Congenital Absence of the Gallbladder: Another Cause of False-Positive Hepatobiliary Image

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Hepatobiliary imaging with the various technetium-labeled IDA compounds is more than 90% sensitive and specific for the diagnosis of acute cholecystitis. Causes of false-positive studies include chronic cholecystitis, cystic-duct obstruction by tumor, prolonged fasting, the nonfasting state, pancreatitis, alcoholism, parenteral hyperalimentation, and severe intercurrent illness. A case of congenital absence of the gallbladder is submitted as another cause of a false-positive scan.

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Radionuclide imaging of the hepatobiliary system has become very useful in the evaluation of biliary-tract disorders since 1975, when the various technetium-labeled IDA compounds were introduced to replace I-131 rose bengal (*1*). The low-energy gamma radiation of Tc-99m has made possible efficient imaging with high spatial resolution with agents such as di-isopropyl-IDA, which maintains the physical characteristics of an ideal hepatobiliary agent, including efficient hepatocellular extraction and low renal clearance (*2*).

Nonvisualization of the gallbladder is the typical finding in acute cholecystitis and Tc-99m-labeled agents are felt to be more than 90% sensitive and specific for this condition (*3*). False-positive studies have been documented in various states, including chronic cholecystitis, cystic-duct obstruction by tumor, prolonged fasting, the nonfasting state, pancreatitis, alcoholism, parenteral hyperalimentation, and severe intercurrent illness (*4–10*).

We present a case with proven congenital absence of the gallbladder as another cause of false-positive hepatobiliary imaging.

CASE REPORT

A 69-yr-old male patient was examined at the Veterans Administration Medical Center on June 1, 1982 complaining of vague abdominal pain with epigastric burning, worsened by meals. He was initially evaluated as an outpatient, with an oral cholecystogram. The gallbladder did not visualize at that time, nor with a double-dose examination. An upper GI series showed a small hiatal hernia without reflux. A barium enema demonstrated narrowing of the distal transverse colon, with a ring-like mucosal appearance. Abdominal ultrasound showed a preponderance of bowel gas with nonvisualization of the gallbladder, thought at that time to be secondary to poor patient preparation.

The patient was admitted for elective colonoscopy because of the barium-enema findings. The physical examination was essentially within normal limits, and the colonoscopy was normal. The abdominal ultrasound was repeated, showing no clear visualization of the gallbladder, although a small contracted gallbladder could not be excluded (Fig. 1, upper left). A Tc-99m disofenin image showed normal hepatic uptake and prompt excretion of the radiopharmaceutical, with visualization of the main hepatic ducts, common bile duct, and bowel (Fig. 1, upper right). The gallbladder was not visualized, even on delayed views obtained 4 hr after injection (Fig. 1, lower left). Due to the presence of recurrent abdominal pain, the possibility of chronic cholecystitis could not be excluded, and the patient underwent a laparotomy. At surgery, the gallbladder could not be identified. An intraoperative cholangiogram was performed in an effort to exclude an intrahepatic gallbladder (Fig. 1, lower right). The right and left main hepatic ducts, common bile duct, and duodenum were demonstrated and drained normally. No gallbladder or cystic duct was seen, and the diagnosis of congenitally absent gallbladder was made. Postoperatively the patient did very well.

DISCUSSION

Congenital absence of the gallbladder, although common in many herbivorous mammals, is a rare condition in man, apparently first observed by Aristotle (*11*). It is felt to be due to the failure of a ventrocaudal bud to develop from the hepatic diverticulum in the third fetal week, or later failure of the bud to recanalize (*12*). The first reported case was published by Lemery in 1701 A.D. (*13*). The scarcity of reported cases is reflected by Sander's review of the world's literature in 1968, when he found less than 200 reported cases (*14*). Monroe, in 1956, collected the largest known postmortem series, which included 181 cases in a total of 1,352,000 autopsies (*15*). This incidence of 0.013% is recognized by most

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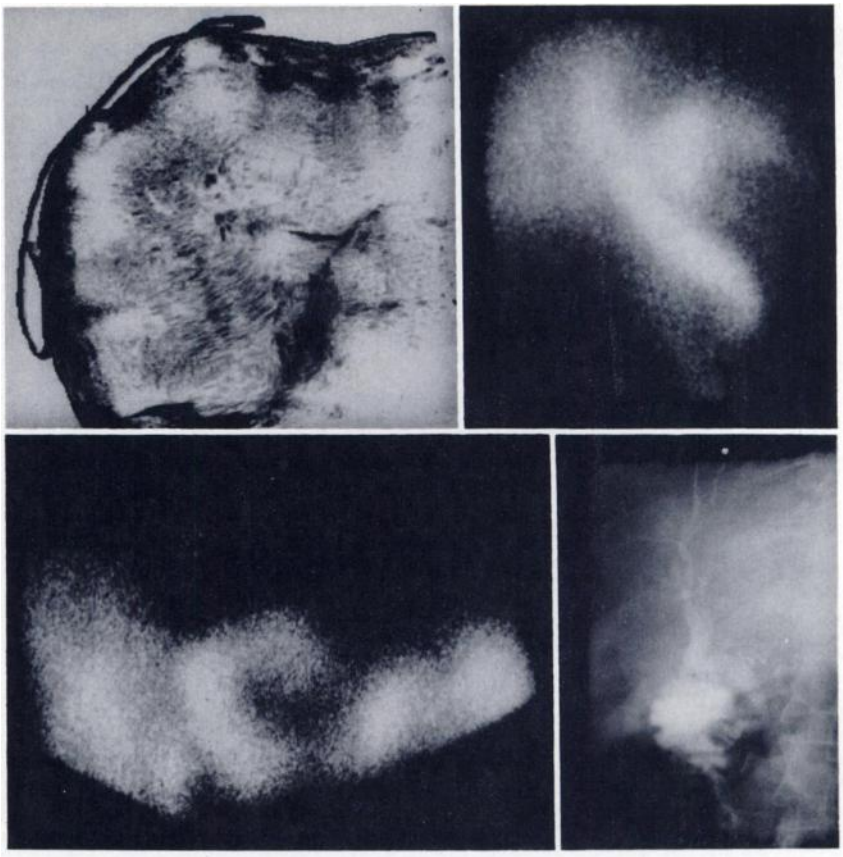

