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Bystander trauma in the World Trade Center disaster

Published online: 9 February 2002
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Abstract We present the CT and clinical findings in a 21-year-old male who presented to the emergency department following bystander trauma during the rescue effort of the World Trade Center disaster.

Keywords Shrapnel · Retroperitoneal gas · Perinephric hematoma · Computed tomography · Bystander trauma

Introduction

Bystander trauma has been described in the orthopedic, pediatric, and burn literature [1, 2, 3]. Trauma from a foreign body has been described during war, but no reports of bystander trauma have been described in the radiology literature. The massive destruction of the World Trade Center disaster had many effects; the primarily injured victims had burns and traumatic injuries associated with the explosion. However, an event of this magnitude also draws many spectators. We present the case of an onlooker who was injured as he was simply watching the rescue effort. We describe the clinical and radiographic features of this patient.

Case report

A 21-year-old white male was watching the rescue effort shortly after the World Trade Center disaster on 11 September 2001 when a fire truck drove past him. The truck drove over a metal object that was propelled toward and penetrated the patient’s abdomen. The patient reported feeling something hit his abdomen, noticing a hole in his shirt, and feeling bleeding. He presented to the emergency room complaining of abdominal pain and a wound on his abdomen. Physical exam revealed a jagged wound less than 1 cm in size, just below the umbilicus, that was not bleeding. Bowel sounds were present and the abdomen was soft. The hemoglobin concentration was 13.5 g/dl and the hematocrit was 51 ml/dl. Liver function tests, chemistry 7 panel, and amylase and lipase were within normal limits. Upright chest film showed no free air. Abdominal film showed a foreign body in the right posterior abdomen at the level of the L2 vertebral body (Fig. 1a).

After the patient was stabilized, a CT scan of the abdomen and pelvis was performed with 125 ml intravenous contrast (Optiray 320, Mallinckrodt Inc., St. Louis, Mo.) and 350 ml oral contrast (MD-Gastroview, 367 mg/ml, Mallinckrodt). Initial, non-intravenous-contrast-enhanced and delayed contrast-enhanced images were taken of the kidneys. Initial non-intravenous-contrast-enhanced images showed a metallic object in the right perinephric space, with a crescentic high-density right perinephric or subcapsular fluid collection consistent with acute hemorrhage (Fig. 1b). There were bubbles of air projecting within the high-density collection. Fluid surrounded the right kidney and extended into Morison’s pouch (Fig. 1c). Also noted was free air under the diaphragm and in the region of the fissure for the ligamentum venosum and within the porta hepatis (Fig. 1c). After the intravenous infusion of contrast, a perfusion defect was apparent in the right anterior cortex, consistent with an acute injury such as contusion (Fig. 1d). There was no evidence of active extravasation of intravenous or oral contrast.

The patient was taken to the operating room and underwent exploratory laparotomy, foreign body extraction, and evacuation of the perinephric hematoma. There was no evidence of bowel perforation. The postoperative course was uneventful.

Discussion

Our medical center is located close to the recent tragedy at the World Trade Center. Onlookers gather at significant events like this for many reasons: to simply look, to offer assistance, to take pictures, out of curiosity, etc. This unfortunate young man was observing the rescue effort in progress when he was injured.

Reports in medical literature of bystander trauma are rare. One publication involves a 22-year retrospective study of 316 fireworks-related injuries at a major urban children’s hospital. Twenty-six percent of these injuries were to bystanders. The authors of this article recom-
mended banning private use of fireworks [3]. A multi-center study of 144 lawn-mower-related injuries to the extremities of children reported that 84 of those patients were bystanders. Patients who needed skin flaps required as part of their surgery were more likely to be bystanders. These same patients also required more surgical operations, stayed longer in hospital, and needed more transfusions than other patients. The authors of

Fig. 1a–d. A 21-year-old male with penetrating trauma to the abdomen. a Digital radiograph of the abdomen showing a metallic object projecting in the right upper quadrant (arrow). b Nonenhanced CT scan of the abdomen showing right perinephric hematoma (arrow) and bubbles of perinephric gas (arrowheads). c Contrast-enhanced CT showing metallic foreign body adjacent to the right kidney and pneumoperitoneum (arrow). d Contrast-enhanced CT showing perfusion defect in the upper pole of the right kidney (arrows)