

Howard C. Adelman,¹ M.D.

Asphyxial Deaths as a Result of Aspiration of Dental Appliances: A Report of Three Cases

REFERENCE: Adelman, H. C., "Asphyxial Deaths as a Result of Aspiration of Dental Appliances: A Report of Three Cases," *Journal of Forensic Sciences*, JFSCA, Vol. 33, No. 2, March 1988, pp. 389-395.

ABSTRACT: Three cases of asphyxial deaths as a result of aspiration of dental appliances are presented. The possible association of this condition with resuscitative effort and patient debilitation is discussed. A recommendation to improve diagnosis and facilitate resuscitation is offered.

KEYWORDS: pathology and biology, asphyxia, prosthetic devices, dental appliances

Asphyxial deaths as a result of aspiration of boluses of food have been well documented in both technical literature as well as in lay publications. The condition known as "Café Coronary" [1,2] is now treated by the so-called "Heimlich Maneuver" [3,4]. Thanks to public education and posters on restaurant walls, asphyxial conditions can be recognized by lay persons as well as the medically trained.

Deaths as a result of aspiration of foreign objects have also been described [5]. Children fall prey to aspiration of foreign objects which they tend to insert into their mouths [6-10]. Several toys have been taken off the market because of this problem.

Perhaps the earliest recorded death in an adult caused by aspiration of a foreign body was that of Sophocles, who died after aspirating a grape [8]. Aspiration of a denture is an unusual form of asphyxiation not often reported [11]. Three cases of asphyxial deaths as a result of aspiration of a denture are reported in this paper.

Case Reports

Case 1

The edentulous patient, a 79-year-old white male, lost his way while driving his automobile at night. He and his wife, both residents of another state, had been driving all day in order to visit their daughter. Stopping at the side of the road to check directions, he collapsed at the steering wheel following an emotional outburst of anger and frustration because he was lost. An emergency medical team responded to the scene promptly after receiving a call for help. Cardiopulmonary resuscitation (CPR) was attempted, and the patient was rushed to a nearby hospital. At the hospital, CPR was continued and an attempt at intuba-

Received for publication 26 March 1987, accepted for publication 2 June 1987.

¹Director of pathology, St. Joseph Riverside Hospital, Warren, OH. Former Deputy chief medical examiner, Suffolk County, NY.

tion by a staff anesthesiologist was made. Despite these efforts, the patient was pronounced dead.

External examination of the patient just before autopsy revealed a circular fresh bleeding abrasion on the mid-posterior occipital region. Because of this injury, an X-ray was taken (Fig. 1). The X-ray revealed a denture situated high in the neck of the patient. A lower (mandibular) denture was found among the patient's property and clothing, before the autopsy, but no upper (maxillary) denture could be located. The upper denture was found impacted in the upper larynx and pharynx overlying and occluding both of these structures (Fig. 2). The denture measured 6 by 6 by 2.5 cm, weighed 18 g, and was difficult to see, even at autopsy, because of the way the color blended with the surrounding tissues (Fig. 3). Signs of asphyxia, including petrosal bone congestion, visceral pleural petechiae, pulmonary congestion with edema, and areas of atelectasis were found in addition to hemorrhage in the arytenoid membrane and epiglottal congestion. Other significant findings included marked occlusive coronary arteriosclerosis with pinpoint narrowing in the proximal third of the left anterior descending artery (LAD). The circumflex branch revealed a focal area of subplaque hemorrhage and red, brittle mural thrombosis completely obliterating the lumen. A small focus of subendocardial fibrosis was also found. The heart weighed 300 g. An old area of infarction in the left basal ganglion was also noted. No alcohol or drugs was found in routine postmortem tissue toxicologic examination.

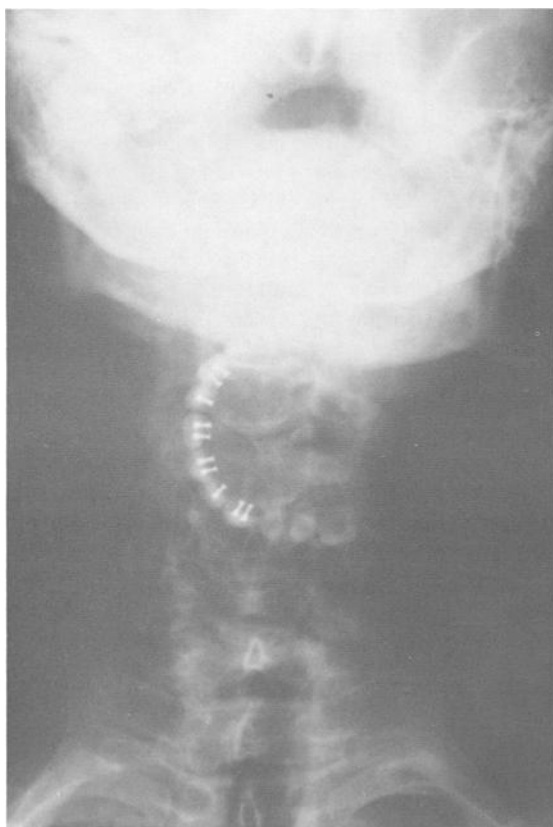


FIG. 1.—*Postmortem preautopsy X-ray of Case 1 showing semiradiolucent denture lodged in neck.*

