

CASE REPORT

ESOPHAGEAL LACERATION WITH MASSIVE SUBCUTANEOUS EMPHYSEMA: A RARE COMPLICATION OF ENDOTRACHEAL INTUBATION

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ABSTRACT: Although uncommon, and rarely reported, esophageal perforation has significant medical and legal consequences. Upper aero digestive tract injury can result in severe complications like pneumothorax, pneumonia, retropharyngeal abscess, retrosternal abscess, mediastinitis etc. Such patients have very poor outcome especially if there is a delay in diagnosis and treatment. Our patient sustained a laceration of the upper esophagus associated with subcutaneous emphysema after a difficult direct laryngoscopy and failed intubation. The importance of prompt diagnosis and treatment in the event of this rare complication and the different causative factors are discussed.

KEYWORDS: Esophageal laceration, endotracheal Intubation, subcutaneous emphysema.

INTRODUCTION: Aero-digestive tract injury during general anesthesia is a significant source of morbidity for patients and a source of liability for anesthesiologists. Karen B. Domino et al¹ analysed the ASA Closed Claims database which showed that most claims for esophageal injuries were for esophageal perforation (n= 43 of 48 esophageal injuries, 90%). Sixty-two percent (n= 30) of all esophageal injuries were associated with difficult intubation (P <0.001 compared with all other sites combined.). In addition, esophageal injuries involved a significantly greater proportion of females (P <0.001) and patients older than 60 yr of age (P<0.001) compared with other sites combined. Esophageal injuries were more severe than all other types of airway injury combined, with 9 (19%) deaths (P= 0.005). Perforation of the esophagus was associated with poor outcome.

Laceration of the trachea has been reported as a result of repeated attempts at a difficult intubation, especially if a stylet is used (Schild et al, 1976).² Other causative factors reported are tracheal abnormalities (Thompson and Read, 1968)³ and overinflation or rupture of the cuff of an endotracheal tube (Couniot and Santy, 1955; Elman et al, 1955; Tornvall et al, 1971),⁴ but tracheal laceration can occur in apparently uneventful intubation too (Kumar et al, 1977).⁵

CASE REPORT: An 80 year old female was admitted to the ENT department of Medical College Kottayam with complaints of discharge from right ear for 1 month duration and with the help of clinical examination and relevant investigations, the diagnosis of Chronic Suppurative Otitis Media. She was posted for Mastoid exploration under General Anesthesia. She gives history of systemic hypertension and was on Nifedipine for 5 years. There is no history of any other co-morbid illness. She gives no history of any respiratory tract illness or any other illness of acute onset. Pre anesthetic evaluation revealed the following. She was a very small built and poorly nourished lady with a total body weight of 35kgs with a BMI of 18.6. Her blood pressure was 140/100 mmHg, with a pulse rate of 82bpm, she was afebrile and her other general examination findings were within the normal range. Examination of her cardiovascular, respiratory and neurological systems revealed no abnormalities.

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Her airway evaluation revealed a possibility of a difficult intubation. Mallampatti grade was 4, mouth opening was only 2 finger breadth and Thyro-mental distance was 3 finger breadth.

She was brought to the Operation theatre where the findings of the pre-anesthetic check-up were confirmed. An 18G iv canula was secured on her right forearm vein and a normal saline drip was maintained. ECG, Blood pressure, heart rate and oxygen saturation were monitored. She was preoxygenated with 100% Oxygen for 3 minutes and was given Midazolam 0.5 mg iv, Glycopyrolate 0.2 mg iv, Pentazocin 6mg iv, Ondansetron 3mg iv. She was induced by Inj. Thiopentone titrated to loss of eyelash and eyeball reflexes with a total of 150mg, followed by Ligocaine iv 50 mg. Mask ventilation was possible and she was paralyzed using Succinylcholine 50 mg iv. After 60 seconds, Direct laryngoscopy was tried but intubation was not possible due to inadequate glottic view. Direct laryngoscopy was repeated thrice with a different blade and by a senior anesthesiologist and using gum elastic bougie but the scopy failed to provide any better view of the glottis. Video laryngoscope and Fiberoptic bronchoscope were not available in the ENT OT. The procedure was postponed to a later date for an elective fiberoptic bronchoscopy and intubation. All through the attempts of intubation, oxygenation was well maintained by intermittent mask ventilation. Once spontaneous ventilation was resumed and tidal volume was adequate an FiO₂ of 40% was maintained using Venturi mask. She was shifted to the recovery room once she was fully awake. She was given Inj. Dexamethasone 8 mg iv.

