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Tracheostomy Timing, Indications and Complications in Critically Ill Patient

Submitted for Partial Fulminent of Master Degree in Intensive Care

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2016

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جامعة عين شمس

الشق الحنجرى فى مرضى الرعاية المركزة: التوقيت ودواعى الإستخدام و المضاعفات

رسالة
توطئة للحصول على درجة الماجستير فى الرعاية المركزة

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2016

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Abbreviations

ENT**:** Ear Nose Throat.

PBT: Percutaneous bedside tracheostomy.

ICU: Intensive care unit.

E.g: Example.

BPD: Bronchopulmonary Dysplasia.

MV: Mechanical ventilation.

VAP: Ventilator acquired pneumonia.

LOS: Length of stay.

ETT: Endotracheal tube.

PDT: Percutaneous dilation tracheostomy.

BMI: Body mass index.

COPD: Chronic obstructive pulmonary disease.

ABSTRACT

Tracheostomy refers to the creation of a stoma at the skin surface, which leads to the trachea. Percutaneous bedside tracheostomy (PBT) is a one of the common and safe procedures in intensive care units through the world. It is safe and similar outcome in comparison to open surgical tracheostomy method in operation room by ENT team. ’Early’ and ’late’ tracheostomies are two categories of the timing of tracheostomy. Tracheostomy is indicated in long-term mechanical ventilation, mechanical obstruction of the upper airways, Protection of tracheobronchial tree in patients at risk of aspiration, respiratory failure, retention of bronchial secretions and elective tracheostomy. Complications are best considered to be immediate (within the first 24 h) eg. Haemorrhage, air embolism and apnea, intermediate complications (while the patient is still in hospital and within the first 4 weeks) eg. Surgical Emphysema and pneumothorax and late complications (after discharge) eg. tracheal stenosis, tracheocutaneous fistula. Decannulation can be carried out when the patient is not dependent on ventilatory support and has an adequate respiratory reserve, the patient is able to cough and swallow effectively and manage their own secretions whilst being able to protect their own airway the patient is able to cough and clear his / her tracheal secretions.

Key words

Tracheostomy ,critically, patient

Introduction

Tracheostomy is one of the oldest and most commonly performed surgical procedures among critically ill patients. Tracheostomy creates an artificial opening, or stoma, in the trachea to establish an airway through the neck. The stoma is usually maintained by inserting a tracheostomy tube through the opening. **(Ron *et al.*, 2012)**

Tracheostomies were indifferently performed by surgeon/ENT specialist or by an intensivist. Percutaneous bedside tracheostomy (PBT) is a one of the common and safe procedures in intensive care units through the world. It is safe and similar outcome in comparison to open surgical tracheostomy method in operation room by ENT team. The performance of percutaneous bedside tracheostomy in the regular ward showed potential economic advantages in saving medical staff and operating room resources. **(Evgeni *et al.*, 2014)**

Long-term mechanical ventilation is the most common situation where tracheostomy is indicated for patients in intensive care units (ICU). ’Early’ and ’late’ tracheostomies are two categories of the timing of tracheostomy. The evidence on the advantages attributed to early over late tracheostomy is somewhat conflicting but includes shorter hospital stays and lower mortality rates **(Gomes *et al.*, 2012)**

Emergent Tracheostomy: It is required when intubation and laryngotomy (cricothyrotomy) are not feasible, and emergency airway distress is accompanied with impending death. Urgent (awake) Tracheostomy: This is done in the operation theater under local anesthesia with minimal sedation. The patient has respiratory distress, and needs immediate surgical intervention. Elective Tracheostomy: This tranquil, orderly and routine tracheostomy is a planned surgery. It is performed where all operative surgical facilities such as endotracheal intubation, local and general anesthesia, are available.The general opinion that the best time of doing tracheostomy is when you first think that patient needs tracheotomy. **(Mohan, 2013)**

