

# Accidental strangulation by a motor vehicle window

RICHARD H. STRAUSS, MD, JEFFREY E. THOMPSON, MD, ANTHONY MACASAET, MD

**Objective:** To describe a child who was asphyxiated by a motor vehicle window and to review the relevant literature.

**Design:** Case report.

**Setting:** A 402-bed tertiary care medical center in La Crosse, WI.

**Patient:** Four-year-old girl.

**Interventions:** Supportive pediatric critical care.

**Main outcome measures:** None.

**Results:** The patient did not survive.

**Conclusions:** Parents must assume responsibility for restraining their children in motor vehicles. Parents must not leave children alone in motor vehicles. Parents must become "more injury literate."

Injury is the leading cause of death and disability in childhood and adolescence.<sup>1</sup> Injuries associated with motor vehicles are more frequent than those caused by burns, drowning, falls, suicide, homicide, or violence, and almost all are associated with motor vehicle collisions.<sup>2</sup> Interventions that have been suggested to lower injury rates have targeted motor vehicle drivers (delayed licensure, elimination of driver education classes) and motor vehicle occupants (comprehensive child passenger safety laws, comprehensive seat belt laws for all seating positions, installation of lap-shoulder seat belts in rear seating positions, passive restraints using automatic shoulder belts in all seating positions, airbags in both front seat positions of all cars), but there has been little attention paid to those accidents that occur in motor vehicles not associated with crashes. We present a patient who died as a result of power window strangulation that occurred in a stationary motor vehicle.

## CASE

K.K. was a four-year, nine-month-old previously healthy girl who was left with her three-year-old and one-year-old siblings in her father's pickup truck with the engine running and the heater on as he left the vehicle and entered a neighbor's house. The patient was in the front right side passenger seat and the siblings were unrestrained in the rear seat. It was reported that five minutes later someone in the house noticed the vehicle's emergency lights flashing, prompting investigation. The child was found supine, partially ejected, and entrapped in the front seat passenger side window. The window was closed against the child's back, the upper door frame on her neck and armpits, and her arms and head outside the vehicle. The window was

lowered, the patient was carried to the house, and cardiopulmonary resuscitation (CPR) was begun by a CPR-trained nurse.

The patient was transported to a local hospital by an emergency medical service. At the hospital, she was endotracheally intubated and mechanically ventilated and an intraosseous needle was inserted. Epinephrine, atropine, and dopamine were given by the intraosseous route, and there was resumption of cardiac electro-mechanical activity. The patient was comatose, however, with a Glasgow coma scale score of 3. Her arterial blood pH was 6.78 and the arterial blood  $P_{CO_2}$  was 17 following intubation and ventilation. She was transported by helicopter to Lutheran Hospital-La Crosse and admitted to the Pediatric Intensive Care Unit. A computerized tomography scan of the head showed generalized cerebral edema and a small subarachnoid hemorrhage. Over a period of 24 hours, the patient developed central diabetes insipidus and a clinical examination showing absence of brain activity. A brain blood flow study showed absence of arterial blood flow to the brain, and she was pronounced dead the day after the injury.

## DISCUSSION

The National Highway Traffic Safety Administration's (NHTSA) handout, "Safe Driving Practices," advises drivers, "Never leave your car with the engine running . . . even momentarily . . . Before getting out . . . turn off the engine."<sup>3</sup> The vehicle, a 1993 Chevrolet 1500 pickup truck, was equipped with automatic power windows, which require ongoing pressure to continue opening or closing the windows—that is, one push of the button will not cause the windows to close or open completely. It is most likely the patient or the three-year-old sibling activated the window button, and that neither was capable of reversing the window closure. Death from this type of injury may result from severe bradycardia caused by carotid body stimulation, from obstruction of arterial and venous blood flow to and from the brain and/or obstruction of the airway.<sup>4</sup>

In a study of 233 patients who died because of strangulation, investigators noted five cases of strangulation by automatic power windows in motor vehicles.<sup>4</sup> Power window strangulation has occasionally been reported elsewhere.<sup>5,6</sup> It has been recommended that "one-touch" electrically powered vehicle windows have a reverse mechanism similar to automatic garage door openers (which reverse automatically upon contact with a certain degree of resistance). The NHTSA has not recommended such a step except for automatic windows that are remote control operated (NHTSA; personal communication, 1995).<sup>7</sup>

The American Academy of Pediatrics, in its most recent statement on injury prevention counseling, recommended ". . . appropriate use of currently approved child safety restraints . . ." which, if used in this situation, would have prevented this tragic accident.<sup>8</sup> The Committee also recommended that "Appropriate counseling by

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pediatricians can alert parents and children to many risky behaviors or environments."<sup>8</sup> Pediatricians should stress to parents that children must not be left unattended in motor vehicles. It is impossible, however, for pediatricians to address every conceivable danger to children during anticipatory guidance counseling. Parents must take greater responsibility for the well-being of their children and become "more injury literate" for needless deaths like this to stop.<sup>9</sup>

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11/25/97 11:00 AM