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CHOKING CHILD- NO MORE AN ENIGMA

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ABSTRACT

An airway obstruction is a blockage in any part of the airway. Blockage of the upper airway can be caused by foreign body aspiration like peanuts, balloon, buttons, small toys etc. another reason for choking is allergic reaction to bee sting, peanuts, antibiotics, or any other drug. Sometimes it occurs during dental treatment because of fear or anxiety for instrumentation and accidental entry of dental material in the airway. The age group for such choking is variable; it can be 2-4 years or even 10-12 years. Upper airway obstruction is an immediate risk of life & requires emergency treatment. This review discusses about causes, sequalae and management of airway obstruction.

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Keywords: Airway Obstruction, Choking, Wheezing, Aphonia, Dysphonia.

INTRODUCTION

Airway obstruction or anoxia is the most common precipitating event of cardiopulmonary arrest in a child.[1,2] While very few individuals adore a visit to the dentist, few of them develop a fear of this experience that can run deeper and lead to a dental phobia. In the majority of cases, the telltale sign of this problem can be extremely varied and cause people to act in a number of ways, with a solution near-impossible to find without assistance from a professional. Patients may have a hyper-cognizance of swallowing saliva – although this is a natural process that the majority of people do instinctively. However, this can make it extremely difficult for people to relax and allow dental treatment to be done. Similarly, many people suffer from this problem because they have experienced a life-threatening episode of choking on food, despite the fact they may never have had shortness of breath in the dentist's chair. This can result in patients becoming acutely aware of the possibility of losing their breath, particularly when gauze or cotton wool has been placed in their mouth.

Incidence: According to the journal by D Pessali et al, on "Foreign body inhalation in children:-an update", it accounts for more than 300 deaths annually in our country. Approximately 80% of episodes of foreign body aspiration occur in children younger than 3 years. Most children of this age are learning to explore their world through the oral route and tend to put everything in their mouth. The absence of the molar teeth makes them unable to chew adequately. These factors increase the risk of foreign body. Other predisposing factors include older siblings who may place food or objects in the mouth of infants or toddlers.[3]

A foreign body is defined as any substance that is not natural to the passage in which it is found. Originally safety pins led to the lists of common objects aspirated by children less than one year of age. Coins & peanuts were most common for two-to-four-year-old age group. More recently, identified hazards that

may cause significant obstruction include the aspiration of deflated balloons[4], baby aspirin tablets[5] pop tops of beverage cans, egg shells,[6] & baby powder[7] etc.

Anatomic site: The anatomic site of obstruction in infants under one year of age is the larynx, whereas the trachea & the bronchus are more likely to be involved in children one to four years.

Manifestation: The manifestations depend on the size of the foreign body, the composition, location & degree of blockage & duration of the obstruction. The immediate manifestation of the upper airway obstruction are -gagging, choking, wheezing, aphonia or dysphonia. Upper airway obstruction is an immediate threat to life & requires rapid relief. Lower airway obstruction can be tolerated for prolonged periods.

Controversy in management: The controversy concerning the most effective management of choking has received significant coverage in the past literature.[8-15] Three different maneuvers have been described for the treatment of obstructing foreign bodies.

- The back blow and chest thrust maneuvers (recommended by the Accident and Poison Prevention Committee of the American Academy of Pediatrics, AAP) [1]
- The abdominal thrust-Heimlich maneuver [12]
- The theoretical shoulder caudal maneuver suggested by Day[9, 10]

The published recommendations of the AAP, Accident and Poison Prevention Committee, supported by the National Academy of Science-National Research Council views.[11] Day and his coworkers ended their presentation with the conclusion that more study and research were needed to elicit the best technique for relieving a complete obstruction of the airway;[9,10] we concur with their recommendations.

Techniques: The natural defense mechanism for expelling foreign material from the airway is the cough. The cough reflex receptors located throughout the respiratory tract are stimulated when foreign material enters the airway. These receptors stimulate the medullary centers via the efferent nerves to produce (a) an inspiratory phase where the glottis opens and there is a rapid and deep inhalation with the entry of air into the lungs; (b) a compression phase in which the glottis closes and the respiratory muscles contract, producing an increase in intra thoracic pressure; and (c) an expiratory phase in which the glottis opens with a coordinated movement of the respiratory muscles leading to a violent expulsion of the foreign substance from the respiratory tract. These dynamic changes also cause a vibratory action of the vocal cords and the mucosal lining of the upper respiratory tract.

In the absence or failure of the natural cough mechanism, artificial techniques have been sought to generate a positive intra thoracic pressure to expel the foreign body from the upper airway. According to Gordon, [16] the back blows dislodge the completely obstructing foreign body by producing a vibratory movement and very high pressure over a short period of time. The chest thrusts or abdominal thrusts expel the foreign body by producing less pressure over a longer period of time. The back blow and chest thrust have not been recommended to be performed in isolation. Persistence in repeating the sequence is important if the maneuvers are not successful.

