

Tracheal injury: late symptom after double-lumen tube intubation - A case report

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Abstract

As a basic skill, endotracheal intubation, performed throughout the world by health care professionals is a relatively safe and effective maneuver. However, this technique is not risk free and could lead to many serious complications. We wanted to report that in a patient with double lumen tube intubation, airway trauma can cause late symptoms. We thought that such complications must be published to share experiences.

Keywords: Tracheal intubation, Double-Lumen tube, Late symptoms of tracheal injury

Introduction

Maintaining sufficient lung ventilation is an integral part of managing patients both in emergency rooms and operating rooms. Endotracheal intubation procedural skill is basically performed throughout the world by healthcare professionals and is relatively safe and is among the most effective procedures. Besides being one of the commonly performed procedures, one should be aware that endotracheal intubation is not risk-free and its complications, from mild injuries to severe long-term, life-threatening results, are comprehensively elaborated in literature.¹

The rate of airway complications, resulting from endotracheal intubation with single or double lumen tube, ranges from 0.5 to 7%.¹

In addition to injuries that can occur during tube placement or replacement, ruptures on the tissue can be observed due to over-inflation of the cuff large size tube repeated entubation, therapeutic endobronchial intervention.^{3,4} Dyspnoea, haemoptysis, (massive) soft-tissue or mediastinal emphysema, pneumothorax, pneumomediastinum and emphysema are the common symptoms of tracheobronchial injuries.⁵ Although clinical manifestations may generally occur immediately, slower manifestation of symptoms such as subcutaneous emphysema, respiratory failure, pneumothorax and haemoptysis may delay recognition in some cases.⁵ The diagnoses of tracheobronchial injuries are not always

easy, since the actual presentation of the medical condition might be late and require serious medical attention, therefore the diagnoses could be delayed. Very mild injuries are treated conservatively; however, it is reported that most of the injuries are transmural lacerations and require surgical repair.⁶ Diagnosis depends on tracheobronchoscopy, chest radiography and computed tomography. Surgical repair must be done immediately if the laceration is bigger than 2 cm.⁵

We present a case of tracheal injury with late symptoms; which was seen in Kocaeli University Hospital in March 2017.

Case Report

The patient was a 28 years old female with lung cancer with weight of 60 kg and 162 cm height. Right upper lobectomy was planned for the patient. No additional systemic diseases were present in her medical history and no significant findings were observed in her physical examination. In the preoperative airway examination, mouth opening was normal and her mallampati score was I.⁷ Laboratory tests results were within normal limits. Her American Society of Anaesthesiologists (ASA) score was I.⁸ The patient was informed about the outcomes of the surgical procedure and her informed consent was obtained. She was continuously monitored in the operating room. The heart rate was 70 beats/min, noninvasive arterial blood pressure 110/65 mmHg, and

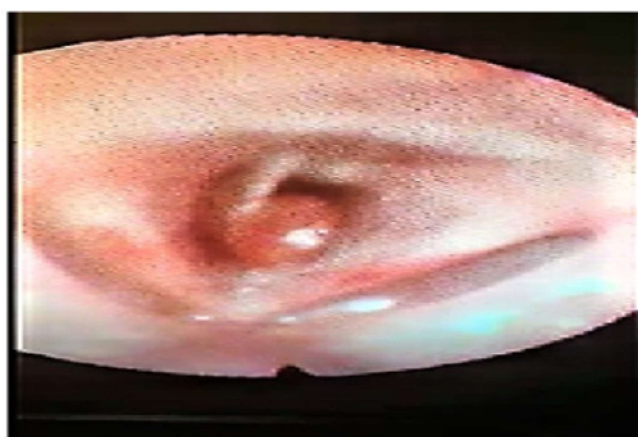


Figure-1: Rupture of the laryngeal mucosa.

