

## Case Report

# Percutaneous dilatational tracheostomy through paramedian technique and lateral approach in a patient with cervical esophagostomy-a case report

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**Abstract:** Background: Percutaneous dilatational tracheostomy (PDT) is a common surgical procedure and established as first choice for securing the airway in critically ill patients needing prolonged mechanical ventilation. There are case reports of open tracheostomy through paramedian approach without complications. This case report presents a case of PDT through paramedian approach. Case report: An 18 year old female, case of firearm injury underwent cervical esophagostomy on the left side of neck approaching midline. So we perform PDT through paramedian technique and lateral approach safely with use of real time ultrasound and fiberoptic bronchoscope. Discussion: PDT can be done through paramedian technique and lateral approach to trachea safely with help of ultrasound and fiberoptic bronchoscope in the conditions where midline approach is not feasible and unsafe.

**Keywords:** PDT, fiberoptic bronchoscope

### Introduction

Percutaneous dilatational tracheostomy (PDT) is a common surgical procedure and now a method of choice for securing the airway in critically ill patients needing prolonged mechanical ventilation. It is safer, less invasive bedside method and an alternative to open tracheostomy [1]. However, the feasibility of PDT in cases of cervical esophagostomy is often challenging due to close proximity of the landmark for PDT and cervical esophagostomy precluding precision. Here, we report feasibility of an alternative approach to tracheostomy in which access to midline of trachea is difficult.

### Case report

An 18 years old female, case of firearm injury with gastric and esophageal perforation underwent cervical esophagostomy on the left side of neck. Incision and stoma site nearly approached the midpoint of the neck (**Figure 1**). The patient required prolonged mechanical ventilation because of sepsis in ICU. On the day

14, the PDT was planned with real time view of ultrasound and fiberoptic bronchoscopy. PDT was performed using the Ciaglia Blue Rhino kit.

The patient was positioned with her neck extended. USG was done to identify structures like thyroid and cricoid cartilage, blood vessels, trachea and the level of tracheal cartilage.

The neck was prepared with chlorhexidine and betadine solution. After local infiltration, a 1 cm long incision was made through the skin and subcutaneous tissue in paratracheal region (**Figure 2**). The pretracheal fascia was exposed using blunt dissection and the needle was introduced into the trachea between the second and third tracheal rings. Insertion of needle was confirmed by the fiberoptic bronchoscope.

A guidewire was passed into the trachea and the needle was removed. A dilator was inserted over guidewire and then tracheostomy tube (size 7.5) was inserted and fixed (**Figure 3**). The correct placement of tracheostomy tube well above carina was confirmed with the fiberoptic



**Figure 1.** Cervical esophagostomy stoma site.



**Figure 3.** PDT through paramedian approach within the trachea.



**Figure 2.** Paramedian and lateral approach to trachea.

bronchoscope. Tracheal complication or posterior wall injury was ruled out by fiberoptic bronchoscopy.

### Discussion

The above case highlights the feasibility and safety of the paramedian and lateral approach to trachea for PDT. Most of the guidelines suggest a midline approach to PDT which is always desirable. However, certain condition precludes the general approach and requires improvement. In the above case, the cervical esophagostomy and surrounding edema extended towards the midline. An approach of PDT through midline would entails a track through the skin and deep tissue which could have been risky. The risk of involving esophagostomy and subsequent infection would persist for long term to the patient. Therefore it was decided to approach trachea from the lateral side through paramedian approach.

But the path through paramedian may also be unsafe and involves following challenges:

1. Increased risk of bleeding from the muscle edge and anterior jugular vein as compared to the median approach.
2. Risk of injury to the major vessels in the neck (carotid and internal jugular vein).
3. Increased risk of pneumothorax

as the dome of the lung reaches up to the paramedian plane. 4. Increased chances of recurrent laryngeal nerve injury as this nerve lies in the tracheoesophageal groove. 5. Increased chances of rupture of the posterior wall of the trachea.

Moriwaki et al. studied the safety of open tracheostomy by paramedian approach in a patient with cervical infection involving midline [2] and reported no complications-bleeding, desaturation or displacement of the tube.

There are concerns in securing tracheostomy tube and daily care of the tracheostomy site if it lies near to cervical esophagostomy site. Paramedian approach and PDT (smaller incision) provides improved care of the tracheostomy site and maintains the safety. The use of real time ultrasonography provides additional safety in conduct of the procedure by reducing the chances of vascular puncture and bleeding. In our previous published report, we showed the feasibility of paramedian approach to PDT but although the skin incision was placed laterally in neck the trachea was approached in midline since it was deviated [3].

The safety of paramedian approach can be further enhanced by the use of fiberoptic bronchoscope [4]. Fiberoptic bronchoscopy helps in identifying the point of needle insertion into the trachea and also helps in real time identification of complications like tracheal ring fracture [5] or bleeding.

### Conclusion

PDT can be done through paramedian technique and lateral approach to trachea safely with help of ultrasound and fiberoptic bronchoscope in the conditions where midline approach is not feasible and unsafe.

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### Disclosure of conflict of interest

None.

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