Suspected pharyngoesophageal perforation after a difficult intubation: A case report

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Although uncommon and rarely reported, pharyngoesophageal perforation has medical and legal consequences of substantial proportion. Perforation of the upper aerodigestive system may result in severe airway complications that include pneumothorax, pneumonia, mediastinitis, and retropharyngeal abscess. Despite the relative rare occurrence of esophageal perforation during intubation, this type of injury is associated with the poorest outcome, especially when the diagnosis and treatment are delayed.

Our case report presents a healthy 23-year-old female for a thyroidectomy. Postoperatively she developed what appeared to be symptoms of pharyngoesophageal injury, suspected to be related to blunt trauma from laryngoscopy. Knowledge of and prompt attention to the cardinal signs of pharyngoesophageal injury in partnership between the anesthetist and the surgical team were the key instruments in ruling out this potentially devastating diagnosis.

Key words: **Adverse respiratory events, esophageal perforation, pharyngoesophageal perforation.**

Early recognition of injuries resulting from instrumentation of the airway and placement of an endotracheal tube is essential. The morbidity and mortality associated with these injuries, especially perforation of the upper aerodigestive system, is substantial, and the potential medical and legal consequences of unrecognized injuries is enormous.[1] The ability to promptly detect injuries of the upper aerodigestive system, namely pharyngoesophageal perforation, is strongly associated with reduced morbidity and mortality.[1,2] This case report presents a suspected case of esophageal injury following a difficult intubation in a patient undergoing a scheduled total thyroidectomy.

Case summary

A 23-year-old woman weighing 67 kg was scheduled for a total thyroidectomy secondary to a multinodular thyroid tumor. Her medical and surgical history was insignificant. She had no history of licit or illicit drug use. Preoperative laboratory studies were normal. Radiographic studies indicated no tracheal deviation or other airway involvement. Physical examination revealed a large, firm, mobile mass in the midline of the neck. No limitation in range of motion of the cervical spine or mouth opening was appreciated. Her Mallampati classification was class II with only faucial pillars and soft palate visible, and the thyromental distance was estimated to be greater than 7 cm. She denied subjective complaints of dyspnea or dysphagia.

Upon entering the operating suite, premedication consisted of administration of intravenous (IV) midazolam and fentanyl. Concurrently, preoxygenation with 100% oxygen was instituted by face mask and standard monitors were applied. Induction was accomplished with the IV administration of lidocaine and propofol. When the ability to ventilate by mask was confirmed, muscle relaxation was accomplished with the IV administration of rocuronium. Readiness for intubation was assessed via peripheral nerve stimulation.

Following placement of the head in the sniffing position, laryngoscopy was performed using a Macintosh size 3 blade. A first-year nurse anesthesia student was unable to directly visualize the vocal cords. The addition of the Sellick maneuver and repositioning of the head provided minimal improvement in laryngeal exposure. The epiglottis, arytenoid cartilage, and base of the glottic opening were the only structures visible, which was consistent with grade II laryngeal exposure. Orotracheal intubation was attempted employing a 7.5-mm wire-reinforced endotracheal tube fitted with a malleable wire stylet. The stylet did not protrude further than the distal opening of the endotracheal tube. After placement of the endotracheal tube, esophageal intubation was presumed based on the absence of bilateral breath sounds, end-tidal carbon dioxide, and chest excursion with controlled ventilation. The endotracheal tube was immediately removed and mask ventilation was resumed. An experienced anesthesia provider performed laryngoscopy and successfully placed the endotracheal tube. The second laryngoscopy failed to reveal signs of obvious trauma to the airway.

Following successful placement of the endotracheal tube, the case proceeded and concluded without further difficulty. Maintenance was achieved with

inhaled anesthetic gases, isoflurane, nitrous oxide, and oxygen. Supplemental doses of fentanyl were given intravenously at 1-hour intervals based on clinical evaluation for a total of 250 µg. Emergence was uneventful and the trachea was extubated without complication. The patient was transported to the postanesthesia care unit in stable condition.

