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Ultrasound and fibreoptic-guided percutaneous tracheostomy in patient with deviated trachea

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Sir,

A 78-year-old female, suffering from bronchial asthma with old pulmonary Koch's disease was admitted with a history of a fall followed by pain in the right hip. She was diagnosed with an inter-trochanteric fracture of the right femur. Her chest x-ray showed right middle zone and lower zone homogenous opacity with tracheal deviation (Fig. 1). She was admitted to the ICU after 4 days of hospital stay following acute breathlessness and arterial blood desaturation. The trachea was intubated and ventilatory support was commenced due to respiratory failure.

Due to predicted prolonged mechanical ventilation support, a percutaneous tracheostomy (PCT) was planned on the 5th day from ICU admission.

The trachea was located being shifted toward right side on palpation. A decision was made to use a USG for accurate localization of trachea and its real time puncture. Following skin disinfection, a vertical incision of 1 cm was performed 2 cm lateral to the midline at the level of the 2nd and 3rd tracheal cartilage (Fig. 2). The percutaneous tracheostomy (PCT) was performed with the Blue Rhino single dilator technique. The procedure was completed with minimal blood loss and no complications.

Percutaneous tracheostomy is the standard method of tracheostomy for patients in ICUs. However, the procedure is not without risks. The most common risks associated with PCT are as follows: haemorrhage, hypoxaemia, loss of airway, cannula misplacement, airway injury, pneumothorax, surgical emphysema, damage to the posterior tracheal wall and accidental decannulation in the immediate perioperative period [1].



Figure 1. Chest x-ray of the patient showing tracheal deviation toward the right side



Figure 2. Modified incision for percutaneous tracheostomy 2 cm lateral to midline

Fibreoptic bronchoscopy can be used to identify the point of needle insertion into the trachea and for confirmation of the correct guide wire placement. This reduces the incidence of complications, especially posterior tracheal wall injury. Pre-procedure USG may be used to define the relevant airway anatomy, identify the tracheal midline, the blood vessels adjacent to the PCT insertion site, thereby decreasing the risk of bleeding. It also helps in estimating depth of the trachea from skin surface, as well as the tracheal

diameter, thus assisting in tracheostomy tube size selection. Accurate placement of the needle into the trachea can be confirmed, while patients deemed difficult for PCT may also be identified using USG. However, its beneficial effects have not been established adequately in the literature. The use of USG increases the accuracy only marginally in centrally located trachea. A few studies have demonstrated an improvement in accuracy for PCT utilising USG. Rudas *et al.* [2] randomly assigned 50 patients to either traditional anatomical landmark or real time USG guidance. The latter method resulted in more accurate tracheal punctures.

However, the use of USG during the PCT in a patient with lung fibrosis, collapse and deviated trachea has rarely been described. Yavuz *et al.* [3], in their randomised controlled trial on 341 patients, reported the use of USG guidance for PCT in only one patient with deviated trachea due to lung fibrosis. To conclude, in difficult scenarios such as deviated trachea, the ability of USG to improve the accuracy of PCT increases considerably, along with the prevention of complications.

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