FIG. 1. Transverse abdominal sonogram (upper left) performed 1 cm below xiphoid. Gallbladder could not be identified. Hepatobiliary scintigram (upper right, Tc-99m DISIDA, 5 mCi). Anterior view at 30 min demonstrates hepatic activity and activity in right and left hepatic ducts, common bile duct, and duodenum. Hepatobiliary scintigram (lower left). Anterior view at 4 hr. There is almost complete excretion by hepatocytes, with predominance of bowel activity seen. Gallbladder is not visualized. Intraoperative cholangiogram (lower right), anteroposterior view. Hepatic ducts, common bile duct, and duodenum are demonstrated. There is no evidence of cystic duct or gallbladder.

authors as standard, although other series have noted prevalence as high as 0.3% (*16,17*). Equal frequency in both sexes has been found in all major studies at autopsy, although in clinical studies the overall incidence favors women approximately two to one. The average age of patients discovered at surgery is 46 yr (*16,18*).

Accompanying symptoms described in many patients, suggest the diagnosis of chronic cholecystitis. Dixon and Lichtman published a series of 60 clinical cases and reported that 58% of the patients had symptoms related to cholecystic disease, notably biliary colic and intolerance of fatty foods. Forty-eight percent of the symptomatic group presented with jaundice, and 26% were found to have common-duct stones. Pancreatitis, due to choledocholithiasis, was present in 6% (*19*). Other series have reported the incidence of common-duct stones to be as high as 50%, or as low as 11% (*20,21*). The common duct is frequently found to be dilated at exploration, usually but not necessarily in the presence of stones. The mechanism of this phenomenon is possibly the increased tonicity of the sphincter of Oddi in the absence of a gallbladder (*22*). Nevertheless, there is no characteristic symptom picture when choledocholithiasis is absent, although the patient may complain of vague abdominal discomfort, bloating, nausea, and flatulence (*23*).

Other anatomical anomalies that are known to accompany gallbladder agenesis include absent quadrate lobe, microcephaly, choledochal cyst, absent or transposed spleen, polycystic kidney, imperforate anus, tracheoesophageal fistula, and various cardiac abnormalities including ventricular septal defect, pulmonary stenosis, and tricuspid atresia. Association with mitral annulus prolapse was recently reported by Schlossman (*24*).

We report a case of proven agenesis of the gallbladder that has been studied with radionuclide hepatobiliary imaging. Although this condition is rare, it should be considered in the differential diagnosis of gallbladder nonvisualization.

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Bone Scintigraphy: Differentiating Benign Cortical Irregularity of the Distal Femur from Malignancy

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Two cases of benign cortical irregularity of the distal femur (BCIDF), which radiologically simulate malignancy, are presented. The use of bone scintigraphy in differentiating this entity from malignancy is described.

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Malignant bone tumors typically appear as abnormal foci of intense radionuclide uptake on bone image, whereas benign cortical irregularity of the distal femur (BCIDF), being more diffuse in nature, characteristically has normal or only minimally increased uptake of the tracer. This dramatic difference in scintigraphic appearance should obviate unnecessary amputations and biopsies in patients with BCIDF, which radiologically masquerades as malignancy. Avulsive cortical irregularity of the distal femur (*1*) was first described in 1951 by Kimmelstiel and Rapp (*2*); it is also referred to as cortical desmoid, periosteal desmoid (*2*), subperiosteal desmoid, subperiosteal abrasion, cortical abrasion, medial distal metaphyseal femoral irregularity (*3*), and subperiosteal cortical defect. There is very little in the nuclear medicine literature concerning this topic. Conway et al. found normal bone images in several children with this entity and strongly recommended the use of bone scintigraphy in such cases (*4*).

CASE REPORTS

Case 1. A 10½-yr-old white male had a history of left knee pain beginning approximately 2 mo before admission. Physical examination was remarkable for fullness in the popliteal space of the left knee and about the medial femoral condyle in the region of the adductor tubercle. The impression on admission was a mass in the region of the left knee, possibly from osteosarcoma.

Plain radiographs revealed an area of cortical irregularity and periosteal reaction in the posterior medial aspect of the distal left femur in the region of the adductor tubercle, with a mild degree of associated soft-tissue fullness and no evidence of effusion (Fig. 1). A single-phase bone image, performed with 10 mCi of Tc-99m MDP and including pinhole views of both knees, was normal (Fig. 2). An arteriogram demonstrated normal vascularity.

Since the plain radiographs were suspicious for a malignant tumor of the distal femur, a biopsy of the adductor tubercle was performed. Microscopy revealed normal-appearing bone, cartilage, vascular fibrous tissue, and giant cells suggestive of reactive changes without any evidence of malignancy.

Plain radiographs obtained at the 4-mo follow-up demonstrated healing of the biopsy site without any evidence of bone destruction.

Case 2. A 13-yr-old black male presented with a 3-hr history of pain in the left knee associated with swelling and difficulty in weight-bearing after playing basketball. There was a history of an effusion in this knee 6 mo before admission.

Physical examination of the left knee revealed swelling and

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