the stomach at the lesser curvature. Core needle biopsy of the tumor showed histologic features consistent with epithelioid hemangioendothelioma. At operation the mass was found to originate from the gastric wall at the lesser curvature. The tumor compressed the adjacent liver, and the left lateral segment seemed atrophic. A subtotal gastrectomy was performed, and histologic studies revealed a malignant gastric stromal tumor in the submucosa invading the muscularis mucosa. Immunohistochemical stainings were positive for α-1 actin and negative for s-100, neuron-specific enolase, synaptophysin and chromogranin.

**Patient 3**

A 6 year old girl presented with a huge abdominal mass. Imaging studies, including ultrasonography and CT, suggested a mass involving most of the right lobe of the liver, with multiple small nodules studding the hepatic parenchyma. Serum αFP levels were markedly elevated (276,000 ng/ml), and open biopsy findings were consistent with a germ cell tumor. Combination chemotherapy was instituted, with a marked drop in αFP serum levels (63 ng/ml). On repeated CT and MRI studies, the tumor seemed to have shrunken and was confined to the right lobe of the liver.

At operation, the tumor was a large (10 x 8 x 7 cm) retroperitoneal germ cell tumor that compressed the vena cava. The right lobe of the liver appeared smaller in size than the left lobe. The tumor was completely resected and the child made an uneventful recovery.

**Comment**

Perihepatic tissue at the porta hepatis or the portocaval space may be the origin of lymphatic tumors. Because of their location and enhancing characteristics on dynamic CT, these hypervascular lesions may be difficult to differentiate from benign liver tumors such as focal nodular hyperplasia and hepatocellular adenoma. In its benign form, Castleman disease, a localized lymph node hyperplasia with marked capillary proliferation, has been reported to mimic liver tumor (2). In its first case, the perihepatic mass was similar to masses seen with Castleman disease. Unlike the benign condition in the localized form of Castleman disease, in our case the histology from the enlarged lymph node revealed a B cell lymphoma. The 5 year history of a persistent mass may suggest transformation of a benign lymph node hyperplasia into malignant lymphoma.

Extrahepatic lesions may originate from different structures surrounding the liver, including muscle, nerve, lymphatic, fat or vascular tissue. Adrenal and gastric tumors may also simulate primary liver lesions. In our second patient, the gastric origin of the tumor was clear during exploration, while preoperative radiology studies and histologic findings of the biopsy were misleading. Gastric stromal tumors are unusual malignancies characterized by poorly differentiated cells showing features of either smooth muscle or neural elements (3). Diagnosis is established by findings of cytoplasmic neural processes and dense core secretory granules by electron microscopy and positive neuron-specific enolase, synaptophysin, and chromogranin A by immunohistochemistry (3).

Extraglandular germ cell tumors are found in the retroperitoneum and, like hepatoblastomas, are frequently associated with elevated serum αFP level. On CT, these tumors are large, lobulated and of mixed density. Fat plane obliteration against adjacent structures is frequent, and both the aorta and the vena cava can be embedded within the tumor. Although rare, germ cell tumors can be found within the liver (4). In our third patient, despite the distinct histologic characteristics of the tumor, we could not precisely define its origin by imaging techniques. Despite our uncertainty regarding the origin of the tumor, we employed currently recommended chemotherapy protocol for stage VI germ cell tumor and continued with resection after reduction of tumor mass.

Interestingly, in two of our three cases we noted atrophy of the adjacent liver segments. The left lobe in one case and the right lobe in the other were compressed but not invaded by the tumor and were much smaller than their expected volume. We speculated that compression of the liver was associated with a reduction of portal inflow, leading to hepatic atrophy, as described in experimental model of Eck fistula (5).

In summary, extrahepatic tumors may
mimic primary hepatic lesions. Care must be taken when interpreting CT and MRI studies, with much attention paid to the tumor/normal liver tissue transition zone. Recognition of specific characteristics of these rare tumors on CT and MRI is important to establish the correct diagnosis preoperatively. Newly developed magnetic resonance technologies such as use of liver-specific MRI contrast agents and methods for increasing the speed and improving the resolution of three-dimensional acquisition are promising.

References

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**Liver Abscesses Caused by *Streptococcus milleri*: An Uncommon Presenting Sign of Silent Colonic Cancer**

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**Key words**: liver abscess, *Streptococcus milleri*, colon cancer

Colorectal cancer is one of the most prevalent cancers. Common presenting symptoms are well known, but it is less commonly recognized that unusual infections may herald the presence of such cancer. We describe a patient in whom colon cancer presented clinically with liver abscesses, without evidence of liver metastases. Effective management of pyogenic liver abscesses requires identification and treatment of the underlying cause in addition to elimination of the abscesses.

**Patient Description**

A 64 year old man was admitted to the hospital suffering from right upper abdominal pain, high fever and chills lasting for 2 days. His medical history was unremarkable. The patient did not report altered bowel habits, loss of weight or loss of appetite. Physical examination revealed pallor, a temperature of 38.4°C, enlarged liver, and severe tenderness of the epigastrium and the right upper abdomen, without peritonitis. Significant laboratory data included: hemoglobin of 9.6 g/dl, white blood cell count 13,060, aspartate aminotransferase 222 IU/L, alanine aminotransferase 270 IU/L, alkaline phosphatase 358 IU/L, gamma-glutamyltranspeptidase 245 IU/L, lactate dehydrogenase 891 IU/L, total bilirubin 26 m mol/L, alpha-fetoprotein 1.6 ng/ml, and carcinoembryonic antigen level 1.3 ng/ml. Chest X-ray revealed an elevated right diaphragm. Abdominal ultrasound demonstrated a round non-homogeneous lesion 4 x 5 cm in size located in the right lobe of the liver.

The patient was treated with broad-spectrum antimicrobial treatment but the pyrexia persisted. Computed tomography demonstrated bilateral pleural effusion accompanied by partial atelectasis of the lower lobe of the right lung, two large lobular septated lesions located in the right lobe of the liver, and a space occupying lesion in the cecum (Figure). Blood cultures were positive for *Streptococcus milleri*. Echocardiography revealed no vegetations.

CT-guided percutaneous drainage of the liver abscesses yielded frank pus, and catheters were left in the cavities for drainage. *S. milleri* was cultured from the aspirate and pathologic examination revealed no malignant cells. Following drainage and an appropriate antibiotic regimen, the patient's clinical condition and laboratory tests improved dramatically. On the sixth day of hospitalization a colonoscopy was performed, demonstrating a 30 mm polypoid tumor in the proximal ascending colon. Biopsies were positive for adenocarcinoma. Twelve days later the patient underwent right hemicolectomy. Operative findings demonstrated a large inflammatory cecal mass involving the appendix and the terminal ileum. No additional hepatic lesions were found. Histologic examination of the surgical specimen revealed moderately differentiated adenocarcinoma of the colon involving all layers of the intestinal wall without involvement of lymph nodes. The postoperative course was uneventful. CT done 6 months later demonstrated almost complete resolution of the hepatic lesions.

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