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Fracture and Aspiration of Tracheostomy Tube

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ABSTRACT

Methods of opening the airways like tracheostomy are used to provide appropriate ventilation for patients with upper airway problems. Tracheostomy may be accompanied by some complications. In the present study, we reported a 41-year-old man with progressive dyspnea and cyanosis induced by fracture of tracheostomy tube. He referred to our center and a chest x-ray was obtained showing fracture of tracheostomy tube within trachea. He underwent surgery and fractured tracheostomy was removed/extracted. A plastic tracheostomy tube was placed for him and he discharged the day after.

Conclusion: Fracture and aspiration of tracheostomy tube is a rare complication which requires a prompt and precise management. Patient education regarding the maintenance of tracheostomy tube for prevention of this complication is highly recommended. (Tanaffos 2009; 8(1): 75-78)

Key words: Tracheostomy, Fracture, Trachea, Aspiration

INTRODUCTION

Tracheostomy is defined as opening the airway (trachea) and placing a tracheostomy tube to provide an appropriate ventilation for patients.

Using various methods of opening the airways like tracheotomy and tracheostomy (which are occasionally used together), has a common goal which is providing an appropriate ventilation for those patients with upper airway problems and impaired ventilation. One of the most common indications for tracheostomy is providing ventilation support due to prolonged mechanical ventilation.

Those patients who have partial to complete obstruction of upper airways are major candidates for tracheostomy. In our center, some patients with severe tracheal stenosis at the level of the vocal cords or subglottic levels undergo tracheostomy before resection and levels anastomosis (removal of stenotic tissue and anastomosis of the two intact ends).

Nearly, there is no contraindication for tracheostomy but its relative contraindications are coagulation disorders and previous mid-sternotomy.

Tracheostomy like other invasive procedures may be accompanied by some complications which are divided into early and late complications. Early complications include bleeding during or after the operation, hypoxemia, displacement of tracheostomy tube resulting in adjacent organ injuries and tube catching fire during surgical cauterization. Late

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complications are tracheostomy tube obstruction with thick secretions, tracheal stenosis, tracheostomy tube displacement, operation-site infection, tracheo-innominate artery fistula, tracheo-esophageal fistula, tracheostoma left open after tube removal, formation of granulation tissue resulting in tracheostomy-site obstruction and voice change. Tracheostomy is used as a temporary life-saving procedure in some patients; however, some require a permanent tracheostomy tube to maintain open airway for different reasons. There are various types of tracheostomy tubes which are different by type, quality, with cuff or cuffless, etc. Tracheostomy is always considered as an adjunct for patients' ventilation and can provide an appropriate ventilation in patients with partial or complete obstruction of upper airway for any cause. It is unlikely that tracheostomy tube is responsible airway obstruction by itself.

In this article, we reported a patient with tracheostomy tube aspiration and subsequent partial airway obstruction. This patient had undergone tracheostomy for surgical complications due to previous thyroid surgery and a permanent tracheostomy tube had been inserted for him.

CASE SUMMARIES

A 41-year-old man with progressive dyspnea and cyanosis induced by fracture of tracheostomy tube with displacement in to left bronchus referred to Emergency room of Masih Daneshvari Hospital. He had been diagnosed with papillary cell carcinoma of thyroid three years ago in another center and had undergone total thyroidectomy followed by bilateral vocal cords paralysis as a complication. A plastic tracheostomy tube (size: 7) was inserted for him at that time and then replaced by a metal tracheostomy tube (size: 6.5) after two weeks. One year later, he underwent right arythenoidectomy by CO₂ laser and lateralization of right true vocal cords and discharged with a metal tracheostomy tube (size: 6.5). On

admission day, his tracheostomy tube was broken from its shaft and had migrated down the left bronchus. He had severe continuous coughs, progressive cyanosis and severe dyspnea at initial evaluation in the emergency ward and immediately transferred to the operating room after initial preparation. A chest x-ray was obtained showing fracture of tracheostomy tube within the trachea (Fig. 1).