The back blow is delivered four times rapidly between the victim's shoulder blades with the heel of the rescuer's hand while the victim is held in an inverted, head down position. The chest thrust is performed in the same manner as external cardiac compression. The abdominal thrust recommended by Heimlich exerts firm upward sub xiphoid abdominal pressure using the fist as a fulcrum. The third maneuver suggested by Day for theoretical consideration is untried and would consist of caudal blows to the shoulder.

Recommendations for the management of the choking child: Dr. Day, [9, 10] the authors, and the Accident and Poison Prevention Committee[1] of the AAP agree that more study is needed. For the present, the authors prefer the following management of a foreign body in the upper airway of children[10]

- Nonintervention, if the patient can cough, breathes, or speaks. The patient's natural cough will more effectively clear the airway than any artificial assistance. Partial obstruction with poor air exchange or cyanosis and complete obstruction require immediate relief.

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- Position the infant/child patient with the head lower than the trunk inverted face down, and administer four back blows rapidly with the heel of the hand high between the patient's shoulder blades. An infant can be placed face down with the head lower than the trunk on the rescuer's arm (which is rested firmly against the rescuer's body for additional support). An older child may be positioned across the lap of the rescuer. The rescuer can sit or kneel on the floor and place the victim across the thighs with the head face down and lower than the trunk and administer four back blows as above.
- If the above maneuvers do not reinstate breathing, turn the patient over to deliver four rapid chest thrusts similar to the maneuver for external cardiac compression .(To accomplish this maneuver the patient should be turned onto his back so that he lies in a supine position). Never place the hands over the xiphoid process or on lower margin of the rib cage.
- If breathing does not resume, the airway should be opened by the jaw' thrust technique to visualize for a foreign body. If foreign material is visualized, remove it.
- If breathing does not resume, administer four breaths by mouth-to-mouth or mouth-to-nose ventilation. If the chest fails to rise, the obstruction persists and the sequence should be repeated.

It should be emphasized that the two key ingredients in the management of the completely obstructed choking; patient are persistent in repeating the sequence and rehearsals of the sequence prior to the emergency.

If the rescuer feels more comfortable using abdominal thrusts than the recommended chest thrust, this is an acceptable option. However, it is our opinion that back blows are useful in dislodging a completely blocking foreign body and should not be omitted.

If the above maneuvers are unsuccessful, an emergency tracheotomy or the insertion of a large-bore needle (14 gauge) through the cricothyroid membrane can be performed by those with experience. This will secure an airway until the child can be removed to a medical facility and the services of an endoscopist and anesthesiologist are available.

Cautions:

- Do not turn the patient immediately upside down or pound on the back if the patient is coughing, breathing, or speaking, as this is unnecessary and may cause the foreign body to completely occlude the airway.
- Do not thrust a groping finger blindly into the throat, as this may push the object into the larynx and completely obstruct the airway.
- Do not intervene in incompletely obstructing foreign bodies; you may transform a nonemergency situation into a life-threatening complete obstruction.
- For the chest maneuver, never place hands over the xiphoid process of the lower margin of the rib cage.

Prevention of Aspiration Accidents:

- Small parts on toys manufactured for children under three years of age, by government regulation, must be larger than 1.25 inches in diameter and not fit into a specifically designed truncated cylinder 2.25 inches long. The toys of older siblings, which do not have to meet these standards, however, pose a danger to younger siblings.
- Food should be cut or broken into bite-size pieces and children encouraged chewing thoroughly.
- Conversation should be discouraged during eating, playing, running, and other activities that can precipitate aspiration.
- Safety pins are less of a hazard now, but where they are used; they should be kept out of reach and closed.
- Children should be taught not to hold foreign objects in their mouths.
- Small children should not be given coins or small objects for play or as reward items.
- Hard, smooth food such as peanuts or food containing nuts that require a grinding motion

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should not be given to young children. This chewing motion is not well established until over four years. Peanuts should not be given to children until they are seven years old. Adult type pills also fit into this category.

- Chewable pills for children should be given only after the age of three years.
- Do not allow deflated balloons to be around small children. The deflated balloon may be sucked into the posterior pharynx, larynx, or trachea.
- Do not thrust a finger down blindly after a foreign body.
- Children with depressed airway protective reflexes are more likely to aspirate foreign bodies. Therefore, special care must be taken with patients with neurologic conditions or those who are receiving depressant medication that may interfere with the gag and airway protective reflexes.

SUMMARY AND CONCLUSION

There is controversy regarding the best maneuver to expel a completely obstructing foreign body from the upper airway of a patient. Further study and research are needed. However, we recommend that no change in the present recommendations be made until these studies are accomplished. We have attempted to outline the major aspects of the controversy and give the rationale for the present recommendations.

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