Diagnosis of Traumatic Gallbladder Avulsion: Role of Sagittal and Coronal Computed Tomographic Reformations

Paveljit S. Bindra, A.B., Jill M. Dobbins, M.D., and Robert A. Novelline, M.D.
Department of Radiology, Massachusetts General Hospital, Boston, Massachusetts

An 85-year-old seat-belted woman was injured in a head-on motor vehicle collision and presented with diffuse epigastric pain. Computed tomography (CT) revealed hemoperitoneum, hyperemia of the gallbladder wall, and active bleeding in the gallbladder fossa. Coronal and sagittal CT reformations clearly displayed gallbladder avulsion, facilitating surgical planning and management. A discussion of gallbladder injuries secondary to blunt abdominal trauma is presented along with an analysis of the CT features of gallbladder avulsion.

DISCUSSION

The gallbladder is afforded significant protection from external blunt trauma as it is partially embedded in the liver parenchyma and is further protected by the surrounding omentum, intestines, and rib cage (1). Thus, it is rarely injured. Soderstrom et al. (1) reported the incidence of gallbladder injuries in 1,449 patients sustaining blunt abdominal trauma to be 2.1%. Earlier reports indicated that the most common etiologic factors in blunt trauma were kicks, blows, or falls. With the increased use of seat belts, motor vehicle crashes leading to rapid shearing acceleration–deceleration forces have become the primary cause of such injuries.

Gallbladder injury may be classified as contusion, laceration, or avulsion (2). Contusion refers to gallbladder bruising. Smith and Hastings (2) reported that contusion is the least common type of gallbladder injury. They argue, however, that limited methods of diagnosis result in underreporting. Laceration refers to rupture or perforation of the gallbladder wall without displacement of the gallbladder from its fossa in the liver. This is the most commonly...
Figure 1. Axial images of the abdomen from a contrast-enhanced helical CT scan of a patient with traumatic avulsion of the gallbladder. **Left,** there is extravasation of intravenous contrast material (black arrows), indicative of active hemorrhage adjacent to the gallbladder. A high-density blood clot (open arrow) is present in the gallbladder lumen. **L = liver; A = aorta; V = inferior vena cava; C = right renal cyst. Right,** image slightly more caudad demonstrates distention of the common bile duct (short white arrow), believed to be secondary to a blood clot within the ductal lumen. A blood clot (long white arrow) is also evident in the gallbladder neck.

Figure 2. Coronal (left) and sagittal (right) reformatted images more clearly depict the relationship of the gallbladder to the liver. **Left,** the gallbladder is separated from the liver by a hematoma containing extravasated contrast material (arrows), indicating active hemorrhage. **GB = gallbladder; H = hematoma. Right,** the superior aspect of the gallbladder wall is ill-defined (arrowheads), and there is adjacent extravasation of intravenous contrast material (arrow). **GB = gallbladder; H = hematoma; K = kidney; L = liver.**