Within 15 to 20 minutes she developed fullness and swelling of the neck and upper chest wall which gradually spread to her face. Palpation revealed crepitus. She had no respiratory distress of any kind and her chest had bilaterally equal air entry. Her vitals were stable and she was shifted to Anesthesia ICU for close monitoring. An X-ray chest was taken which revealed subcutaneous emphysema with pneumomediastinum. An emergency cardiothoracic surgery consultation was sent for and a working diagnosis of possible esophageal injury was made and acted upon. A Ryle's tube was placed for continuous gastric aspiration, and she was put on broad spectrum antibiotics. On the second day an Oral contrast CT was taken which revealed a leak of contrast from the upper esophagus at the level of T1. Thoracic surgeon advised conservative management for 10 days and to have a repeat CT thereafter. Ryle's tube feeding was started on third day and continued for 10 days along with antibiotics and maintenance of good oral hygiene. The Subcutaneous emphysema improved clinically from day three and was minimal by day 5. Repeat CT was taken on the 10th day which revealed persisting contrast leak. As per the opinion of the cardiothoracic surgeon, she was put on conservative management and Ryle's tube feed for a month. Until day 15, she had not developed any signs of complications like mediastinitis, pneumonia, retropharyngeal abscess or pericarditis. But because of financial constraints, the family had to take her home and she was discharged. She never came for follow up.

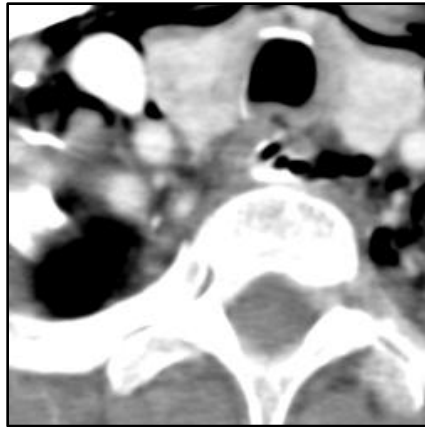
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Pre Procedure X-ray Chest



Post Procedure X-ray Chest showing Evidence of pneumomediastinum along with surgical emphysema



CT with oral contrast showing dye leak at the level of T1 vertebra

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.^{1,5,7} Earlier signs are pneumothorax and pneumomediastinum (Table 1).^{2,7} Moreover, the amount of payment of compensation for this type of injury was significantly higher than payments secondary to all other airway injuries combined.¹

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Table 1: Cardinal signs and symptoms of pharyngoesophageal:

Perforation^{1,2,4}

Early signs and symptoms

Neck pain
Cervical crepitation
Fever
Dysphagia
Cervical swelling
Pneumothorax
Pneumomediastinum

Late signs and symptoms

Retropharyngeal abscess
Mediastinitis
Pneumonia
Pericarditis
Pneumomediastinum

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.⁸ The bevel tip of the endotracheal tube and the use of a rigid stylet also have been implicated in this type of airway injury.⁸ 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.⁸ Confirmatory diagnostic studies are chest roentgenogram, endoscopic evaluation of the hypopharynx, esophagogram, and computed tomography scan.⁸

Table 2: Risk factors for iatrogenic pharyngoesophageal:

Perforation:

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.^{8,9} 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. The team work between the anesthetist and surgical team can thwart the potentially devastating consequences of this uncommon airway injury.

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In order to identify pharyngoesophageal 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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