

Synchronous Bilateral Pneumothorax as a Complication of Tracheostomy

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Abstract

Tracheostomy is one of the most frequently performed surgical procedures in critically ill patients. Development of pneumothorax after tracheostomy is a rare but expected complication. We report a case of bilateral iatrogenic pneumothoraces due to a tracheostomy applied because of bilateral vocal cord paralysis associated with dyspnea. After tracheostomy, bilateral pneumothoraces were identified on chest X-ray. The patient was treated with bilateral tube thoracostomies.

Keywords: tracheostomy, bilateral pneumothorax, iatrogenic pneumothorax.

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INTRODUCTION

Ever-increasing utilization of invasive diagnostic and therapeutic interventions undoubtedly inflates the already significant incidence of iatrogenic pneumothoraces [1]. Tracheostomy is frequently performed as an elective therapeutic procedure and only rarely as an emergency procedure [2]. While complications are seldom and generally controllable, fatal complications can sometimes occur. Herein we report a case with iatrogenic development of bilateral pneumothoraces, which is an extremely rare and dangerous condition.

CASE PRESENTATION

A 33-year-old woman admitted to the emergency department with shortness of breath and numbness in her hands lasting for 15 days. During her initial examination, inspiratory stridor and hyperesthesia in the C6-7 dermatomes on the right were detected. Chest X-ray did not reveal any pathology. Laboratory tests were carried out by the Department of Neurology with the preliminary diagnosis of multiple sclerosis, but when the patient experienced an increase in shortness of breath, she was consulted with the Ear, Nose and Throat Department. The patient's blood gas analysis was pH: 7.29, PaO₂: 47, and PaCO₂: 68. After detecting bilateral vocal cord paralysis with direct laryngoscope, an emergency tracheostomy was performed. While the complaint of short-

ness of breath was diminished after tracheostomy with pH: 7.38, PaO₂: 88 and PaCO₂: 42, respiratory distress recurred after an observation period of approximately six hours. Blood gas analysis was pH: 7.33, PaO₂: 65, and PaCO₂: 57. An immediate chest X-ray revealed bilateral pneumothoraces, partial on the right and total on the left hemithorax. Bilateral tube thoracostomies were applied (Figure 1A-1B). In the follow-up, right and left chest tubes were removed on the fifth and the seventh days, respectively. When evaluating the etiology of acute respiratory distress and vocal cord paralysis, cranial CT and MRI revealed no pathology as well as completely normal neurological findings, and a diagnosis of idiopathic vocal cord paralysis was made. The patient was discharged with a permanent tracheostomy.

DISCUSSION

Pneumothoraces are classified as spontaneous and acquired. Acquired pneumothoraces are subdivided into iatrogenic, barotraumatic and traumatic. Medical interventions may result in iatrogenic pneumothoraces [3]. Iatrogenic pneumothoraces may have considerable associated costs including possible morbidity, mortality, and in one series, prolonged hospitalization in 8% of affected patients [1]. The exact incidence rate of iatrogenic pneumothoraces is unknown. In our clinic, from January 2003 to December 2004, we treated 196 patients with pneumothorax. Fifty-three patients were found to have iatrogenic pneumothorax. Sassoon et al. [4] reported the rates of iatrogenic pneumothorax among 538 patients as follows: transthoracic needle lung biopsy, 24%; subclavian vein catheterization, 22%; thoracentesis, 20%; transbronchial lung biopsy, 10%; pleural biopsy, 8%; and positive pressure ventilation, 7%.

Tracheostomy is one of the oldest surgical procedures. Although it was traditionally used for the treatment of upper airway stenosis, in recent years it is the primary surgical indication in the long-term intensive care unit patient. Obviously for some patient groups, tracheostomy remains the treatment of first choice. Immediate need and ventilation abnormalities can predict the need for tracheostomy [5]. Complications occur in 5% to 40% of tracheostomies. Tis-

