Aspiration and ingestion of a foreign body during dental examination by a patient with spastic quadriparesis: case report

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Introduction

Aspiration of foreign bodies resulting in airway obstruction can be life threatening and require prompt recognition and immediate emergency management. Measures used to prevent aspiration during dental care include: using a rubber dam during all restorative and endodontic procedures; using floss ligature on objects such as rubber dam clamps, cast crowns and bridges,[1] elastic separators and space maintainer appliances; and using a gauze net barrier to protect the airway during extractions and other procedures in which rubber dam and ligatures are not appropriate.

Dental objects commonly aspirated or swallowed include burs, rubber dam clamps,[2] fragmented or complete tooth material,[3] endodontic instruments,[4] dentures,[5,6] and impression materials.[7]

Clinical signs and symptoms of foreign body aspiration include choking, gagging, coughing, signs of distress, inspiratory stridor, high-pitched wheezing, pallor, cyanosis, reduction or absence of air entry, asymmetrical chest movement, and tracheal shift.[1,8] Complications and sequelae are post-obstructive pneumonitis, pulmonary abscess, and bronchiectasis.[1,8,9] Diagnosis is based on clinical presentation and roentgenographic and videofluoroscopic visualization of the object or demonstration of obstruction by air trapping.[8]

Noninvasive procedures for managing airway obstruction include back blows in infants, the Heimlich maneuver, abdominal or chest thrusts in pregnant or obese patients, and finger sweeps when the object is located in the oral cavity in unconscious adults.[8,9]

Case report

A.B., a 4-year, 2-month-old Caucasian female with a principal diagnosis of encephalopathy and dystonia was examined at the University of Minnesota Hospital Dental Clinic as a neuropsychology inpatient consultation, referred by her family dentist for treatment under general anesthesia.

She had multiple admissions at Children's Variety Club Heart Hospital, University of Minnesota for problems arising from encephalopathy following measles, mumps and rubella (MMR) immunization. Her presenting diagnosis was spastic quadriparesis, seizures, developmental delay, and gastroesophageal reflux. She was confined to an orthokinetic chair for travel and positioning and she could not communicate. Her daily medications were 0.8 mg diazepam for seizures, 15.6 mg baclofen for muscle spasms, 60 mg ranitidine, 5 ml Maalox® (Rorer Consumer Pharmaceuticals, Fort Washington, PA) after meals for gastroesophageal reflux, and multivitamins.

The patient was examined while she was strapped in the orthokinetic chair (Fig). She had an intact deciduous dentition with interproximal spacing, poor oral hygiene, and generalized extrinsic staining. A Molt Mouth Prop® (Hu-Friedy, Chicago, IL) was used during the exam. Because parents were not available to provide specific consent, radiographs were not taken.

Significant jaw movement throughout the examination caused the rubber tubing of one of the mouth prop arms to dislodge and fall into the oropharyngeal region. It could not be retrieved. Within 20–30 sec the patient showed signs of respiratory distress and her complexion changed to an ashen color. The operator attempted emergency airway management, but the patient was strapped to her wheelchair and had bracket table support anterior to her thorax, so this was not successful until she was unbuckled and freed from the table support. The restraints had been fastened tightly and were difficult to release. As the operator unfastened the straps, the assistant secured the clinic nurse manager who performed the Heimlich maneuver from the right side of the patient. The obstruction was relieved and normal coloring returned. Airway, breathing,

Fig. Orthokinetic chair.

and circulation were confirmed in accordance with American Heart Association Basic Life Support guidelines.[10] The incident lasted approximately 1.5 min. The rubber tubing was not recovered, and therefore assumed to be aspirated or swallowed. In accordance with clinic procedure, the patient was transported to the Radiology Department of the University Hospital where a single view radiograph of the chest and abdomen was exposed. The results showed mild increased lucency throughout the left lung. However, both lungs were clear, no areas of atelectasis were seen and the heart and pulmonary vasculature were normal. The film demonstrated a "possible" foreign body at the gastroesophageal junction, but this could not be confirmed since the object was radiolucent. A similar piece of tubing was radiographed for comparison. Fluoroscopy was done to rule out a foreign body in the left bronchus and to verify normal lung function. A modified barium swallow showed no foreign body in the esophagus. The patient's primary physician confirmed a clear chest and normal breathing. Rubber tubing similar to that ingested was made available to the personnel at her station for identification and comparison if passed in stool or regurgitated. Two days later, spontaneous vomiting occurred and the tubing was found in emesis. No ill effects were present from the ingestion and no further treatment was necessary. Dental treatment was performed under general anesthesia one week after the initial exam.

