The choking hazard of grapes: a plea for awareness

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ABSTRACT

Deaths from choking are a major cause of childhood mortality, especially in the very young. Whole grapes are ideally suited to cause paediatric airway obstruction and, though regularly implicated, knowledge that this popular fruit, and other similarly shaped foods, is a choking hazard is not widespread. We present the cases of three children who presented to our institution after grape aspiration. Increased dissemination of the learning points among health professionals working with children may aid in the prevention of further episodes.

INTRODUCTION

The aspiration of foreign bodies is a major cause of childhood mortality. In the USA, there were 2103 childhood deaths from foreign body airway obstruction between 1999 and 2013.[1] The majority of choking episodes occur in those under 3 years of age, the very group most at risk of death.[2 3] In addition to having airways with a small cross-sectional diameter, little children have incomplete dentition and therefore reduced ability to chew foods into a smooth bolus; underdeveloped swallowing coordination and a tendency to be easily distracted while eating.[4]

The physical features of a foreign body are important in determining the potential effects of aspiration. Compared with grapes, small, hard objects or foods may more easily be dislodged from the rest of the upper airway with chest or abdominal thrusts. They are also more likely to pass through the larynx and come to rest in the right main bronchus, causing respiratory difficulty but allowing ventilation of the left lung. In contrast, round foods or objects that are larger than a child's airway may cause occlusion at the level of the laryngeal inlet, resulting in complete airway obstruction that is rapidly fatal if not alleviated promptly. The threat is bigger still if such an object has a smooth, easily deformable surface allowing it to form a tight seal, wedge, and thus becomes very difficult to dislodge with first aid manoeuvres.[5]

There is already widespread awareness of the choking risk posed by small toys, and warnings on packaging are commonplace but despite the fact that items of food account for over half the fatal choking episodes in children up to 5 years of age,[6] warnings are routinely absent on packaging and public knowledge of many of the dangers is not widespread. Grapes are a popular food with young children but are ideally suited to cause obstruction of a paediatric airway and are the third most common cause of food-related fatal choking episodes after hotdogs and sweets.[4]

We present three cases of airway obstruction due to grapes in paediatric patients presenting to the Paediatric Emergency Department (PED) of The Royal Aberdeen Children's Hospital (RACH): two of which were fatal.

CASE REPORTS

Case 1

A 5-year-old boy developed features of choking while eating whole grapes at an after school club. Appropriate first aid measures to dislodge the grape were attempted by staff and continued by local technician ambulance staff on their prompt arrival. Despite back blows and suction, the child progressed into cardiac arrest and cardiopulmonary resuscitation (CPR) was instituted. A paramedic met the crew en route and on direct laryngoscopy was able to remove a grape from the upper airway with Magill's forceps and then intubate the trachea, allowing effective ventilation. Full CPR was continued as per Advanced Paediatric Life Support guidance as the patient was transferred to hospital. On arrival to the PED, despite full resuscitation efforts, he remained in cardiac arrest and died.

Case 2

A 17-month-old boy was at home eating sandwiches and fruits with his family. He was consuming a grape when he developed signs of choking. Attempts to dislodge the fruit at home were unsuccessful and, after dialling 999, the patient was rushed to the local community hospital. Further attempts to alleviate the obstruction failed, chest compressions were commenced (but ventilation was ineffectual until the grape was removed under direct vision at laryngoscopy) and continued during ambulance transfer to RACH where the child was later declared dead in the PED.

Case 3

A 2-year-old boy was eating grapes as a snack while at the park with family. He was noticed to be choking and the Heimlich manoeuvre was performed but without success. The child quickly became floppy and unresponsive and was rushed to a residential home at the end of the park from where an ambulance was called. Fortunately, an ambulance was close by and was on the scene within minutes. Paramedics rapidly identified respiratory arrest and promptly removed the grape on direct laryngoscopy. The paramedic promptly performed direct laryngoscopy and removed the grape. Spontaneous respirations resumed quickly, oxygen was administered and transfer to hospital was initiated. En route in the ambulance the child had two brief seizures and on arrival to the PED there were clear signs of cerebral and pulmonary oedema. He was transferred directly to the operating theatre for tracheal intubation and ventilation. He also underwent flexible bronchoscopy, which revealed no residual foreign body and was

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subsequently transferred to the Paediatric Intensive Care Unit in Edinburgh where he was ventilated for 5 days. An MRI scan of the brain was normal and he returned to RACH after a further 2 days. He made an excellent recovery and was discharged home 4 days later alert and playing normally.

DISCUSSION

The above case reports clearly delineate that children can choke on grapes with tragic results. As demonstrated in Case 3, timely and successful intervention to dislodge or remove the offending object can result in excellent clinical outcomes. In all three instances, adults were present, identified the problem quickly and promptly instituted appropriate first aid manoeuvres for the treatment of choking but with no success. In fact, even when these measures were performed by trained ambulance personnel, they were also unsuccessful and all three cases required that the grape be removed under direct laryngoscopy, clearly something that requires specialist expertise and equipment.

Though we would wholeheartedly support the wide dissemination of the knowledge and skills to promptly identify a choking child and intervene appropriately, prevention is better than cure.

There is a general awareness of the need to supervise young children when they are eating and to get small solid objects, and some foods such as nuts, promptly out of the mouths of small children; but knowledge of the dangers posed by grapes and other similar foods is not widespread. Intuitively, first aid measures for the management of choking are more likely to be successful for the harder, more solid items, but their effectiveness (as in the three cases described) may be poor if grapes are the cause.

Others have previously suggested a simple warning label should be placed on the packaging of grapes and other similarly shaped enveloped foods (such as cherry tomatoes), highlighting the potential choking hazard and recommending that they are divided in half or preferably quartered.[7]

We have contacted The Scottish Government regarding the provision of information to parents on the risks of choking on these types of food. There is currently no specific legal requirement for such foods such as grapes to include a choking hazard warning and this may be difficult if such items are being sold loose. However, NHS Health Scotland has revised its guidance, given free to all parents in pregnancy, to clearly highlight the potential choking hazard posed by grapes and cherry tomatoes and the importance of the need to 'halve or chop small fruit, nuts and vegetables like cherry tomatoes and grapes.'[8 9] It has also helpfully reviewed the website to ensure that any pictures of grapes or tomatoes only show chopped fruit.

While these are positive moves from the Scottish Government, grapes are widely consumed throughout the UK and beyond. By way of this article, we mean to highlight the need for clear labelling of foods known to be choking hazards, with succinct advice that such should be chopped in half and ideally quartered before being given to young children (≤5 years), and reiteration of the importance of adult supervision of small children while they are eating. It is our hope that dissemination of this information to health professionals with direct involvement with children through this article will filter through to the public. Further avenues to explore are the provision of information and literature directly to those working in primary care and to those providing food for children on a commercial basis.

Hopefully improving professional and public awareness will reduce the number of these tragic preventable deaths occurring.

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