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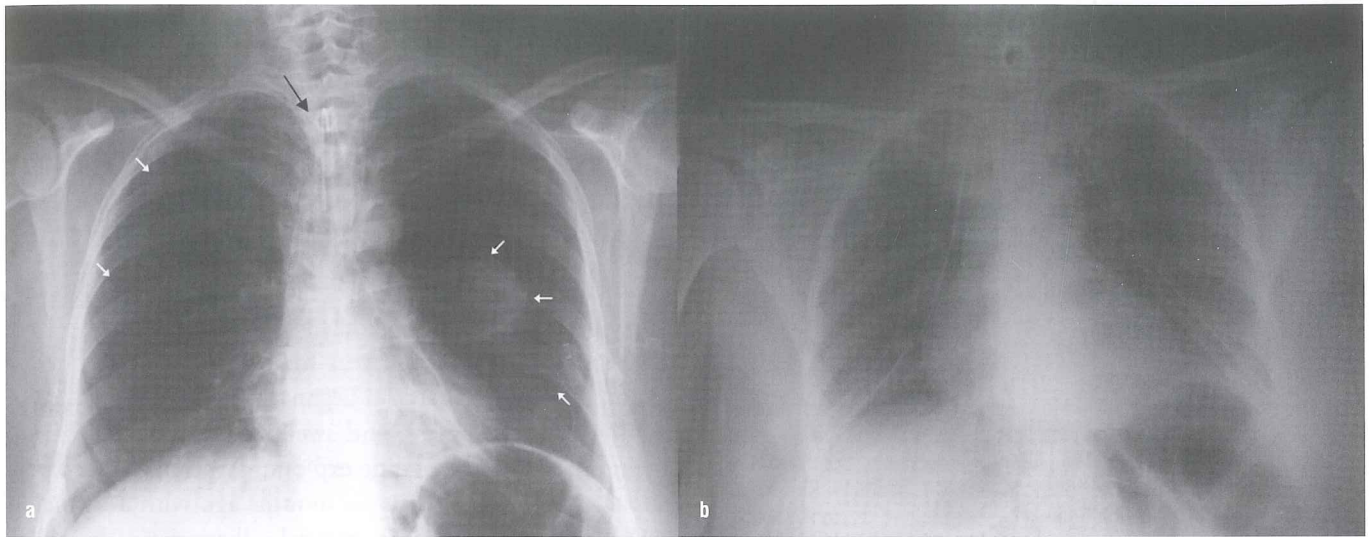


Figure 1. A) Chest X-ray shows the tracheostomy cannula and bilateral pneumothoraces. B) Chest X-ray taken after the application of bilateral tube thoracostomy.

sue damage, injury of the laryngeal or tracheal mucosa and forced insertion of the cannula contribute to development of early (pneumomediastinum, pneumothorax, hemorrhage, wound complication, misplacement of the cannula) and late (tracheal stenosis, laryngeal stenosis, failed reinsertion of the cannula) complications [5]. The mortality rate of tracheostomy is reported to be less than 2% [2].

Posterior tracheal wall laceration is responsible for mediastinal emphysema after percutaneous tracheostomy. Pleural space can be reached easily after perforation of the posterior tracheal wall. This may result in a pneumothorax. Pneumothorax incidence during tracheostomy was reported to be 0-4%. In the pediatric age group, this rate is about 10-17% [6].

Currently, pneumothorax may also develop during percutaneous tracheostomy, which is preferred to surgical tracheostomy and is a less-invasive procedure. Reviewing the literature, we found 41 case of emphysema (1.4%) and 25 cases of pneumothorax (0.8%) in a total of 3012 patients with tracheostomy. The mortality rate of percutaneous tracheostomy was nearly 0.5% [7].

Chest radiography is required in the diagnosis of potential tracheostomy complications in patients with dyspnea, tachypnea, and subcutaneous emphysema and similar symptoms. Routine chest radiography is not indicated in patients with uncomplicated open tracheostomy [8]. Similarly, we reached the diagnosis of bilateral pneumothoraces in our patient with the aid of plain chest radiography, and we suggest the routine use of chest X-ray after surgical tracheostomy.

Treatment of iatrogenic pneumothoraces should focus upon the least invasive intervention appropriate to the patient's clinical circumstances [1]. Conventional chest tube thoracostomy is a safe and effective procedure in the treatment of iatrogenic pneumothorax [9]. We agree with

this opinion and believe that iatrogenic pneumothoraces should be treated with tube thoracostomy.

CONCLUSION

We believe that all complications of tracheostomy may be prevented or minimized by a careful surgical technique and postoperative tracheostomy care. It is obvious that the operation has to be performed by an experienced surgeon to reduce the potential complications.

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