

Abstract:

Penetrating abdominal trauma from gunshot or stab wounds accounts for just 10% of all abdominal injuries in children. Exploratory laparotomy has been the surgical dictum for the evaluation penetrating abdominal injuries; however, accumulating data in the adult and pediatric literature indicate that selective nonoperative management may be safely considered in hemodynamically stable children after careful clinical examination and appropriate radiographic evaluation. We describe 2 children with penetrating abdominal injury who were managed successfully nonoperatively and briefly review the literature on this approach in children.

Keywords:

penetrating injury; pediatric; children; nonoperative management; abdominal trauma

Selective Nonoperative Management of Pediatric Penetrating Abdominal Trauma

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Penetrating abdominal trauma from gunshot or stab wounds accounts for 10% of all abdominal injuries in the pediatric population.¹ Traditionally, exploratory laparotomy has been the surgical dictum for penetrating abdominal injuries; however, accumulating data in the adult and pediatric literature indicate that selective nonoperative management (SNOM) may be safely considered in hemodynamically stable children after careful clinical examination and appropriate radiographic evaluation.²⁻⁵ In this article, we describe 2 children with penetrating abdominal injury who were managed successfully without an operation and briefly review the literature on nonoperative management in children.

CASE 1

An otherwise healthy 10-year-old girl presented to our emergency department (ED) with a stab wound to the right flank. She was at home in bed peeling an orange with a kitchen knife and later forgot the knife on her mattress. After disposing of the peels in the garbage, she later got back into bed and slid down

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onto the knife resulting in an accidental penetration injury to the right flank. According to the patient, she then removed the knife herself. The patient was initially evaluated at an outside facility but was then transferred to our institution, a pediatric trauma center.

Three hours postinjury, the patient arrived to our institution awake, alert, and hemodynamically stable. Upon presentation to our ED, her initial vital signs included a blood pressure of 128/60 mm Hg, heart rate of 135 beats/min, respiratory rate of 20 breaths/min, and temperature of 37.4°C; her weight was 38.9 kg. On physical examination, she had a 1-cm stab wound to the right flank with visible subcutaneous fat. The wound was not actively bleeding, and flank ecchymosis was absent. Her abdomen was soft, nontender, and nondistended, and the remainder of her examination was otherwise normal. Laboratory studies from the transferring facility were reviewed and revealed a normal electrolyte panel, nonbloody urinalysis, and hemoglobin level of 13.6 g/dL. An abdominal x-ray result at the other institution was also normal and did not demonstrate pneumoperitoneum.

Because the patient was hemodynamically stable, a noncontrast computed tomographic (CT) scan of the abdomen was performed at our institution to evaluate for penetration into the peritoneal cavity. The examination revealed skin and soft tissue disruption in the right flank extending into the retroperitoneal fat posterior to the ascending colon with punctate foci of air coursing along the wound track into the retroperitoneal space. Because contrast was not administered, hollow viscus injury could not be excluded. The patient was admitted for serial abdominal examinations, and a triple-contrast (oral, intravenous, and rectal) CT scan of the abdomen was obtained 6 hours later to reevaluate for intestinal perforation. The study demonstrated persistent small foci of air in the retroperitoneum; however, there was no small bowel or colonic contrast extravasation to suggest bowel perforation (Figure 1).

The patient's abdominal examination remained benign, and she was discharged after tolerating a normal diet. She was seen 3 weeks postinjury and is doing well without sequelae.

CASE 2

An 11-year-old girl sustained 2 gunshot wounds (GSWs) to the left flank by an unknown assailant while playing in her front yard. She was transferred directly to our ED from the scene fully alert and responsive. Her presenting vital signs upon arrival showed a blood pressure of 129/68 mm Hg, heart



Figure 1. CT with axial view of right retroperitoneal foci of air (arrow) and contrast-filled colon without extravasation.

rate of 112 beats/min, temperature of 36.1°C, respiratory rate of 16 breaths/min, and an oxygen saturation of 98% on room air; her weight was 58.8 kg. On physical examination, she had 2 penetrating wounds located in the left lateral and posterior flank. Her abdomen was soft, nontender, and nondistended, and the remainder of her physical examination was otherwise normal. Her electrolyte panel and urine drug screen were normal, and her hemoglobin level was 11.7 g/L. Urinalysis was significant for large occult blood.

After the primary and secondary surveys were complete, the wounds were marked with paper clips, and chest and pelvis radiographs were obtained. The imaging studies were negative for pneumoperitoneum or retained projectiles. Because the patient was hemodynamically stable, a triple-contrast CT scan of the abdomen was subsequently performed to assess for missile trajectory and peritoneal penetration. The study revealed a tangential contiguous subcutaneous tract that connected both the flank wounds, without violation into the peritoneal cavity (Figure 2). After establishing a discharge safety plan with social services, the patient was discharged home from the ED uneventfully.

DISCUSSION

The practice of deciding which patients who may not require surgery after penetrating abdominal wounds has been termed SNOM.^{4,5} Up until the 1960s, penetrating abdominal injuries have essentially been treated with a mandatory exploratory laparotomy. This surgical practice stems from

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