

Patterns of Liver Injury in Childhood: CT Analysis

H. Philip Stalker¹
Robert A. Kaufman^{1,2}
Richard Towbin^{1,2}

Forty-eight consecutive cases of liver injury diagnosed by CT in hemodynamically stable children were analyzed retrospectively for anatomic location, type of injury, associated nonhepatic injuries, and complications. It was found that the right lobe was involved in 83% of all injuries, and that the posterior segment of the right lobe was injured most often. Right-sided injuries were usually superficial and simple, while left-sided injuries were more likely to be deep and complex. Significant complications were associated with deep, complex, perihilar injuries. Retroperitoneal blood collections were noted around the adrenal, in a distribution not previously described. Injuries of the hepatic dome were most characteristic and were often associated with injuries of the lung base, kidney, ribs, and pneumothorax.

Blunt abdominal trauma in childhood often results in solid-organ injury, commonly involving the spleen and liver. While the appearance of hepatic trauma on CT has been described in both children and adults, there has been no systematic evaluation of these injuries or of the likelihood of encountering a given type of injury. In a large series of children with the clinical and CT diagnosis of hepatic injury, we observed that hepatic injury occurs in predictable anatomic distributions, with commonly associated findings and complications.

Recently, in children with blunt abdominal trauma, nonoperative management of renal, splenic, and liver injuries [1-3] has become more commonplace. This is due in part to the accuracy and utility of CT for emergent evaluation of serious upper abdominal injury [4-6], coupled with selection of appropriate patients followed with careful serial clinical evaluations [1, 4]. Thus, recognition of common patterns of liver injury and predictors of possible complications should aid the successful management of blunt abdominal trauma in children.

Materials and Methods

Between August 1981 and September 1985, 216 consecutive hemodynamically stable children with blunt abdominal injury and clinical suspicion of solid-organ damage were evaluated by abdominal CT. Liver injury was diagnosed in 48. This subgroup was studied retrospectively to determine the distribution and type of hepatic injury, the presence and nature of associated injuries, the presence of intraabdominal bleeding, and complications of liver injury.

The mean age of all children in the study was 8 years (range, 1-16 years). Twenty-nine (60%) were boys and 19 (40%) were girls.

Injury Location

Injury location was described (1) by the hepatic segment(s) involved, (2) as deep or superficial, and (3) when appropriate, as perihilar or involving the liver dome. A *deep* lesion (Fig. 1) was defined as one that involved liver parenchyma in the region of the first two to three portal venous divisions, regardless of the volume of superficial liver tissue involved. In

Received June 2, 1986; accepted after revision July 11, 1986.

Presented at the annual meeting of the Society for Pediatric Radiology, Washington, DC, April 1986.

¹ Department of Radiology, University of Cincinnati College of Medicine, and Division of Radiology, Children's Hospital Medical Center, Elland and Bethesda Avenues, Cincinnati, OH 45229. Address reprint requests to R. A. Kaufman.

² Department of Pediatrics, University of Cincinnati College of Medicine, Cincinnati, OH 45229.

AJR 147:1199-1205, December 1986
0361-803X/86/1476-1199

© American Roentgen Ray Society

most cases, it was a lesion closer to the hilus than to the peripheral hepatic surface. The remaining lesions were considered *superficial* (Fig. 2). *Perihilar* lesions (Fig. 3) were those that extended to the hilar hepatic surface. The *dome* (Fig. 4A) was considered the uppermost portion of the liver in contact with the diaphragm.

Imaging Appearance

Each injury was described as either simple or complex. All were of low attenuation on IV contrast-enhanced studies. *Simple* lesions (Fig. 2) were rounded (or linear) or well localized, or had short branches. *Complex* lesions (Fig. 5) were poorly localized and more disorganized, often with multiple long, branching segments.

Correlation with sonography and nuclear scintigraphy was not sought. The accuracy of CT relative to sonography and scintigraphy in the first 100 patients (including 19 liver injuries) has been reported [4]. Operative correlation was available in only two cases. Peritoneal lavage was not routinely performed.

All examinations were performed on a GE 8800 scanner, with oral-contrast-medium opacification of the upper gastrointestinal tract, IV contrast medium given as a bolus during scanning, and dynamic scanning with table incrementation. The details of the technique have been published [4].

Results

Age and Gender

No type of injury was more likely to occur in a given age group, and the ratio of boys to girls was approximately the same for each type of injury.

Distribution of Injuries

Table 1 summarizes the injuries by anatomic location. In 17 children (35%), multiple hepatic segments were injured, and four injuries (8%) involved more than one hepatic lobe. The right lobe of the liver was injured four times more often than the left and 20 times more often than the caudate lobe. Caudate injury occurred only with multilobar trauma. The posterior segment of the right lobe was the most vulnerable segment, injured in 65% of all patients.

Types of Injuries

Tables 2 and 3 analyze the injuries as simple vs complex and superficial vs deep. Although simple lesions were three times more common than complex ones in the right lobe, the two types occurred with nearly equal frequency in the left lobe. The frequencies of superficial and deep lesions in the right and left lobes were strikingly disparate, with right-sided injuries twice as likely to be superficial and left-sided injuries three times as likely to be deep.

There were 17 perihilar injuries, 35% of the total. Most deep injuries (17/22) were perihilar.

Associated Injuries

Right thoracic injuries.—Right-lung parenchymal abnormality, pleural fluid, pneumothorax, and rib fractures were

TABLE 1: Anatomic Distribution of Injuries in 48 Children

Site	No. of Patients (%)
Right lobe:	
Posterior segment	31 (65)
Dome	15 (31)
Anterior segment	10 (21)
Total ^a	40 (83)
Left lobe:	
Medial segment	7 (15)
Lateral segment	5 (10)
Total ^a	11 (23)
Caudate	2 (4)

^a Numbers in columns add up to more than totals and totals do not add up to 48 because some children were injured in more than one site.

TABLE 2: Characterization of Injuries in 48 Children: Simple vs Complex

Type of Injury	No. of Patients (%)
Simple:	
Right lobe	30 (63)
Left lobe	6 (13)
Total ^a	35 (73)
Complex:	
Right lobe	10 (21)
Left lobe	5 (10)
Total ^a	13 (27)

^a Some of the 48 children were injured in both the right and left lobes, which is the reason that numbers add up to more than totals.

TABLE 3: Characterization of Injuries in 48 Children: Superficial vs Deep

Type of Injury	No. of Patients (%)
Superficial:	
Right lobe	26 (54)
Left lobe	3 (6)
Total ^a	28 (58)
Deep:	
Right lobe	14 (29)
Left lobe	8 (17)
Total ^a	20 (42)

^a Some of the 48 children were injured in both the right and left lobes, which is why numbers add up to more than totals.

frequently associated with hepatic injury. Some degree of consolidation in the right lung was detected by CT in nearly half (46%) of our patients. This was usually believed to represent contusion or atelectasis, although occasionally laceration was present. Ninety-five percent of the patients with

Download English Version:

<https://daneshyari.com/en/article/7807501>

Download Persian Version:

<https://daneshyari.com/article/7807501>

[Daneshyari.com](https://daneshyari.com)