Case Report

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A Case of A Fractured Fragment of Tracheostomy Tube Entering the Left Bronchus: A Case Report

K. Amini (MD)[1], M. Vakili Ogharood (MD)[2], M. Davari (MSc)[3], S. Ershadifard (MSc)[3], H. Asadi (MSc)*[4]

1.Department of Emergency, School of Medicine, Ardabil University of Medical Sciences, Ardabil, I.R.Iran

2.Department of Surgery, School of Medicine, Ardabil University of Medical Sciences, Ardabil, I.R.Iran

3.School of Nursing and Midwifery, Ardabil University of Medical Sciences, Ardabil, I.R.Iran

4.Student Research Committee, Ardabil University of Medical Sciences, Ardabil, I.R.Iran

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ABSTRACT

BACKGROUND AND OBJECTIVE: Tracheostomy is one of the most common surgeries in patients with upper airway defects. Tracheostomy is a surgical procedure to open a side passage through the neck into the trachea to stabilize the airway. The complications of this operation are very important, common and at the same time preventable. The purpose of this article is to report a case of a fractured fragment of tracheostomy tube entering the left bronchus.

CASE REPORT: The patient was a 34-year-old man diagnosed with amyotrophic lateral sclerosis and quadriplegia, who has had a tracheostomy tube for 7 years, who referred with complaint of shortness of breath following a tracheostomy tube fracture. The patient had 60% saturation and significant respiratory distress. After confirming the fracture of the tracheostomy tube with a CT scan of the lung, the fractured fragment was removed with rigid bronchoscopy and the tracheostomy tube was re-inserted for the patient. The patient was discharged from the hospital two days after tracheostomy.

CONCLUSION: In case of shortness of breath and decreased saturation, tracheostomy tube fracture should be considered. Proper cleaning and planned replacement of the tracheostomy tube may prevent this complication.

KEY WORDS: *Tracheostomy, Airway, Foreign Body.*

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***Corresonding Author: H. Asadi (MSc)**

Address: Student Research Committee, Ardabil University of Medical Sciences, Ardabil, I.R.Iran

Tel: +98 45 33258763

E-mail: asadihosein5361@gmail.com

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Introduction

Tracheostomy is one of the major ways of managing upper airway problems, during which a hole is made in the anterior wall of the trachea to establish the airway (1). This method is often not permanent and is temporary and reversible (2). This method was first invented by the Greeks and its history dates back to BC era (3). Nowadays, tracheostomy is performed by two methods: open surgery and percutaneous tracheostomy (4). In the early 1900s, Chevalier Jacksons developed the open surgery method, but the use of the percutaneous method has increased in recent years (5).

The time to perform a tracheostomy is during the first three weeks of intubation, but the most appropriate time is after the first week. Studies have shown that early tracheostomy reduces mortality (6). Tracheostomy as a second method is mostly performed in patients who require long-term and permanent ventilation and continued intubation in these patients will be associated with serious complications (7). Tracheostomy has several advantages over endotracheal intubation, including lower airway resistance, less dead space, less movement of the tube inside the trachea, more comfort for the patient, proper discharge of secretions, the possibility of receiving food through the mouth and the possibility of the patient talking through special tubes (8). In addition, tracheostomy allows the patient to be more mobile and even allows the patient to get out of bed (9).

Complications due to tracheostomy are divided into three categories: complications during tracheostomy, early complications and late complications. The prevalence of complications is reported to be between 5 and 40%. Early complications include bleeding, pneumothorax, and damage to neck organs. Late complications include tracheostomy tube removal, tracheoesophageal fistula, and damage to trachea (10). The rate of tracheostomy complications will vary depending on the surgical technique, intraoperative and postoperative care, the duration of the operation and the patient's medical condition (11).

Complications of tracheostomy and proper management of these patients are a challenge in patients who are cared for at home and without proper training, complications in these patients will be inevitable (6, 9). Post-tracheostomy care is a very important care point for the proper management of these patients, which requires a lot of time and money (12). Despite reports of tracheostomy tube fractures in studies, reporting specific cases and examining clinical differences between patients and the factors involved in causing these problems can increase clinical knowledge and by integrating this with the results of previous studies, we can improve the patients' lives and prevent the complications of clinical procedures. Periodic examination of patients with long-term tracheostomy should be given more attention as an important key point to reduce possible complications in these patients. The aim of this study was to report a case of a fractured fragment of tracheostomy tube entering the left bronchus.

Case Report

This study was approved by the ethics committee of Ardabil University of Medical Sciences with the code IR.ARUMS.REC.1400.051. The patient was a 34-year-old man with amyotrophic lateral sclerosis and quadriplegia who had a tracheostomy tube for 7 years. The patient was referred to the emergency department of the hospital by emergency personnel with obvious distress and shortness of breath with the possibility of tracheostomy tube fracture (according to the patient's companions).

