Endotracheal tube placement using glottic depth marker in children

Dear Editor,

Correct placement of the endotracheal tube (ETT) is always a challenge in children, with endobronchial intubation being more common due to a smaller margin of error.[1] There are multiple methods and formulas to confirm the correct depth of ETT placement but remains poorly concordant with the chest X-ray evaluation of the proper ETT tip placement.[1,2] In the operating room, placing the vocal cord guide (marked proximally to the tube cuff by manufacturers) at the vocal cords is the commonest method to position ETT.

We report an airway management issue during the anaesthetic management of a 3-year-old male child posted for repair of lumbosacral meningomyelocele under general anaesthesia. Using a vocal cord guide, a cuffed, 4.5-mm internal diameter (ID) ETT (Sterimed, New Delhi, India) was placed inside the trachea. On auscultation, air entry was found to be more on the right side of the chest. After withdrawing ETT by 2 cm, bilateral air entry was equal. We were intrigued to see the vocal cord guide lying significantly outside the glottic opening on direct laryngoscopy in this position.

This observation made us examine four available models of ETTs of ID 4.5 mm made by four different manufacturers (Mallinckrodt, Covidien Ireland Ltd, Tullamore, Ireland; Shiley, Medtronic, Minneapolis, USA; Sterimed, India; and Teleflex, Kulim, Malaysia). The difference in the design of the vocal cord guide between different manufacturers was observed [Figure 1]. The design of the vocal cord guide and the distance from the ETT tip to its proximal end on each ETT was measured using a ruler, and a marked difference was noted in the position of the proximal end of the vocal cord guide between different models of all sizes of ETTs [Table 1]. The most significant difference was 23 mm between the size 4.5 cuffed ETT (Sterimed) and the cuffed ETT from Teleflex (Malaysia) [Figure 1, Table 1].

Using the vocal cord guide to estimate insertion depth may lead to inadvertent consequences.[3] Even after adherence to the depth guidelines for correct placement, the incidence of mispositioned ETTs

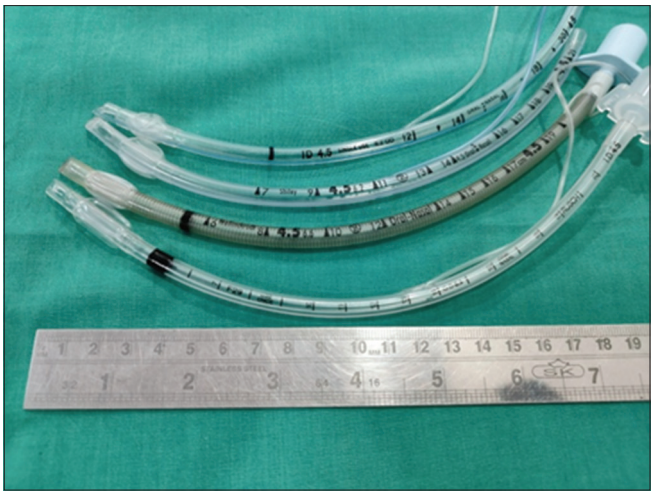

Figure 1: Glottic depth marker in various brands of endotracheal tubes

Table 1: Glottic depth marker in various brands of endotracheal tubes

Various available brands of endotracheal tube of 4.5 mm internal diameter	Distance of the glottic depth marker from the tip of the endotracheal tube (mm)
Mallinckrodt, UK	54
Shiley, Ireland	No vocal cord guide
Sterimed, India	70
Teleflex, Malaysia	47

detected by the first post-intubation chest radiograph was a staggering 69% in a study involving paediatric patients.[4] Therefore, the vocal cord guide should be carefully inspected before tube positioning, and the position of ETT should be reconfirmed by auscultation. Other adjuvant methods, including confirming the cuff position using ultrasound, are gradually becoming popular.[5] The current American Society for Testing and Materials (ASTM) standards require the depth markings in centimetres measured from the patient end to be printed on the tube. However, a clear recommendation about the vocal cord guide must be included. Our case shows that even after many years since the issue was highlighted, there has yet to be an international standard for tube markings.[6]

Declaration of patient consent

The authors certify that they have obtained all appropriate consent forms from the parents. In the form, the parents consented to the images and other clinical information of the child to be reported in the journal. The parents understand that the child's name and initials will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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