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Figure-1: Rupture of the laryngeal mucosa.

arterial oxygen saturation 98%. Propofol 3 mg / kg, fentanyl 2 mcg / kg, rocuronium 0.6 mg / kg were administered intravenously during induction of anaesthesia. Obtaining enough skeletal muscle relaxation, the patient was intubated with the left double lumen tube number 35. The bronchial cuff was inflated and the location of the tube was checked with a stethoscope. It was found in the right main bronchus therefore, the tube was withdrawn and replaced again. After the second attempt, both lumens were evaluated with a fiberoptic endoscopy and no bleeding or damage was observed. Sedation was done with propofol and remifentanyl infusion. Adequate intraoperative stability was obtained. No haemodynamic or respiratory deterioration was observed. The patient was administered intravenous morphine and paracetamol for postoperative analgesia. Postoperative muscle relaxation was reversed by the administration of sugammadex. The patient did not show any reaction to the endotracheal tube before extubation. No postoperative problems were reported in the intensive care unit and the patient was transferred to the service room to be followed up. On the postoperative day 2, she developed respiratory distress and stridor. The physical examination of the patient was normal. Chest X-ray revealed no related pathology. The otorhinolaryngologic evaluation revealed oedema of the vocal cords and rupture of the laryngeal mucosa (Figure-1, 2). The bulla was moving with breathing and was partially blocking the airway. During the examination, the respiration of the patient was disturbed after the bulla was ruptured. The otorhinolaryngologist planned a mucosal repair surgery and the patient was operated again. She was intubated

with Internal Diameter (ID) No. 5 endotracheal tube and the tear in the mucous membrane was repaired. After the operation, the patient was extubated and followed up for 6 hours in the intensive care unit. The blood gas values were pH: 7.37, pCO₂: 44.6, and pO₂: 87.4. When the patient regained consciousness and her haemodynamic parameters were stable, she was transferred to the chest surgery clinic again. No clinical problems were encountered in the follow-up. The patient consented for publication of this report.

Discussions

Tracheobronchial injuries, including penetrating, blunt or iatrogenic thoracic trauma, may occur especially after the administration of endotracheal intubation after a large airway intervention. It is mostly observed in females, in patients with tracheal wall weakness as a result of inflammatory diseases, in patients with long-term systemic corticosteroid therapy, and in patients with congenital tracheal malformations.⁹ Clinical features are seen as dyspnoea, stridor, haemoptysis, subcutaneous emphysema, tension pneumothorax, persistent or large air leak, and flail chest. Our patient was a non-obese female and she was not taking corticosteroids. The main reasons of this injury are the selection of the inappropriate tube size, overinflation of the cuff and instantaneous movements of the tube.⁹ The direct injury caused by the tube occurs after multiple orotracheal intubation interventions in the emergencies.¹⁰ Other mechanisms include improper usage of the guide, replacement of the tube and incomplete deflation of the cuff during removal.⁹ In our case, the double lumen tube was inserted twice, without causing any problems. Interestingly, on postoperative day 2, she encountered breathing problems and was diagnosed as respiratory distress and stridor. There is always a wide range of risks for tracheal injury, from a laceration to bronchial rupture during endotracheal intubation with a double lumen tube.¹¹ The higher risk factors are known as the patients over 50 years of age, females, the use of double lumen tube, and over-inflation of the cuff. Lower risk factors include the medication of corticosteroids, tracheomalacia, malpositioning of the tube, poor medical conditions, excessive coughing and misuse of the stylet. On the other hand, unproven risks are believed as percutaneous tracheostomy, short stature, and obesity.¹² Endotracheal intubation is a safe, life-saving procedure. Rare injuries can be observed performing

endotracheal intubation. Soft tissue haematomas and lacerations may be developed in the nose and mouth cavities, oropharynx and larynx. These injuries are often caused by a set back in laryngoscopy or tube placement. Most of these injuries recover spontaneously without presenting with severe symptoms or permanent sequelae.²

Conclusions

In airway manipulations, except for the routine intubations, extra precautions must be taken. Possible reasons for airway injuries during endotracheal intubation should be controlled. Early assessment by otorhinolaryngologist should be performed to the patients older than 1 month, who has severe, acute, soft tissue injuries has severe symptoms after extubation and presenting post-extubation symptoms (voice, dysphagia, aspiration). Cuff pressures and tube size should be monitored to avoid over inflation. It is necessary to ensure that the endotracheal tube is visible on the distal fiberoptic bronchoscopy monitor for double lumen tube intubations. If any pathological findings are observed in patients during the postoperative follow-up period, common treatment protocols should be initiated with an otolaryngologist. It is important to remember that this cooperation is life-saving for the patient.

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