Videolaryngoscopy for Removal of Airway Foreign Bodies: Surgical and Anesthetic Considerations
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INTRODUCTION
Patients with foreign body aspiration (FBA) commonly present to emergency departments and require urgent otolaryngology consultation. Upper airway foreign bodies are particularly challenging due to the risk of dislodging the object into an unfavorable position during airway manipulation, causing aspiration and/or obstructing ventilation.

The successful removal of tenacious upper airway foreign bodies requires a team approach by the anesthesiologist and otolaryngologist in order to provide appropriate levels of sedation and airway stabilization. Direct laryngoscopy with bronchoscopy is a common method for removing foreign bodies from the upper airway.

We report the use of the video laryngoscope for successful andatraumatic removal of upper airway foreign bodies in our own patients and discuss the anesthetic and surgical considerations in patients with FBA.

CASE ONE
- 51yo female with history of CKD and CHF presented with a history of losing her partial denture prosthesis while swallowing pills.
- Noted on plain radiographs to have a supraglottic foreign body at an outside hospital (see below). She was transferred to our facility maintaining her own airway with minimal discomfort or distress.
- Flexible laryngoscopy revealed a foreign body resting at the level of the aryepiglottic folds. A surgical injury was used to visualize the epiglottis and supraglottis and the patient was removed with Magill forceps.
- The patient subsequently went into laryngospasm and became apneic. The GlideScope was then used to visualize the glottis and orotracheally intubate the patient. After several minutes, the patient was extubated successfully.

CASE TWO
- 49yo male with a history of mental illness and previous foreign body ingestion presented to our facility after swallowing a razor blade.
- A plain film demonstrated the foreign body at the level of the vallecula (see below). The patient was taken to the operating room and a rapid sequence induction with propofol and succinylcholine was performed. The GlideScope was immediately used to visualize the small razor blade in the vallecula while the patient was apneic.
- Using Magill forceps, the object was successfully removed (see below), and the patient was then intubated.
- Operative laryngoscopy, bronchoscopy, and esophagoscopy revealed no additional ingested objects. He was subsequently reawakened and extubated successfully.

ANESTHETIC MANAGEMENT
- Key is communication between the anesthesiologist, the surgeon and OR nursing staff re: sequence of events and preparation for potential complications.
- The type of airway instrumentation, as well as who will be performing it, must be determined by the surgeon and anesthesiologist prior to proceeding to the OR.
- Preoperative review should include history of previous anesthetics, including airway management. Imaging studies can aid in locating the object, as well as its orientation and possible trajectories. Preparation should include consideration of the mechanical and/or chemical effects of the object.
- Physical exam should minimize neck extension to prevent dislodgment of the object and phonation should be strictly avoided to prevent any further movement or damage by the object.
- Anxiety should be used with utmost caution. Consideration for glycopyrrolate is prudent to dry out airway secretions, which may be copious due to the foreign object.
- Anesthesia for retrieval of foreign bodies can vary from topicalization with local anesthetic to general anesthesia with volatile agents or intravenous agents.
- It is best to avoid positive pressure ventilation with mask ventilation
- Body habitus, ability to tolerate apnea, medication tolerance, and cooperation may guide use of type of sedation

OTHER CONSIDERATIONS
- In all patients with a FBA, NPO status <8 hours, and airway compromise ideally need to undergo an intravenous rapid sequence induction with gentle cricoid pressure and immediate placement of an endotracheal tube to protect the airway.
- Conversely, in a patient that is kept spontaneously ventilating without paralysis, coughing or bucking due to an inadequate plane of anesthesia may also dislodge the object or cause severe laryngospasm or bronchospasm.
- Objects that are difficult to retrieve may require the patient to be paralyzed so that the surgeon has the best working environment in which to successfully complete removal as quickly as possible.
- Standard airway precautions (backup and standard instrumentation available, including operative laryngoscopes, bronchoscopes, and esophagoscopy)
- Surgical and anesthetic teams should be prepared for emergent tracheotomy in the event of unforeseen problems.

REFERENCES

SURGICAL CONSIDERATIONS
- Telescopic video laryngoscopy for FBA has disadvantages of repeated manipulations, the need for possible direct laryngoscopy as a fallback procedure, and fogging phenomenon as frequent problems, which would be obviated using the GlideScope.
- Glidescopes offer the additional advantages of not requiring general anesthesia so that foreign bodies may be removed in a safe manner prior to intubation when intubation may dislodge the object and cause airway distress.
- Video laryngoscopes allow the anesthesiologist and the otolaryngologist simultaneous views and allow for immediate placement of an endotracheal tube after foreign body removal.
- Magill forceps are commonly used, as they are readily available from the anesthesiologist, but may not be optimal for videolaryngoscopy.
- Boedeker (curved) forceps and kidney stone are alternatives

CASE ONE
- Figure 1. A 51yo female with a dental prosthesis lodged in the supraglottis and hypopharynx

CASE TWO
- Figure 2. A 49yo male with a razor blade lodged in the vallecula

VIDEO LARYNGOSCOPY
- A GlideScope GVL® Video Laryngoscope was used for visualization and foreign body retrieval by the surgeon in both cases (Verathon, Inc.; Bothell, WA).
- 6.5 inch color monitor with 320x240 pixel display with anti-reflective coating and anti-fog lens coating.
- 3 reusable blade sizes, unique blade angulation for Macintosh indirect lift of the epiglottis or a Miller lift.
- Sharp angulation also allows for minimal airway manipulation, including minimal neck extension and tongue retraction during intubation, without reducing exposure.

Figure 3. The razor blade from Figure 2 shown on GlideScope view and after removal

Figure 2. A 49yo male with a razor blade lodged in the vallecula

Figure 1. A 51yo female with a dental prosthesis lodged in the supraglottis and hypopharynx