Tracheostomy is indicated in long-term mechanical ventilation, mechanical obstruction of the upper airways, Protection of tracheobronchial tree in patients at risk of aspiration, respiratory failure, retention of bronchial secretions and elective tracheostomy, e.g. during major head and neck surgery a tracheostomy can provide/improve surgical access and facilitate ventilation. **(Claudia and Basil, 2004)**

Complications are common; most are usually self-limiting and easily managed by appropriate nursing care. However, there are some complications that are fatal, and early signs of imminent problems should be ignored at the clinician's peril. Complications are best considered to be immediate

(within the first 24 h) eg. Haemorrhage, air embolism and apnea, intermediate complications (while the patient is still in hospital and within the first 4 weeks) eg. Surgical Emphysema and pneumothorax and late complications (after discharge) eg. tracheal stenosis, tracheocutaneous fistula. (**Anniko *et al*., 2010)**

Decannulation can be carried out when the patient is not dependent on ventilatory support and has an adequate respiratory reserve, the patient is able to cough and swallow effectively and manage their own secretions whilst being able to protect their own airway the patient is able to cough and clear his / her tracheal secretions and patient can tolerate cuff deflation or capping of the tracheostomy tube. (**Rakesh and Niraj, 2011)**

Aim of the work

This essay aims to review the use of tracheostomy in the intensive care unit: why, when, how to do tracheostomy in the intensive care patient? With special emphasis on indications, recent techniques of tracheostomy, advantages, disadvantages, follow up and timing of decannulation with discussion of controversies and updates.

Tracheostomy have been performed for many years as an essential intervention for patients in critical conditions or injured patients, multi-organ injury, and it provides improved care for patients in the trauma or critical care setting and reduced the hospital and patient costs. As the trachea is easily accessible at the bedside, it provides ready access for emergency airway cannulation (eg, in the setting of acute upper-airway obstruction) and for long-term airway access after laryngeal surgery. More commonly, tracheostomy tubes are placed to allow removal of a translaryngeal endotracheal tube (ETT). The procedure can be done surgically or percutaneously, and with either technique the procedure can be performed in the operating room or at the bedside in the intensive care unit (ICU). **(Scott, 2005)**

The lower respiratory tract starts at the vocal cords inferior to the vocal cords, the rigid cricoid cartilage encases a 1.5–2.0-cm region known as the subglottic space. Access to this space is possible via the cricothyroid ligament, a membrane that runs from the thyroid cartilage inferiorly to the cricoid cartilage. Inferior to cricoid is the trachea, a cylindrical tube that extends inferiorly and slightly posteriorly**. (Scott, 2005)**

The trachea connects the larynx with main bronchi. It is located on the midline of the body, with its distal part

usually displaced to the right side. The upper border of trachea is placed higher in children as compared to adults. In a newborn it lies at the level of second cervical vertebra. As the descent of the larynx occurs its upper border reaches fifth cervical vertebra in a five year old child and finally comes to lie at the level of sixth vertebra in fifteenth year of life. Similarly the tracheal bifurcation is situated at the level of third or fourth cervical vertebra in new-born infants and at the fifth thoracic vertebra in adults. In an individual with a narrow thoracic cage the tracheal bifurcation may be situated at a higher level. The cranial end of trachea is attached to the lower border of cricoid with the help of cricotracheal ligament. This attachment makes the larynx move up and down along with the larynx during respiration and swallowing. **(Paul *et al.*, 2009)**

Adult male trachea averages 11.8 cm in length (range 10 to 13 cm) from the lower border of the cricoid cartilage to the top of the cranial spur, varying with the patient's height. There are usually from 18 to 22 cartilages within this length, approximating almost two rings per cm. cartilaginous rings may be incomplete or bifid. The lateral tracheobronchial angles are located slightly higher than the cranial spur so that the length of the trachea proper along its lateral wall is slightly shorter than that measured anteriorly in the midline to the cranial spur. The crania in the adult projects quite consistently on the body surface at