On the first postoperative day, the patient became febrile with a maximum temperature of 38.3°C. Crepitus was palpated along the angle of the mandible to the superior border of the clavicle consistent with subcutaneous emphysema. The patient also subjectively reported throat soreness, mild dysphagia, and neck pain. A chest roentgenogram was ordered and it revealed questionable pneumomediastinum. An endoscopic examination of the upper airway was performed that revealed the absence esophageal trauma. Treatment included no oral feeding, insertion of a nasogastric tube, and IV antibiotics. On the second postoperative day, the throat soreness and subcutaneous emphysema had significantly resolved. Additionally, the patient had remained afebrile for a 24-hour period. A Gastrografin swallow study and computed tomography scan were ordered. The swallow study showed no extravasation of contrast medium from the esophagus, and computed tomography scan did not reveal free air in the mediastinum or retrophayngeal space. The conclusion based on these findings for the etiology of the subcutaneous emphysema was postsurgical free air in the soft tissues of the neck. The patient was discharged early on the third postoperative day. Routine follow-up visits with the surgeon revealed no further complications.

Discussion

The American Association of Nurse Anesthetists and the American Society of Anesthesiologists closed claims analysis underscores the seriousness of pharyngoesophageal perforation.[1,3] Despite the relatively rare occurrence of this type of injury compared to other airway injuries, pharyngoesophageal perforation, especially when diagnosis and treatment were delayed, was associated with the poorest outcome. The late sequelae of undiagnosed pharyngoesophageal perforation are mediastinitis, retropharyngeal abscess, pneumonia, pericarditis, and death.[1,4,5] Earlier signs are pneumothorax and pneumomediastinum (Table 1).[2,4] Moreover, the amount of payment for this type of injury was significantly higher than payments secondary to all other airway injuries combined.[1]

Contributing factors demonstrating the strongest correlation with pharyngoesophageal perforation are difficult intubation, age older than 60 years, and female gender (Table 2).[1] Several published case reports have identified laryngoscopy performed by an inexperienced laryngoscopist as a contributory factor in many instances of pharyngoesophageal perforation.[2,7] The bevel tip of the endotracheal tube and the use of a rigid stylet also have been implicated in this type of airway injury.[6,7] Cardinal signs of pharyngoesophageal perforation that should prompt the anesthetist to investigate the possibility of this type of injury are subcutaneous cervical emphysema, fever, neck pain, and dysphagia.[2,5,7] Confirmatory diagnostic studies are chest roentgenogram, endoscopic evaluation of the hypopharynx, esophagogram, and computed tomography scan.[7]

Table 1. Cardinal signs and symptoms of pharyngoesophageal perforation[1,2,4]

Early signs and symptoms
Neck pain
Cervical crepitance
Fever
Dysphagia
Cervical swelling
Pneumothorax
Pneumomediastinum
Late signs and symptoms
Retropharyngal abscess
Mediastinitis
Pneumonia
Pericarditis
Pneumomediastinum

Table 2. Risk factors for iatrogenic pharyngoesophageal perforation[1,5,6]

Female gender
Age > 60 years
Anatomical problems with airway
Broad or short neck
Micrognathia
Trismus
Poor dental health
Macroglossia
Cervical spondylosis
Inexperience of individual performing laryngoscopy
Use of rigid stylet

When detected promptly, most patients respond well to conservative treatment such as broad spectrum antibiotics and no oral feeding.[8] Therapeutic approaches are surgical repair of the perforation, parenteral antibiotics, drainage of retropharyngeal and mediastinal abscesses, nasogastric tube, and parenteral nutrition.[2,4,5,7] The surgical team needs to be aware of instances when intubation is difficult. They too must be aware and observant for clinical signs and symptoms of pharyngoesophageal perforation to facilitate early detection.[6] The partnership between the anesthetist and surgical team can thwart the potentially devastating consequences of this uncommon airway injury.

In order to identify pharyngoesophogeal perforation in its early stage, the anesthetist must suspect this injury when the patient was difficult to intubate and has developed its cardinal signs and symptoms. Close communication with the surgical team will facilitate prompt recognition and early management, whether operative or nonoperative, decreasing the likelihood of the injury progressing into the later stages.

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