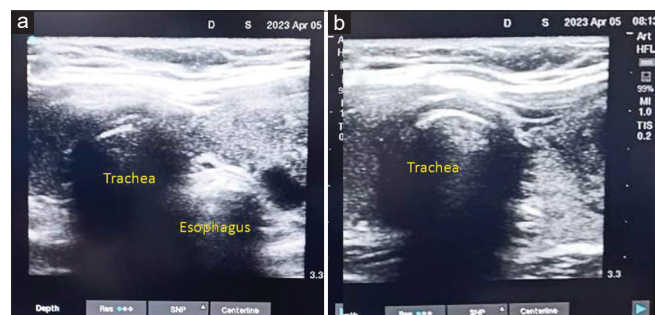


## Nasal endotracheal intubation in a patient with difficult airway under ultrasonographic guidance

Dear Editor,

Use of ultrasonography to confirm endotracheal intubation is well documented. However, its use to direct the placement of endotracheal tube (ETT) in real time is less practiced. A 50-year-old male patient with carcinoma tongue who underwent excision 2 weeks back under local anesthesia was posted for wide excision. He had 4 cm mouth opening, slightly restricted tongue protrusion due to pain, normal neck extension, and Mallampati class II airway. Following preoxygenation and intravenous induction, after ensuring mask ventilation, vecuronium was given as we did not anticipate difficult airway. Direct laryngoscopy revealed Cormack–Lehane grade 4 view. Patient was mask ventilated, and videolaryngoscope was requested.

As ultrasound machine was available in the theater we decided to attempt nasal intubation under ultrasonographic guidance



**Figure 1:** (a) Esophageal intubation, (b) tracheal intubation

while waiting for videoscope. We placed the probe on the neck transversely just above the suprasternal notch and moved it up till the vocal cords were visualized. Keeping the probe there, a 7.0-mm-sized nasal tube was introduced through the right nostril and passed gently down to oropharynx and advanced slowly. We observed the esophagus being opened by ETT by the side of trachea with a double trachea sign [Figure 1a] as the ETT initially entered the esophagus. The ETT was then withdrawn to oropharynx, head was extended, and the ETT was reintroduced. This time, the advancing ETT with some medial rotation entered the trachea. We visualized a brief flutter of vocal cords, and a hyperechoic shadow was seen in the trachea [Figure 1b]. Correct placement was confirmed with end-tidal carbon dioxide waveforms (ETCO<sub>2</sub>) and auscultation. Introduction of ETT nasally till the appearance of ETCO<sub>2</sub> took <1 min. We used Sonosite SII ultrasound system (FUJIFILM SonoSite, Inc., Bothell, WA, USA) and a linear probe (6–13 MHz).

Endotracheal intubation can be confirmed either statically or dynamically using ultrasound. Following intubation, ultrasound probe is used to identify either the bullet sign or the double tract sign in static confirmation. In dynamic confirmation, a probe is used during intubation to visualize increase in artifact as the ETT passes into trachea or the appearance of artifacts as it enters the esophagus. Dynamic confirmation has been described with the probe placed transversely just above the suprasternal notch<sup>[1,2]</sup> or just below the cricoid cartilage.<sup>[3]</sup> In case of tracheal intubation, only one air–mucosal (A–M) interface with reverberation artifact and posterior shadowing could be seen. If two A–M interfaces with posterior shadowing are noticed (double tract sign/double trachea sign), it indicates esophageal intubation.<sup>[4]</sup> Similarly, the probe placed transversely at the level of the thyrohyoid membrane can be moved caudally until a view of vocal cords and surrounding hypopharyngeal tissue is obtained. Appearance of hyperechoic shadowing and

widening of the vocal cords could be visualized when ETT enters the trachea.<sup>[5]</sup>

We did not aid the ultrasound-guided intubation process with direct laryngoscopy. If intubation was unsuccessful, either videoscope- or intubating bronchoscope-assisted intubation would have been performed. It is concluded that following failed intubation in patients with unanticipated difficult airway who can be mask ventilated, ultrasound-guided intubation is an option to be considered while advanced airway gadgets are awaited.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and that due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

**Sunil Rajan, Niranjana K. Sasikumar,  
Jacob Mathew, Sherjin D. S. Raveendran**


Department of Anaesthesiology, Amrita Institute of Medical Sciences,  
Amrita Vishwa Vidyapeetham, Kochi, Kerala, India

**Address for correspondence:** Dr. Sunil Rajan,  
Department of Anaesthesiology, Amrita Institute of Medical Sciences,  
Kochi, Kerala, India.  
E-mail: sunilrajan@aims.amrita.edu

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