

# Authors' Reply on: FOCUS more on POCUS

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The authors thank Venkatesan et al. for their keen interest in our study. The authors agree that confirmation of successful placement of the endotracheal tube (ETT) inside the trachea can be done in 10–15 seconds with ultrasound. However, to assess the exact position of the ETT tip within the trachea, it can take longer, about 5 minutes in our study. In our children, we measured the distance between the superior border of the arch of the aorta and the ETT tip by ultrasound. This distance was compared with the distance between the carina and the ETT tip seen in the chest X-ray (CXR). For most of our children, this distance was between 10 and 20 mm. For our study, in CXR, the ETT tip was considered in the correct position if it was within 5 mm (above or below) from the medial end of clavicles in infants from 1 to 12 months of age. For children from 13 to 60 months, the ETT tip was in the correct position if it was within 10 mm (above or below) from the medial end of the clavicle.<sup>1</sup>

The aim of fixing the correct depth of insertion of ETT is to ensure that it should not migrate into the bronchus (especially the right bronchus), during neck flexion, if the ETT tip is very close to the carina. On the other hand, if ETT tip is just below the vocal cord, neck extension may cause accidental extubation. Hence, the ideal ETT tip position is probably mid-way between the carina and the vocal cords, approximately at the level of the medial end of clavicles in CXR. For example, in an infant of 1 year, with an average tracheal length of 50 mm, the ETT tip should be between 20 and 30 mm from carina.<sup>2</sup> The medial end of the clavicle would be around 25 mm from carina in this case. The ETT tip is considered to be in correct position in CXR, if the CXR measurement is between 20 and 30 mm from carina or if within  $\pm 0.5$  cm from the medial end of clavicle. Similarly, the ultrasound reading should fall in this range to be accurate. If the ultrasound reading is below 20 mm or above 30 mm, then it is said to be in incorrect position.

The usual reported occurrence of incorrect position of ETT tip is 5–10% in previous studies.<sup>3–5</sup> It was 6–16% in another study.<sup>6</sup> However, we had reported a higher figure of 22.2%. We had attributed this to the fact that we had a larger proportion of malnourished children in our study and the age-based formula for selection of ETT size and hence the fixation length must have overestimated the fixation length.

We used both cuffed and uncuffed ETT, but saline-filled ETT cuff identification in suprasternal notch as reported before was not done in our study.<sup>6,7</sup> Saline-filled ETT cuff identification is a different method from our study. Unlike our study, which measured the actual distance of the ETT tip from the aortic arch (quantitative method), saline-filled cuff identification method just looked for

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the presence of saline-filled cuff in suprasternal notch (qualitative method, no actual measurement of distance). This method may be acceptable for screening during an emergency, but measurement of the actual distance as done in our study may be the preferred option in a ventilated patient in the ICU, as change in measurements could be an early sign of migration of ETT tip.

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