A follow-up thoracic radiograph after 20 days demonstrated unchanged vasculature of the cardiopulmonary system and bony thorax. No pulmonary infiltrates or acute abnormalities were identified.

Discussion

Patients with neuromuscular disorders often receive their care either in the dental chair or in wheelchairs. A variety of physical restraining devices and methods are used for patient safety, to prevent unwanted movement, and to maintain body posture. The dentist should become familiar with these methods and understand their use so that dental care can be provided safely, comfortably, and efficiently.[11]

The provider must ensure that the patient can be removed quickly and easily in the event of an iatrogenic or other emergency. Optimum access to all anatomical regions required for resuscitation is imperative since delay may result in fatality.

Many handicapped patients have poor control over the masticatory and deglutitive musculature.[12] Due to unexpected and sudden soft and hard tissue movements, intraoral aids are useful in averting accidental injury and preventing mouth closure during dental procedures. Mouth props should be used judiciously, however, and should not be considered routine for all patients. This is especially true for patients who may have difficulty swallowing. The Molt Mouth Prop,® when fully extended, can interfere with a patient's ability to manage saliva and should be used only when absolutely necessary. There are other hazards associated with its use. Operators may defer responsibility for insertion, control, and removal to an assistant. If used incorrectly, lip and palatal lacerations and luxations of teeth may occur.[13] The prop should only contact the posterior dentition and its use may be difficult in bruxists who have reduced clinical crowns.[12] For patients with poor physical control, precautionary measures to prevent accidental slipping of the rubber sleeve must be taken. The fit over the metal arm should be tight and the rubber should extend over the extraoral parts to the pivot joint.[14] Spastic and athetotic patients who demonstrate significant jaw movement may work the rubber sleeve off the frame, which may lead to an emergency. The quality of rubber sleeves deteriorates with repeated sterilization. They should be checked frequently and replaced when necessary.

The wet and slippery conditions of the mouth and the repeated force exerted when patients occlude on mouth props may result in accidents and airway emergencies. For short examinations or procedures, tongue blades taped together provide a useful alternative. This single-piece apparatus minimizes the risk of dislodged parts, is more readily accepted by parents and does not have the potential to cause iatrogenic injury.

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1. ElBadrawy HE: Aspiration of foreign bodies during dental procedures. J Can Dent Assoc 51:145–47, 1985.
2. Alexander RE, Delhom JJ Jr: Rubber dam clamp ingestion, an operative risk: report of case. J Am Dent Assoc 82:1387–89, 1971.
3. Kisby L, Tsamtsouris A: Aspiration of a primary tooth by a child with congenital encephalopathy. J Pedod 3:87–92, 1978.
4. Govila CP: Accidental swallowing of an endodontic instrument. Oral Surg Oral Med Oral Pathol 48:269–71, 1979.
5. Heggie AA, Walker JD: Traumatic pharyngeal displacement of a full maxillary denture: case report. J Oral Maxillofac Surg 47:1208–10, 1989.
6. Adelman HC: Asphyxial deaths as a result of aspiration of dental appliances: a report of three cases. J Forensic Sci 33:389–95, 1988.
7. Szabó M, Szabó I, Buris L: Foreign objects of dental origin in the esophagus. Oral Surg Oral Med Oral Pathol 34:196–98, 1972.
8. Hoekelman RA, Friedman SB, Nelson NM, Seidel HM: Primary Pediatric Care. 2nd Ed. St. Louis: CVMosby Year Book, 1992, pp 263–63, 1249–51.
9. Malamed SF: Handbook of Medical Emergencies in the Dental Office. 3rd Ed. St. Louis: CV Mosby Co, 1987, pp 141–60.
10. American Heart Association: Healthcare Provider's Manual for Basic Life Support. Dallas, 1990.
11. Davidoff A, Winkler S, Lee MHM, EDS: Dentistry for the Special Patient: The Aged, Chronically Ill and Handicapped. Philadelphia: WB Saunders Co, 1972, pp 67–75.
12. Wessels KE, ED: Dentistry and the Handicapped Patient. Littleton, MA: PSG Publishing Co, 1979, pp 51–52.
13. McDonald RE, Avery DR, EDS: Dentistry for the Child and Adolescent, 5th Ed. St. Louis: CV Mosby Co, 1987, pp 608–14.
14. Rosenstein SN: Dentistry in Cerebral Palsy and Related Handicapping Conditions. Springfield, IL: Charles C Thomas Publisher, 1978, pp 52–62.