

Editorial- Educational

A Modification of the Initial Surgical Steps in Percutaneous Dilatational Tracheostomy

Vipin Kauts, MB, BS, MD, EDIC* Karim Abdel Hakim, MBBCh, Masters in Critical Care,
MD** Priti Narayan, MBBS, MD*** Eamon Tierney, MBBCH, BAO, FFARCSI,
FJFICMI****

The percutaneous dilatational method or serial dilator technique for tracheostomy was described by Ciaglia et al in 1985¹. Since then, at least five other techniques for the procedure have been described: the Rapitrach method (1989), Griggs guide wire dilating forceps method (1990), the retrograde percutaneous trans-laryngeal tracheostomy (1997), Ciaglia Blue Rhino technique (2000) and the PercuTwist technique (2002)²⁻⁶. The initial surgical steps described in most methods include, after positioning of the patient and painting of the neck with an antiseptic, local infiltration of lignocaine, followed by skin incision, and thereafter, tracheal puncture and guide wire insertion.

We propose a modification of the initial surgical steps; the patient is positioned and the neck is painted with antiseptic solution, 14 gauge cannula is inserted into the trachea under bronchoscopic guidance without infiltration of local anesthetic, but with the administration of systemic sedation and potent intravenous analgesia using remifentanil, see figure 1. Traditionally, local anesthetic had been infiltrated before insertion of the cannula into the trachea. After introducing the guide wire into the trachea through the cannula, 15-20 ml of 1% lignocaine is infiltrated alongside the guide wire through the subcutaneous tissue down as far as the anterior tracheal wall creating a “pool” of local anesthetic around the guide wire, see figure 2. Thereafter, the skin is incised in the usual manner, immediately alongside the guide wire, and the incision is continued as far as the anterior tracheal wall.

* Consultant

** Consultant

*** Senior Registrar

**** Consultant and Director of ICU

Department of Intensive Care

King Hamad University Hospital

Kingdom of Bahrain

Email: eamon.tierney@khuh.org.bh; vipin.kauts@khuh.org.bh

From this point forward, the procedure is the same as previously described in the literature.



Figure 1: Insertion of the Guide Wire into the Trachea before the Infiltration of Local Anesthetic



Figure 2: Infiltration of Local Anesthetic in the Midline along the Guidewire into the Pretracheal and Subcutaneous Areas

In our experience, in addition to administering local anaesthesia, this method achieves a hydrodissection because the large volume of local anesthetic (20 ml) displaces the superficial thyroid veins away from the midline, see figure 3. This helps to avoid inadvertent venous puncture. There are three pairs of superficial thyroid veins, two superior and two middle coming from the internal jugular veins, and two inferior thyroid veins, one each from the left and right innominate veins respectively, see figure 4. Moving these veins laterally, whilst also compressing them with the pressure of the local anesthetic bolus, is, in our opinion, an important mean of avoiding inadvertent venous puncture.

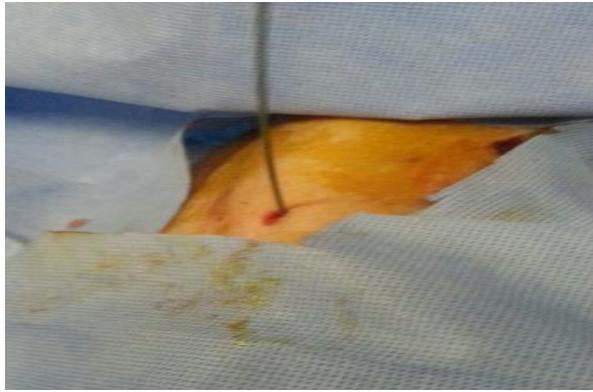


Figure 3: Obscuration of the Anatomical Landmarks by the Swelling Produced by the Midline Infiltration of Local Anesthetic

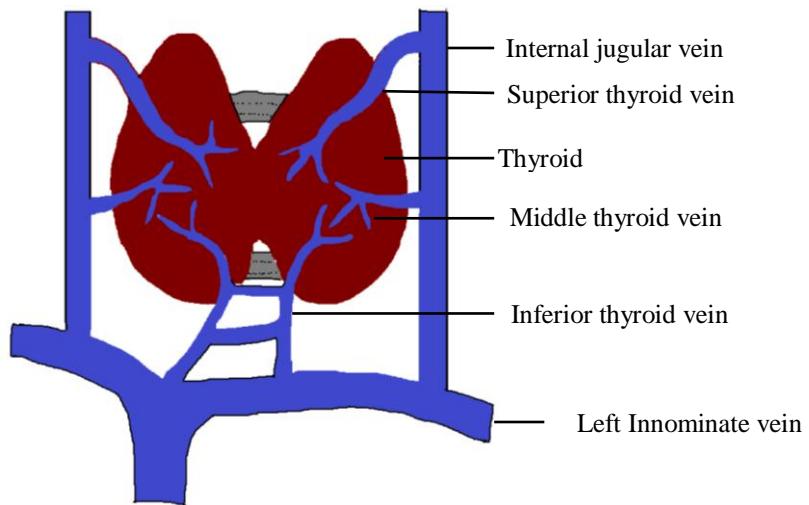


Figure 4: The Pre-tracheal Veins

In addition, the puncture of the trachea before the infiltration of local anesthetic ensures that there is no obscuration or distortion of the anatomical landmarks by the swelling produced by the infiltration of local anesthetic. This swelling may make the palpation of the intercartilaginous spaces and determination of the midline more difficult, especially if the patient has a short neck or obese. The procedure is done more quickly as there is no need to do a detailed blunt dissection after the skin incision. Because the guide wire is already in place, a rapid soft tissue dissection is sufficient.

In our experience using this modification in King Hamad University Hospital, we found no difficulty in locating the trachea and puncturing it successfully with the cannula and guide wire. In addition, we have not encountered any inadvertent puncture of the superficial thyroid veins using this modification. We recommend this variation in technique to all intensivists.

REFERENCES

1. Ciaglia P, Firsching R, Syniec C. Elective Percutaneous Tracheostomy: A New Simple Bedside Procedure: A Preliminary Report. *Chest* 1985;87(6); 715-9.
2. Schachner A, Ovil Y, Sidi J, et al. Percutaneous Tracheostomy--A New Method. *Crit Care Med* 1989; 17(10):1052-6.
3. Griggs WM, Worthley LI, Gilligan JE, et al. A Simple Percutaneous Tracheostomy Technique. *Surg Gynecol Obstet* 1990; 170(6):543-5.
4. Fantoni A, Ripamonti D. A Non-Derivative, Non-Surgical Tracheostomy: The Translaryngeal Method. *Intensive Care Med* 1997; 23(4):386-92.
5. Byhahn C, Wilke HJ, Halbig S, et al. Percutaneous Tracheostomy: Ciaglia Blue Rhino versus the Basic Ciaglia Technique of Percutaneous Dilational Tracheostomy. *Anesth Analg* 2000; 91(4):882-6.
6. Frova G, Quintel M. A New Simple Method for Percutaneous Tracheostomy: Controlled Rotating Dilation. A Preliminary Report. *Intensive Care Med* 2002; 28(3):299-303.