Patient saturation was 60% at the hospital emergency department. The patient's vital signs at the time of admission to the emergency department were respiratory rate of 8 beats per minute, heart rate of 100 beats per minute, and temperature of 38.2 ˚C. On auscultation of lungs, the breathing sounds on both sides were almost the same. The results of blood tests at the time of admission to the hospital were: white blood cells 20.8, red blood cells 4.94, hemoglobin 16.1, hematocrit 45.5, blood sugar 147, urea 13, sodium 149 and potassium 4.

Considering the clinical condition, the patient was immediately transferred to the CPR room. Examination revealed that the inside of the patient's tracheostomy tube was fractured and fell into the lungs. Due to the change in the patient's clinical condition and the possible decrease in saturation in the patient, endotracheal intubation was performed with tube number 6. After performing primary clinical care and stabilizing the patient's condition, the patient was transferred to the intensive care unit with 90% saturation. On the day of admission, a CT scan of the lung was performed, which showed fractured tracheostomy tube on the junction of the tube to the outer edges and the fall of the fractured fragment into the left bronchus (Figure 1). The fractured fragment entered the endotracheal tube and was unusually located

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in the left bronchus (Figure 2). The diagnosis of this rare complication was made quickly and the patient was sent to the operating room. The fractured fragment was removed using rigid bronchoscopy by a thoracic surgeon and the patient underwent re-tracheostomy tube. The patient was discharged from the hospital two days after tracheostomy tube insertion (Figure 3).

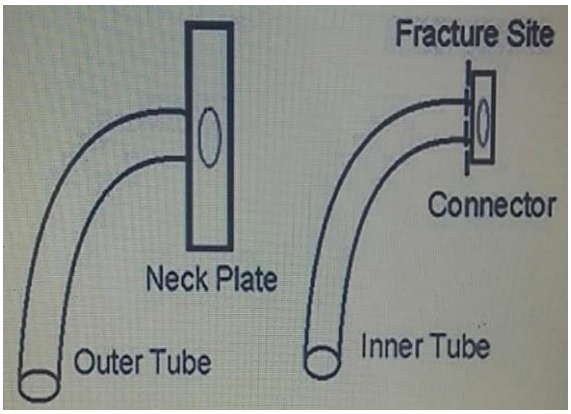

Figure 1. Fracture site at the junction between the inner tube and the connector

Figure 2. Radiograph of the patient after the fragment enters the left bronchus

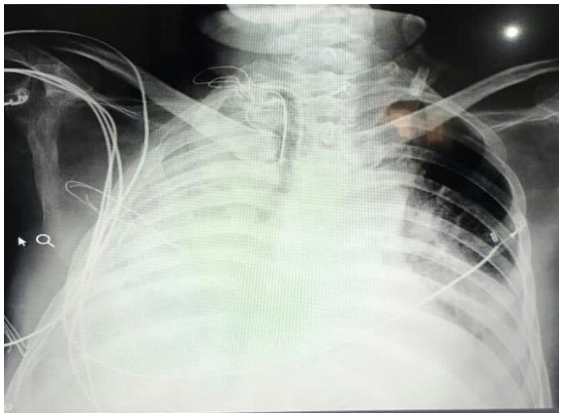

Figure 3. Re-tracheostomy of the patient after removal of the fragment

Discussion

In this study, a patient with symptoms of respiratory distress and shortness of breath with 60% saturation and a history of tracheostomy tube from 7 years ago referred to the emergency department. After CT scan of the lung, it was found that the patient's tracheostomy tube was fractured and the fractured fragment entered the left bronchus.

In the study of Nemati et al., a case of tracheostomy tube fracture was reported in a 58-year-old patient. Preliminary examination showed that the patient had mild symptoms of distress when he went to the emergency room. The auscultation of lungs was almost identical on both sides, but after a lung x-ray, it was clear that the tracheostomy tube was fractured and has entered the right bronchus. Tracheostomy tube fracture occurred after 14 months in the patient (3). In the present study, the patient had clear respiratory distress when referring to the emergency department of the hospital and had a decrease in saturation, and the fracture of the tracheostomy tube occurred over a long period of time. In the present study, a fractured fragment had fallen into the left bronchus, which was not in line with the results of the study of Nemati et al.

In a study by Piromchai et al., where a tracheostomy tube fracture occurred in a child, the patient was a 14-year-old child with a tracheostomy tube who developed an intermittent cough 2 months after tracheostomy tube insertion. While cleaning the tracheostomy tube, the child's parents notice that the inner part is detached and took the patient to the hospital. After performing an x-ray of the patient's lung, it was found that the tracheostomy tube was fractured and the fractured fragment was in the right bronchus. The fracture site of the tracheostomy tube was in the area between the inner tube and the connector (4).

