

## Case Report

# Emergency percutaneous tracheostomy in two cancer patients with difficult airway: An alternative to cricothyroidotomy?

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## Abstract

Inability to intubate and/or ventilate either due to distorted neck anatomy or restricted mouth opening is uncommon but potentially hazardous clinical scenario in head and neck cancer patients. Emergency cricothyroidotomy in such patients may provide a means of oxygenating the patient, but in practice has limitations and does not establish a definitive airway. We report 2 cases who had distorted face and neck anatomy in which percutaneous tracheostomy was done as an emergency life-saving procedure when other measures to obtain a definitive airway failed.

**Key words:** Cannot intubate and ventilate, difficult airway, emergency percutaneous tracheostomy

## Introduction

The indication for surgical airway in a difficult airway situation is inability to intubate the trachea in a patient who requires it. The cricothyroidotomy is the recommended technique in such situations. We present case series of 2 cases where we used emergency percutaneous tracheostomy (PCT) in life-threatening difficult airway where we could not intubate the trachea.

## Case Reports

### Case 1

A 48-year-old male, a known case of carcinoma buccal mucosa stage III and had already undergone commando procedure followed by chemotherapy and concurrent radiotherapy 3 months back, presented to triage with complaints of breathlessness, cough, difficulty in speaking of 1 day duration. On evaluation, there was

an inspiratory stridor and labored respiration along with hypoxemia on room air (oxygen saturation ( $\text{SpO}_2$ ) 77% and  $\text{PaO}_2$  54 mm Hg). After an initial stabilization, he was immediately shifted to the hemato-oncology intensive care unit (ICU).

He was managed conservatively on the lines of laryngeal edema with adrenaline nebulization, steroids, antibiotics, and urgent surgical consultation. However, in next few minutes, patient's condition worsened with increasing stridor, respiratory distress, and hypoxemia. He went into cardio-respiratory arrest, and resuscitation was started as per Advanced Cardiac Life Support (ACLS) protocol.

The call for definitive airway protection was taken as there was no improvement with the primary resuscitation. Orotracheal intubation was tried thrice by senior intensivist, however, it was unsuccessful. A rapid decision for PCT was taken by the critical care team along with on-call surgeon and was performed by Ciaglia technique using Blue Rhino PCT kit (Cook Critical Care Inc, Bloomington, IN) with size 7.0 tracheostomy tube. The time taken to secure an airway was less than 2 minutes, and position was confirmed with capnography. After tracheostomy, there was improvement in ventilation and  $\text{SpO}_2$ . He was successfully resuscitated with the return of spontaneous circulation in approximately 11-12 minutes. Hypothermia protocol was initiated as per our hospital protocol.

Patient showed gradual recovery, vasopressors and ventilatory support were subsequently tapered off, and the patient was transferred out, neurologically alert and oriented, with T-piece on day 5 [Figures 1 and 2].

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## Case 2

A 62-year-old male who was a known case of carcinoma right bronchus stage IV with bone and brain metastasis was admitted with left-sided chest pain, progressively increasing breathlessness since 4 hours. On examination, he was drowsy, hypoxemic on room air ( $\text{SpO}_2$  88%,  $\text{PaO}_2$ -64 mm Hg on  $\text{FiO}_2$  - 0.6), with decreased air entry and tympanic node on percussion on left side of the thorax. Chest X-ray revealed left-sided pneumothorax, and 28 Fr intercostal drain was immediately placed. There was transient improvement in  $\text{SpO}_2$  and respiratory acidosis. After 1 hour, he had generalized tonic clonic seizure, for which lorazepam was given, and he was started on bag and mask ventilation.

The decision to secure definitive airway was taken in view of an altered mental status with persistent respiratory failure. Orotracheal intubation was tried; however, it failed due to restricted mouth opening and restricted lower jaw movement, with Cormack and Lehane grade III on direct laryngoscopy. The decision for emergency PCT was then taken and performed by Ciaglia technique using Blue Rhino PCT kit with 7.5 tracheostomy tube. Procedure was completed in less than 3 minutes. The tube position was confirmed with capnography [Figure 3]. In spite of obtaining definitive airway and using all aggressive medical measures, patient failed to show any clinical improvement and died of refractory shock after 4 days of ICU stay.

## Discussion

The endotracheal intubation is the most common attempted procedure in a clinical scenario where a rapid tracheal access is required.<sup>[1]</sup> However, it may not always be successful, and sometimes surgical airway may be required, especially in patients with a distorted upper airway anatomy. The techniques available for surgical airway access are cricothyroidotomy or tracheostomy.<sup>[2]</sup>

In a difficult airway situation, emergency cricothyroidotomy is recommended in most of the guidelines.<sup>[1,3]</sup> However, there are several problems associated with performing an emergency cricothyroidotomy.<sup>[3-5]</sup> Firstly, in patients with distorted neck anatomy, access to cricothyroid membrane may be limited, and hence, cricothyroidotomy may be either unsuccessful or may cause serious complications. Secondly, the soft plastic cannula of cricothyroidotomy have a tendency to kink and may limit its long term use, while the more rigid type of cannula can cause damage to the posterior wall. Thirdly, the more dreaded complication of the misplaced cannula, which is a real concern in cardiac arrest situation. Hence, it has been recommended that once the situation has been salvaged, a definitive airway still has to be established after emergency



Figure 1: Restricted Neck Morphology



Figure 2: Patient 1: Post tracheostomy



Figure 3: Patient 2: post tracheostomy

cricothyroidotomy. Finally, the conventional breathing systems deliver low flows with small internal diameter of the cannula and jet ventilation may be potentially hazardous, especially with obstructed or misplaced cannula.

Conventionally, the tracheostomy is considered to be more complex and time-consuming procedure, and hence not advised in emergency situations.<sup>[6,7]</sup> However, with its widespread use and increasing experience, there have been a few published literature, which has challenged this conventional “wisdom.”<sup>[5,8,9]</sup>

In our cases, we could not secure definitive airway with orotracheal intubation in spite of using several adjuncts including gum elastic bougie and ventilating stylet, hence we resorted to surgical airway. In patient 1, the application of standard cricothyroidotomy did not work as we could not locate cricothyroid membrane due to grossly-distorted anatomy; cardiac arrest situation made it more complex [Figures 1 and 2]. While in patient 2, as we were able to ventilate the patient, but due to restricted mouth opening, we went ahead directly with a definitive surgical airway with PCT [Figure 3]. We did not perform cricothyroidotomy as the conversion from cricothyroidotomy to tracheostomy can be a high-risk procedure.<sup>[10]</sup>

Our cases demonstrated that PCT can be a valuable and possible option even in an emergency situation to establish definitive airway access.

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