

CASE REPORT

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Shopping Cart Injuries, Entrapment, and Childhood Fatality

ABSTRACT: Shopping carts may be associated with a variety of injuries, particularly in toddlers and young children. These usually relate to falls from carts or to tip-overs. Injuries that are sustained include hematomas/contusions, abrasions, lacerations, fractures, and fingertip amputations. Fatal episodes are uncommon and are usually due to blunt craniocerebral trauma from falls. A case involving a 19-month-old girl is reported who became entrapped when she inserted her head through the side frame of a cart that had been removed from a supermarket and left at her home address. Death was caused by neck compression. Although rare, the potential for lethal entrapment during unsupervised play means that the presence of stray shopping carts at private residences and in public places, including playgrounds and parks, is of concern. Strategies, such as coin deposits, should be encouraged to assist in the return of such carts to supermarkets.

KEYWORDS: forensic science, asphyxia, childhood, shopping cart, trolley

Accidental asphyxia is a well-known cause of death in infants and toddlers; there are a variety of different situations that are dangerous. Asphyxial deaths in the very young may result from unsafe sleeping environments due to wedging, hanging, or suffocation (1–4). As toddlers become more mobile, deaths may result from crush asphyxia when furniture that is being played on falls over, and from suffocation due to entrapment inside refrigerators (5). Increasingly, additional situations that have proved fatal are being identified, placing the pathologist in an excellent position to provide warnings of potentially lethal devices and circumstances to the community. To this end, a case is reported of a rare death of a toddler due to neck compression from entrapment within the frame of a shopping cart (trolley).

Case Report

A 19-month-old girl who had been playing in a back yard shed at her home was found unresponsive trapped underneath a shopping cart. She was lying face down with her legs extended beyond the back of the cart, with her head through a gap between the bottom of the cart basket and a horizontal metal bar that formed the side of the cart base (Fig. 1). The right side of her neck was pressed against the side bar. Resuscitation was unsuccessful. Her only significant past history was of asthma and surgery for intestinal malrotation.

At autopsy, the body was that of a normally formed and well-nourished 19-month-old girl. A reddened linear impression was present under the right side of the chin running along the jaw line (Fig. 2). When the body was placed in the position described when found, this mark corresponded to the side railing of the cart base. Very subtle linear reddening was present in the left parietal scalp

that corresponded to the position of the cart basket against the head. Occasional faint petechiae were present on the outer and inner aspects of the eyelids. There were no other significant markings or injuries. Radiologic and toxicologic evaluations were negative. The biparietal diameter of the head was 120 mm and the antero-posterior diameter was 175 mm. Examination of the cart revealed a wedge-shaped gap on the side between the bottom of the basket and the tubular metal base. The gap between the basket and frame at the front of the cart was 180 mm anteriorly narrowing to 140 mm posteriorly where the toddler's head had been wedged.

Death was attributed to compression of the neck with asphyxia. The toddler had either been able to put her head through the wider part of the frame (180 mm), but had become trapped when she moved backwards causing her head and neck to become wedged in the narrower end of the gap (140 mm), or had inserted her head sideways and had become trapped when her head rotated. The head diameter of 175 mm prevented her from extricating herself, exacerbated by the height of the bar from the ground (210 mm). There was no other evidence of trauma other than the injuries associated with entrapment and there were no underlying organic diseases that could have caused or contributed to death.

Discussion

Accidental asphyxia is more common in infants and toddlers than in older children as they are often unable to disentangle themselves when they become trapped or wedged between objects, or are caught in straps or cords. This is reflected in deaths associated with infant and toddler carriers in the United States in the age range 2–66 months, where asphyxiation was the cause of death in the majority of cases (69%). Fatal episodes have involved entanglement/hanging, overturning of carriers, or turning around of children within carriers resulting in suffocation or neck compression (6).

Because of their size and relative weakness, accidental injuries in toddlers may occur with a minimum of struggle, and those dying from asphyxia may have no, or very subtle, findings at autopsy. In some cases, however, discrete bruises around the neck or on the head, or petechial hemorrhages of the face,

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FIG. 1—Reconstruction of the death scene with placement of the body of a 19-month-old girl who became entrapped underneath a supermarket trolley in the reported position when found and measurement of the trolley dimensions clearly demonstrated the sequence of lethal events.



FIG. 2—A linear groove on the right side of the neck and jaw of the trapped 19-month-old girl.

conjunctivae, and neck and thorax may be seen (7,8). Death scene reconstruction with the body at the time of autopsy was done as it is an important adjunct to assist in verifying the alleged circumstances, and in clarifying the mechanism and manner of death. While the current case demonstrates a rare death caused by asphyxia due to entrapment in a shopping cart, practitioners may be called upon to assess children who have suffered nonfatal injuries related to such devices.

It has been estimated that up to 25,000 children younger than 15 years are treated in U.S. emergency rooms annually with shopping cart-related injuries (9). Similar injuries have been described in other countries including Australia, New Zealand, and the United Kingdom (10–14). Up to 43 injuries due to shopping carts per 1000 shopping visits have been reported (15) with an incidence of 10.6 hospitalizations per 100,000 children per year (12). In most studies, there is a male predominance (53–63%) (9,10,12,14,16). The majority of injured children (69–85%) are younger than 5 years (9,10,14) with the peak age range of 1–3 years (10). When hospitalization is required, children younger than 5 years represent an even larger proportion (92–93%) (9,12) suggesting that they are more vulnerable to severe injury than older children.

The most common type of injury is a fall (56–59%) (10,16,17) with a higher rate in children admitted to hospital (92%), suggesting that falls cause more serious injuries (12). The second most common mechanism of injury involves cart tip-overs (19–26%) (10,16) with entrapment accounting for approximately 5% of emergency room injuries (16). Most accidents occur inside supermarkets (77%), in parking lots (7–16%), or on footpaths (2%). Of interest, approximately 3% of injuries occur in domestic yards, as in the current case (10,16).

The most common sites of injury are the head and neck (74–84%) (9,12,16) with hematomas/contusions (55%), abrasions (14%), lacerations (10%), and skull fractures (10%). The arms (23%) and legs (17%) are the second most commonly injured sites, with the more serious injuries being fractures and fingertip amputations (10,16). In general, most injuries are considered mild or moderate, with only 22% rated as serious (12). Deaths are very rare and have generally resulted from cranial trauma from falls and cart tip-overs (6,9).

The current case demonstrates a rare instance of death associated with a shopping cart from accidental asphyxiation due to entrapment. Given the wedge-shaped structure of shopping cart frames and the common finding in certain districts of abandoned carts around supermarkets, in public parks near playgrounds, and in domestic yards, it is perhaps surprising that this does not occur more frequently.

Different strategies have been tried to reduce the number of shopping cart injuries, including revision of safety standards, public education campaigns, and the provision of restraints on carts, and these have had some effect in decreasing these events (12,17). However, these measures will have minimal effect on toddlers and children engaged in unsupervised play around carts that have been removed from supermarkets and abandoned. Thus, prevention of this type of injury could be facilitated by the collection and return of stray shopping carts. Making coin deposits on shopping carts mandatory would be one way to promote their return, rather than having them discarded in back yards or in public places. Although deaths from shopping carts are rare, and most often relate to craniocerebral trauma from falls or tip-overs, rare cases of entrapment with asphyxia may occur.

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