
Point-of-care ultrasonography for detection of tracheal tube cuff rupture following nasal intubation?

Sir,
Nasotracheal intubation is a technique widely practiced in head and neck surgery to facilitate a clear field for the surgeons. Cuff rupture during placement of the tracheal tube (TT) is not uncommon. This may lead to various complications along with increased cost in the form of tube replacement and wastage of operating room time.

The TT cuff rupture is generally detected by a failure of cuff inflation as observed by a collapsed pilot balloon of the tracheal tube. Alternatively, one can feel for peritubal leak by auscultation or palpation over the larynx on ventilation following intubation. We propose that point-of-care ultrasonography can detect the TT cuff rupture quickly and accurately. We suggest the tracheal dilation assessment – ultrasound probe placed transversely on

the anterior neck superior to the suprasternal notch to validate this assumption.^[1]

Patient in whom nasal intubation is indicated, nasal instillation of xylometazoline is done 10 min before induction following inspection of the nasal passage. After institution of routine monitoring in the form of electrocardiography, noninvasive arterial pressure, and pulse oximetry, anesthesia is induced with fentanyl 2 µg/kg and propofol 2 mg/kg body weight following preoxygenation for 3 min. Neuromuscular blockade is facilitated with vecuronium 0.1 mg/kg body weight. A well-lubricated TT of appropriate size is selected to perform nasal intubation with the patient in the sniffing position.

The primary anesthesiologist responsible for patient care performs the nasal intubation in the standard fashion. As soon as the tip of the TT enters the vocal cords, the clinician has to speak “yes.” Another anesthesiologist performs the ultrasonography with the high-frequency linear ultrasound probe (M-Turbo, Fujifilm SonoSite, Inc, Bothell, WA, USA) placed transversely on the anterior neck approximately 2 cm superior to the suprasternal notch. When the first clinician signals that the TT has entered the cords, ultrasound probe is used to watch the tube passing through the vocal cords. TT can be visualized passing into trachea as a brief flutter when it is being placed.^[2] As soon as the cuff is inflated, the observation is made if tracheal dilation occurred and remained sustained [Figure 1]. The absence of tracheal dilation or failure to sustain the same may suggest that the TT cuff is ruptured.

Cuff rupture during nasal intubation is the big little problem for the clinicians. It may be of particular importance when intubation has been performed with some difficulty or there is a risk of aspiration. Although not much data is available, in a series of 725 cases, TT cuff rupture was noted in 21 intubations.^[3] Cuff rupture has been attributed to

anatomical or technical causes.^[3] Anatomical abnormalities in the nasal passage such as spina or crista of the nasal septum are known to scrape or slit the cuff. The cuff may also get damaged due to the tip of intubation forceps or application of lignocaine spray.

Stethoscope was invented two centuries ago and still remains the primary tool for management of airway and airway devices. The point-of-care ultrasonography is becoming more and more available and showing more accuracy than stethoscope for various uses.^[1]

It has been established that the use of point-of-care ultrasound is highly accurate for localization of the TT within the trachea by examining for tracheal dilation.^[1] This examination is definitive and gives such a clear picture of the tracheal dilation that if the TT cuff gets ruptured, ultrasonography is able to detect it quickly, much earlier than the conventional assessment.

However, there is one limitation to our technique. If the rupture is minor, there is a theoretical possibility that the leak may not be sufficient enough to prevent tracheal dilation. In this situation, there might be dilation that may not remain sustained.

We suggest the use of this technique to assess the integrity of TT cuff following nasal intubation subject to availability.

Acknowledgment

The author expresses his gratitude to Mr. Gopal Panday for his help in preparation of the figure.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

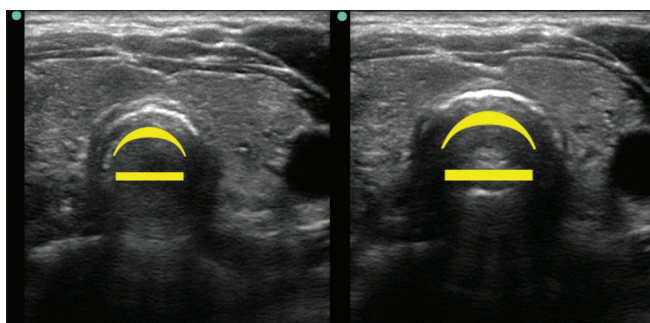


Figure 1: Tracheal dilation with cuff inflation. The image on the left shows a nondilated trachea, and the one on the right shows a dilated trachea secondary to cuff inflation. The absence of tracheal dilation may suggest that the tracheal tube cuff is ruptured

PRAKASH K. DUBEY, PREKSHA DUBEY¹

Department of Anaesthesiology and Critical Care Medicine,
Indira Gandhi Institute of Medical Sciences, Patna, Bihar,

¹Department of Oral and Maxillofacial Surgery, ITS Dental
College, Greater Noida, Uttar Pradesh, India

Address for correspondence:

Prof. Prakash K. Dubey,
E ¾, IGIMS Campus, Patna - 800 014, Bihar, India.
E-mail: pkdubey@hotmail.com

References

1. Ramsingh D, Frank E, Houghton R, Schilling J, Gimenez KM, Banh E, *et al.* Auscultation versus point-of-care ultrasound to determine

endotracheal versus bronchial intubation: A Diagnostic accuracy study. *Anesthesiology* 2016;124:1012-20.

2. Dubey PK, Dubey P, Kumar N, Bhardwaj G, Kumar N. Blind nasal intubation revisited: No longer a blind technique? *J Emerg Med* 2017;52:231-4.
3. Nakamura S, Watanabe T, Hiroi E, Sasaki T, Matsumoto N, Hori T, *et al.* Cuff damage during naso-tracheal intubation for general anesthesia in oral surgery. *Masui* 1997;46:1508-14.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

Access this article online	
Website: www.saudija.org	Quick Response Code 
DOI: 10.4103/sja.SJA_706_17	
How to cite this article: Dubey PK, Dubey P. Point-of-care ultrasonography for detection of tracheal tube cuff rupture following nasal intubation?. <i>Saudi J Anaesth</i> 2018;12:369-71. © 2018 Saudi Journal of Anesthesia Published by Wolters Kluwer - Medknow	