Severe unintentional penetrating abdominal injuries of domestic origin in children

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The authors report five cases in which children sustained severe unintentional penetrating abdominal injuries caused by everyday household items. The five children required emergency surgical intervention. These injuries were potentially preventable. Careful supervision of children and their environment is necessary to prevent this type of injury and to ensure their well-being.

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Unintentional injuries are the fifth most common cause of death in the general population of the United States. However, in children between the ages of 1 and 15 years, unintentional injuries are the most common cause of death [1–4]. Most unintentional injuries occur as a result of motor vehicle accidents or around their home or the playground. More than 40% of all accidents to children occur around their home [2,4]. Lacerations account for the largest group of injuries (32%), followed by contusions, abrasions, fractures, and dislocations. The most common cause of those minor injuries is falls. Most of these patients do not require hospitalization [2,4]. Prevention of unintentional injuries is a very important aspect in the management of pediatric trauma. Penetrating trauma in children is rare, accounting for less than 3.6% of admissions to the hospital [3,4]. Most of the severe injuries in children are caused by blunt trauma, though with increasing social violence and criminal activity we will undoubtedly see an increase in penetrating injuries [5,6]. Severe unintentional penetrating trauma is very uncommon [3,7]. We describe five cases of children who sustained severe unintentional penetrating abdominal injuries caused by common household items – injuries that we believe were potentially preventable.

1. Case reports

1.1. Case 1

An 8-year-old male was at home with his mother. She asked him to throw away a glass frying pan (Visions, Corning®). While performing this task, he fell over the frying pan which broke on impact. He sustained a laceration to the left side of his abdomen, with visceration of the intestine and the omentum. At surgical exploration, he was found to have a small laceration of the sigmoid colon with minimal fecal contamination. No other injuries were identified. Primary repair of the colonic laceration was done with closure of the abdominal wound. He recovered uneventfully and was discharged home 6 days later.
1.2. Case 2

A 5-year-old female was at home, playing roughly with an older sibling after eating a heavy meal. She fell while running and went through a single sheet glass storm door. The flimsy glass shattered on impact. She sustained a laceration of the upper abdomen and a laceration of the right arm with profuse bleeding. Immediately after the accident, evisceration of the whole stomach was noticed (Figs. 1 and 2). After resuscitation, she was taken to the operating room. A partially sealed posterior gastric perforation was found. After evacuation of large amounts of foodstuff, a 5-cm gastric perforation was repaired in two layers. The laceration on her arm was also repaired. No significant neurovascular damage was found. She recovered uneventfully and was discharged home 7 days later.

1.3. Case 3

A 10-year-old female was running through her home while carrying an umbrella. She slipped on a wet carpet. The umbrella broke under her weight. The metal rod at the handle end penetrated her left lower chest at the seventh intercostal space, midclavicular line. A radiograph revealed a pneumoperitoneum and a pneumomediastinum (Fig. 3). A contrast esophagram study ruled out esophageal perforation. At surgical exploration, she was found to have a perforation of the left diaphragm, a laceration of the left lobe of the liver with minimal bleeding, a perforation of the gastric fundus, and a laceration of the spleen. Primary repair of the diaphragmatic and gastric perforations was done. The bleeding from the liver and splenic lacerations was controlled with compression. The postoperative course was complicated by pleural effusion requiring thoracentesis. The patient recovered and was discharged home 11 days after her injury.

1.4. Case 4

A 6-month-old boy was at home in a bouncer on the kitchen counter top. While his mother was cutting some food with a large butcher knife, the baby fell. During the mother’s attempt to prevent her son from falling, she stabbed the baby in the abdomen with the knife. The baby sustained a laceration above the umbilicus through which a portion of small bowel was eviscerated. The patient was resuscitated in the emergency department and brought to the operating room. On exploration, he was found to have three perforations of the proximal jejunum. The baby underwent a small bowel resection with primary end-to-end anastomosis. His postoperative course was uncomplicated and he was discharged home on the sixth postoperative day.

1.5. Case 5

A 6-year-old boy sustained a large laceration to the right flank and abdomen after rough playing with his siblings and falling through a broken window. He suffered evisceration of almost the entire small bowel and partial laceration of the psoas muscle. There were no other associated injuries. His mother did not witness the accident and was unaware of the broken window. He was managed...
with exploration of the abdomen, irrigation, reduction of the evisceration, and closure of the laceration. The bowel was not damaged and there were no enterotomies found. He recovered uneventfully and was discharged 5 days later. The case was reported to Children Protective Services. No abuse or neglect was found.

**Discussion**

Injury is the most common cause of death in children from 0 to 15 years of age [1–4]. About 90% of life-threatening injuries in children are caused by blunt trauma [4]. Penetrating injuries account for less than 5% of admissions to a children's trauma center [4–6]. Most penetrating injuries in children are secondary to gunshot wounds and knife-stab wounds [4,7]. Life-threatening unintentional penetrating injuries are rare [3,6,7]. Most injuries take place as a result of motor vehicle crashes and road traffic injuries, or at home and in playgrounds, where children spend most of the active portion of their day [2,8,9].

The five patients we treated sustained severe injuries at home with common household items. Their injuries required major surgical intervention. These life-threatening injuries are preventable. Children should not be asked to perform tasks that can be dangerous for them. All sharp objects should be kept out of the reach of children. Storm doors and windows that can potentially break should be padded or made of thicker or shatter-proof glass. Shatter-proof and shatter-resistant glass doors and windows similar to automobile windshields are now commercially available. Close supervision of small children is very important to prevent injuries, especially where they commonly occur, around their homes and in playgrounds [2–4,8,9].

When unexplained injuries occur at home, *even if the injury occurs in the presence of a parent or caretaker*, the possibility of child abuse or neglect should be investigated [3,8,9]. *Reporting these cases is mandatory in all states, and is essential to protecting the child.*

Proper supervision of children in their homes and play environments is required to prevent unintentional injuries and to ensure the children’s well-being [2]. In addition, *adequate child-proofing and maintenance of a safe environment in the home may help prevent accidents and injuries in children.*

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**References**