In the present study, the fracture site was the junction between the inner tube and the connector. However, there is a difference regarding the time of fracture between the present study and the study of Piromchai et al. Differences in these results can be due to the material and type of tracheostomy tube, how to take care of the tracheostomy area and the level of knowledge of caregivers on how to clean the tracheostomy tube. One of the weak points in tracheostomy tubes is the area where the inner tube connects to the outer part of the tube, which can be the main site of fractures (4). In a study by Ganjloo et al., the patient was a 74-year-old man who underwent craniotomy, drainage, and decompression surgery with

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a diagnosis of extensive right frontal lobe hematoma. A tracheostomy tube was placed for the patient in the operating room. Two days after the tracheostomy, they noticed fractured tracheostomy tube during the examination. This fracture was on the junction of the tube with the outer edges. The fractured fragment has gone to the left bronchus (5). In the present study, the fractured fragment went to the left bronchus. However, there is a difference in terms of time. The material of tracheostomy tube and initial examination of the tracheostomy tube before placement can be effective in preventing the tracheostomy tube from breaking. Further evaluations about tracheostomy tubes and the use of standard tubes can be effective in controlling possible complications.

In a study by Sandeep et al., the patient was a 24-year-old boy who underwent tracheostomy four years ago following a car accident and quadriplegia. Following a change in the patient's clinical condition and shortness of breath, the patient was referred to the hospital by his parents, and after a lung x-ray, they notice that the tracheostomy tube was fractured. Patient saturation was 95% at the time of referral (13).

In the study by Moideen et al., the patient was a 42-year-old man who referred to the hospital with aspiration of a fractured fragment of tracheostomy tube. The patient has had a tracheostomy tube for the past three years and has not had a single visit to the hospital in the last two years. Tracheostomy tube fracture occured after the patient's caregiver cleaned the tube. The patient suffered from shortness of breath and mild distress on admission to the hospital. Patient saturation at referral was 97% (9).

Upper airway secretions and failure to follow the principles of tracheostomy tube cleaning and late follow-up to examine the location of the tracheostomy tube can be the causes of complications in patients undergoing tracheostomy (9, 14). In the present study, the fracture of the tracheostomy tube occurred after the tracheostomy tube was cleaned by the patient caregiver, which was in line with the results of the study by Moideen et al. In addition, the lack of follow-up to investigate the location of the tracheostomy tube in the present study was consistent with the results of the study by Moideen et al.

In the study of Waindeskar et al., the patient was a 35-year-old man who has had a tracheostomy tube for 9 years and has not visited the hospital since the tracheostomy tube was inserted until the tube was broken. The patient suffered from shortness of breath while cleaning the tracheostomy tube by his caregiver and was transferred to the hospital. In the initial examination, the patient's hemodynamic status was appropriate, but the patient's saturation was 94. After performing a lung x-ray, the patient had tracheostomy tube fracture that fell into the right bronchus (15). In the present study, the long life of the tracheostomy tube and lack of follow-up to investigate the location of the tracheostomy tube and the clinical error of the patient caregiver could be the possible reasons for the fracture of the tracheostomy tube. The location of the tracheostomy tube fracture in the present study was inconsistent with that of Waindeskar et al.

The patient's position when cleaning the airway, how the tracheostomy tube is cleaned by the patient caregiver, and the patient's position after suctioning or after the fracture of the tube can be effective on the location of the fractured fragment of the tracheostomy tube. Various factors are involved in corrosion of the tracheostomy tube and subsequent tube fracture, including endotracheal stenosis, inflammation, increased secretion, microbial colonization around the tube, alkaline secretions of the trachea, mechanical factors such as extraction and insertion of Nelaton catheter for suction, the use of high proportions of copper in the composition of tracheostomy tubes and finally cleaning solutions (3, 5).

The important point in this patient and patients with tracheostomy is that, depending on the patient's clinical condition, periodic examination of the tracheostomy tube should be performed. Moreover, holding training courses for the caregivers of these patients can be effective in improving their clinical condition and preventing possible fractures of the tracheostomy tube. In this patient, lack of regular follow-up by the patient and companions to determine the condition of the tracheostomy tube, long-term retention of the tube in place and clinical error of the patient caregiver while cleaning the tube can be the reasons for tracheostomy tube fracture. Fracture of metal tracheostomy tube is a rare complication and may be overlooked. This includes fractures at the junction of the inner tube and the connector. Proper cleaning and planned replacement of the tracheostomy tube may prevent this complication.

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