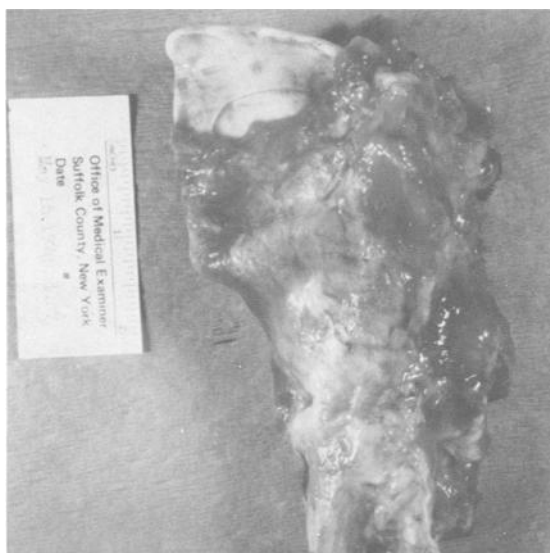


FIG. 2—Autopsy view of Case 1 showing denture impacted in larynx. Note how denture merges with background and is difficult to see.

Case 2

A 21-year-old white female patient required frequent physical restraints while a patient at a mental hospital because of her physically violent behavior. Because of repeated bouts of fever of unknown origin (FUO), she was often transferred to the medical-surgical ward. Her highest temperature, recorded just before death, was 102°F (38.8°C). The patient had a long-standing difficulty in swallowing both liquid and solid food material. Increased salivation was also noted. Before her death, while being fed, the patient started choking and became “stiff.” Resuscitative efforts were unsuccessful and the patient expired.

Autopsy examination revealed a “dental bridge” lodged in the upper esophagus with the teeth pointed down and the ends of the bridge extending into the soft tissue on each side of the larynx (Fig. 4). Visibility of the denture was enhanced by the metallic areas, but the plastic portions blended with the color of the tissues (Fig. 5). No other significant findings were observed. Toxicological examination revealed a 0.3 mg/dL of phenobarbital in her blood and 1.1 mg/dL in her liver. A trace of chlorprothixene metabolites were found in the liver, but no alcohol was present.

Case 3

The patient was a 30-year-old black woman with a known history of alcoholism. A nursing assistant, she was found dead in her room. Resuscitation was attempted without success.

At autopsy, a partial denture measuring 5 by 2 cm and containing a bright yellow metal tooth was impacted in her upper larynx. Extensive pulmonary atelectasis with congestion and edema was also found. The liver weighed 2200 g and revealed extensive steatosis. Post-mortem toxicology revealed 2.5 mg/dL of hydroxyzine and hydroxyzine metabolites in her liver.



FIG. 3—Autopsy view of Case 1 viewing denture in larynx from above. This would be a comparable laryngoscopic view.

Discussion

In Case 1, an argument could be made that the denture was thrust into the air passages either during the vigorous resuscitative effort or in the agonal period. The anesthesiologist involved in the intubation of the patient denies having seen a denture in the patient's larynx. None of the emergency medical technicians (EMTs) who responded to the call could recall whether the patient even had dentures. The presence of a recent and fresh coronary thrombosis and the severe coronary artery disease noted in the autopsy could indeed represent the cause of death in this case. The presence of the impacted denture and the associated soft tissue hemorrhages, however, cannot be ignored.

In all three cases, resuscitation was employed, however only in Case 1 was intubation attempted. No alcohol was present in any of the patients.

References to asphyxial deaths as a result of aspiration of a denture are not easily found in the literature [12]. Prokop reports that dentures can be aspirated by a blow to the mouth or by a loss of consciousness [8]. Spitz and Fisher state that "dislocation of one's denture into the airway is not necessarily associated with alcohol and may occur in traumatic cases particularly with sub- or un-consciousness" [6]. Dotter described a murder by suffocation in which a victim died of multiple blunt force traumatic injuries because of an altercation and asphyxiation on his upper denture [13]. Askin reports of a young woman who died of an aspirated



FIG. 4—Autopsy view of denture in Case 2. Denture would be almost invisible except for metal portions.



FIG. 5—Another view of denture in Case 2 lodged in opened larynx. Again, metal portions are the most visible.

denture following an automobile collision.² Aspiration of a denture during an epileptic seizure was reported by Giovanniti. Because of difficulty in diagnosing the condition by routine X-rays, he suggested that dentists consider using a fixed, nonremovable denture [14]. Radiolucency of an ingested denture also hampered the diagnosis in Hazelrigg's reported case, and he recommended that a radiopaque disk or foil be constructed into each denture as well

²H. Askin, personal communication, 1987.

as an additional patient identification [15]. Radiolucency of dentures was also a problem which was highlighted by Sherman and associates, who also recommended using radiopaque materials in dentures to make them visible on X-ray [16]. A firm recommendation to use radiopaque materials in dental appliances was made in 1981 by the Council on Dental Materials, Instruments, and Equipment [17].

