Preventing choking in children: Many factors increase risk of mechanical airway obstruction due to inhalation or ingestion of foreign bodies

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Preventing choking in children
Many factors increase risk of mechanical airway obstruction due to inhalation or ingestion of foreign bodies

by David Walner, M.D., FAAP, and Julie Wei, M.D., FAAP

Choking is a leading cause of morbidity and mortality in children, with food, coins and toys as the most common causes.

The AAP policy statement, Prevention of Choking Among Children (Pediatrics. 2010;125:601-607), stresses that "Childhood choking hazards should be addressed through comprehensive and coordinated prevention activities."

Understanding the factors that increase the risk for choking will allow pediatric health care providers to raise caretakers' awareness and decrease the incidence of choking.

Scope of the problem
In the United States, mechanical airway obstruction from choking, suffocation and strangulation is the leading cause of unintentional injury that results in death of children younger than 1 year of age. It ranks fourth as a cause of death in children 1 to 9 years of age, surpassed only by motor vehicle injuries, drowning/submersion and fire/burns.

In 2000, 160 children ages 14 years or younger died from an obstruction of the respiratory tract due to inhaled or ingested foreign bodies, with 41% due to food items.

For every choking-related death, there are more than 100 visits to U.S. emergency departments (EDs). In 2001, an estimated 17,537 children ages 14 years or younger were treated in U.S. EDs for choking; 60% of the episodes were associated with food items, 31% were associated with nonfood objects including coins and 9% were not recorded.

Candy was associated with 19% of all choking-related ED visits in children 14 and younger, and coins were related to 18% of all choking-related ED visits in children ages 1-4 years.

Airway obstruction caused by food
Factors influencing the likelihood and severity of a choking injury include the physical properties of the food, how often the person is exposed to the food and the developmental level of the person consuming the food.

Hot dogs, hard candy, nuts, grapes, meat, cookies and biscuits, carrots, apples, popcorn and peanut butter are the 10 foods most commonly associated with fatal airway obstruction, according to data from 48 children's hospitals throughout the world.

Potential for airway obstruction also is profoundly influenced by the feeding abilities developed at different ages. While suckling behavior in newborns is instinctual and is governed by robust hindbrain reaction to stimuli, consumption of solid foods is a learned behavior. In addition, newborns' oral cavities are compact, vertically moving structures that cannot accommodate solid foods. Infants and young children also have immature dentition that prevents them from grinding food into a smooth homogeneous bolus.

As children age, their oral cavity becomes a transverse motile chewing structure, and they develop muscular coordination and oral fluency with more diverse textures.

As children begin to feed themselves, personality and situational factors affect feeding. The feeding behavior of a child sitting quietly at a table with an attentive caregiver is less hazardous than a child eating while running, laughing or playing with a low level of caregiver vigilance. In addition, children suffering from neurological deficits and or developmental delay may have difficulty handling any but the most benign food textures.

Several characteristics of foods influence the risk that they will obstruct the airway. Foods that are small, smooth or slick when wet may inadvertently slip through and enter the pharynx. Objects that are round or cylindrical and pliable or compressible, such as hot dogs and grapes, can form a plug in the airway.

Choking by nonfood items
Rubber balloons are a leading cause of choking deaths resulting from non-food items. Other dangerous items to avoid around children include small toys, pen caps, small balls or foam balls, marbles, toy jewelry, magnets, coins and disc batteries.
Since 1980, toys for use by children under 3 years of age must meet minimal size requirements. Any toy that fits inside a device called a small parts test fixture, a cylinder with a 1¼ inch diameter, must be labeled for use by children older than 3 years.

Toys and consumer products also can be designed so they too are tough enough to resist releasing small parts.

**Prevention strategies**

Strategies to reduce exposure to potentially hazardous foreign bodies include education of parents, child care providers and preschool teachers; caregiver vigilance; and clear product labeling describing hazards.

Education of caregivers can start as early as the 3 or 6 month well-child visit, and should be reinforced at subsequent visits up to age 5 years. Pediatric health care providers should emphasize that children, especially toddlers and preschoolers, be supervised during eating, and caregivers should discourage playing while eating. Caregivers also should be instructed to keep dangerous toys, foods and household items out of children’s reach.

Child care centers and preschools should be provided with information in English and other languages to maximize choking prevention. Basic CPR and choking resuscitation training is widely available and may reduce mortality when choking occurs.

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