Figure 1. CXR of patient showed fracture of tracheostomy tube.

Treatment

In the operating room, oxygenation via mask was started for pre-oxygenation of the patient. Anesthesia induction was initiated with sevoflurane and anesthesia depth was controlled by CSM. When an adequate depth of anesthesia was achieved, inhaled drug was changed to isoflurane and a rigid bronchoscopy was performed considering an appropriate anesthesia depth. Fractured tracheostomy tube was caught by grasping Forceps 3-4 cm under vocal cords and removed. Tracheostomy site was dilated. A plastic tracheostomy tube (size: 6.5) was placed for the patient and he was transferred to the intensive care unit (ICU) for more precise supervision. He was carefully observed for 24 hours. A nebulizer was also put for the patient. After 24 h, he was transferred to the ward and discharged the day after.

DISCUSSION

Presence of an open airway for maintenance a normal ventilation is essential. Foreign body aspiration can cause respiratory distress symptoms and even death in some cases. Thus early diagnosis and proper management in these patients can be effective on prevention of potentially fatal complications. Acute foreign body aspiration can occur by aspiration of numerous materials like nuts, vegetable seeds, plastic materials, bone and large particles which have been reported in some studies (1, 2).

Some of these materials may result in respiratory problems in patients by inducing a partial or complete airway obstruction of an airway. If a prompt and appropriate management is not performed, these materials can cause death due to impossibility of breathing. Figure 2 shows an algorithm which has been designed for management of acute obstruction of airway (3).

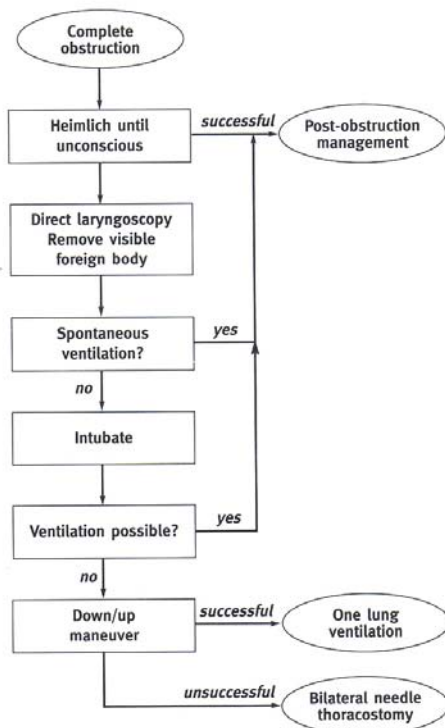


Figure 2. Management of complete airway obstruction by foreign bodies

Tracheostomy tube aspiration as a foreign body is not common and there are rare reports around this issue (4-6).

If displacement of tracheostomy tube is accompanied by trauma to the airways, it may cause potentially dangerous complications including trauma to the trachea and rupturing it, partial or complete obstruction of airways and choking in patients. Rapid management of these patients is critical and some principal roles in anesthesia established for many years should be considered. Sufficient pre-oxygenation before induction of anesthesia, mild induction of anesthesia by inhalation of gases which can be used confidently nowadays, and presence of experienced, personnel within anesthesia and surgery team with good cooperation can be responsible for uncomplicated removal of a fractured tracheostomy tube. Foreign body removal post-op care is important in these patients. They need another tracheostomy tube for maintenance of an open airway. Administration of anti-inflammatory drugs and corticosteroids can be useful. A ventilation support for at least the first 24 hours and ideally until achieving stable ventilation status will be necessary. Antibiotic administration is recommended if there is any risk of contamination or infection. A proper patient training for maintenance and cleaning of tracheostomy tube is crucial.

CONCLUSION

Fracture and aspiration of tracheostomy tube is a rare complication which requires a precise and prompt management. A careful monitoring of ventilation, prompt intervention for extraction of foreign body, ventilation support and post tracheostomy tube removal care are important in treatment of these patients. Patient education in maintenance of tracheostomy tube for prevention of this complication is highly recommended (7).

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