Conclusions

Three cases of aspiration and asphyxiation on dental appliances are reported. Despite the size of these objects, aspiration is indeed possible. This condition must be considered when resuscitative measures, including intubation and ventilation, are performed. Dentures must be removed from the patient's mouth before intubation or resuscitation. The possibility of denture aspiration must also be considered in sudden asphyxial types of deaths where the patient may or may not be eating.

Contrary to other reported cases [2], alcohol, drugs, or severe debilitation need not be present in this condition, although one of the three patients was referred from a mental hospital and another had a history of alcoholism.

Dentures are cosmetic as well as prosthetic appliances. Because of this, the entire denture (with the exception of the teeth) is flesh-colored. This color is cosmetically accurate but difficult to see not only during intubation but also when it is first discovered at autopsy because it blends with the color of the surrounding tissues. The unexposed surfaces could be colored with an easily recognizable dye, such as chartreuse or bright blue turquoise, which cannot be confused either with food or the surrounding tissues. Thus, the cosmetic value would not be affected, and the denture would be easier to locate during resuscitation and intubation. Radiopacity of the denture would also aid in this critical diagnosis.

Note

The black-and-white renditions of the photographs in this article show a sharper distinction in gray contrast than the original color appearances in either the photographs or real life.

Acknowledgment

The author wishes to thank Dr. Charles Hirsch, Chief Medical Examiner of Suffolk County, Long Island, New York, for his cooperation in furnishing the photographs of the autopsy cases in this paper.

References

- [1] Haugen, R. K., "The Café Coronary—Sudden Deaths in Restaurants," *Journal of the American Medical Association*, Vol. 186, No. 2, 12 Oct. 1963, pp. 142-143.
- [2] Mittleman, R. E. and Wetli, C. V., "The Fatal Café Coronary—Foreign Body Airway Obstruction," *Journal of the American Medical Association*, Vol. 247, No. 9, 5 March 1982, pp. 1285-1288.
- [3] Heimlich, H. J., "The Heimlich Maneuver: Prevention of Death From Choking On Foreign Bodies," *Journal of Medicine*, Vol. 19, 1977, pp. 208-210.
- [4] Heimlich, H. J. and Uhley, M. H., "The Heimlich Maneuver," *Ciba Clinical Symposia*, Vol. 31, No. 3, 1979.
- [5] Wolkove, N. et al., "Occult Foreign-Body Aspiration in Adults," *Journal of the American Medical Association*, Vol. 248, No. 11, 17 Sept. 1982, pp. 1350-1352.
- [6] Spitz, W. U. and Fischer, R. S., *Medicolegal Investigation of Death*, 2nd ed., Charles C Thomas, Springfield, IL, 1980, p. 338.

- [7] Mihalakis, I., "Asphyxia From Pacifier," *Maryland State Medical Journal*, Vol. 20, 1971, pp. 53-54.
- [8] Prokop, O., "Veb Verlag Volk und Gesundheit," *Forensiche Medizin*, 2nd ed., Berlin, 1966, p. 135.
- [9] Baker, S. P. and Fischer, R. S., "Childhood Asphyxiation by Choking or Suffocation," *Journal of the American Medical Association*, Vol. 244, No. 12, 19 Sept. 1980, pp. 1343-1346.
- [10] Aytac, A., Yurdakul, Y., et al., "Inhalation of Foreign Bodies In Children—Report of 500 Cases," *The Journal of Cardiovascular Surgery*, Vol. 74, No. 1, July 1977, pp. 145-151.
- [11] Sardana, D. S., Srivastava, R. N., et al., "Denture in the Larynx (letter)," *Ear Nose Throat Journal*, Vol. 62, No. 10, Oct. 1983.
- [12] "Inhaled Foreign Bodies," *British Medical Journal*, Vol. 282, May 23, 1981, pp. 1649-1650.
- [13] Dotter, C., "Case Report: Murder By Suffocation," *Dental Radiology and Photography*, Vol. 50, No. 2, 1977, p. 34.
- [14] Giovannitti, J., "Aspiration of a Partial Denture During an Epileptic Seizure," *Journal of the American Dental Association*, Dec. 1981, p. 895.
- [15] Hazelrigg, C. O., "Ingestion of Mandibular Complete Denture," *Journal of the American Dental Association*, Vol. 108, Feb. 1984, p. 209.
- [16] Sherman, B. M., Karliner, J. S., et al., "Fatal Traumatic Ingestion of a Radiolucent Dental Prosthesis," *New England Journal of Medicine*, Vol. 279, No. 23, 5 Dec. 1968, pp. 1275-1276.
- [17] "The Desirability of Using Radiopaque Plastics in Dentistry: A Status Report," Council on Dental Materials, Instruments, and Equipment, *Journal of the American Dental Association*, Vol. 102, March 1981, pp. 347-349.

Address requests for reprints or additional information to
 Howard C. Adelman, M.D.
 Director of Pathology
 St. Joseph Riverside Hospital
 1400 Tod Ave., N.W.
 Warren, OH 44485