Volatile agents although considered inexpensive when compared with i.v. agents still account for ~20% of all drug costs in an anaesthesia department.[2] With the increasing cost burden of the less-soluble agents such as desflurane and sevoflurane, the onus is on the anaesthesiologist to utilize these resources meaningfully with less chance of wastage.[3] This simple method of diverting sampled anaesthetic gases might safely allow lower fresh gas flows while providing possible cost–benefits and decreased occupational exposure.

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Does the site of anterior tracheal puncture affect the success rate of retrograde intubation?

Editor—Retrograde intubation of the trachea (RI), first described in 1960,[1] is an airway management technique that can be used to place an endotracheal tube (ETT) when more conventional methods (e.g. direct laryngoscopy) have failed. The ASA difficult airway algorithm groups RI with other techniques (LMA, fibreoptic intubation) in the non-emergency limb of the pathway (i.e. cannot intubate but can ventilate)[2] RI also has a role in the elective management of the difficult airway, where its chief strength is that it requires no visualization of the glottic structures. This makes it ideal for an airway soiled by secretions or blood that may be unsuitable for fibreoptic visualization.

Despite the technical ease of performing an RI, anecdotal evidence suggests that the procedure is not widely taught or practiced, felt by some to be an antiquated technique in a world of fibreoptic tools. Furthermore, many practitioners have been disillusioned by initial attempts that resulted in oesophageal intubations. Anatomically, this is because of the confluence of the vestibular folds, laryngeal sinus, and the vocal cords in the small space inferior to the thyroid cartilage. Furthermore, the short distance between the vocal cords and the wire's anchor site (after cricothyroid membrane puncture, the wire is anchored ~9.8 mm distal to the vocal cords in an average-sized adult)[3] may cause the ETT to catch against the anterior surface of the larynx as it is advanced, deflecting it into the oesophagus.

We postulate that a more caudal site of tracheal puncture would offer the advantage of a greater distance between the retrograde wire and the impinging structures, as well as a reduction in the acuity of the angle the ETT must negotiate into the trachea. Our hope is that this would lead to a higher success rate of endotracheal intubation. The cricotracheal membrane, the first membrane caudal to the cricothyroid, is an ideal candidate. It is typically as easy to identify *in vivo* as the cricothyroid, despite its smaller vertical span (10 *vs* 6 mm). It is devoid of blood vessels or nerves, and sits cephalad

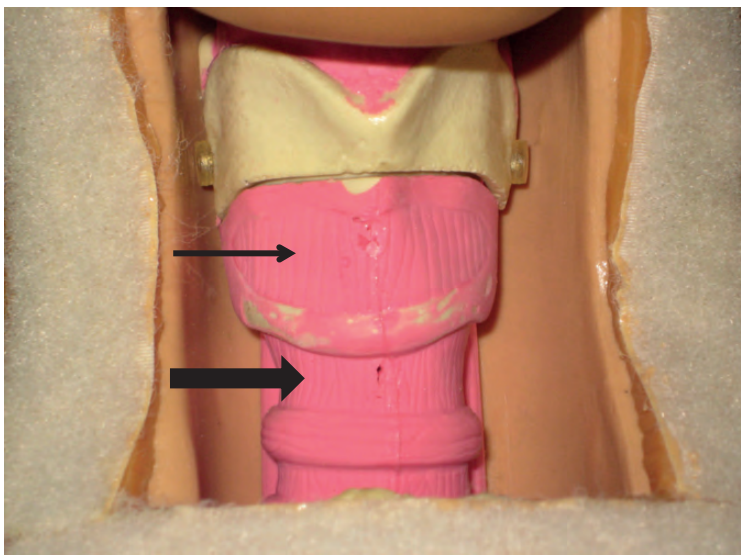

Fig 1 The exposed glottic anatomy of the manikin. The superior (thin) arrow points to the cricothyroid membrane. The inferior (thick) arrow points to the cricotracheal membrane.

of the thyroid gland. The distance from the vocal cords (2.5 cm) is more than double the distance between the cords and the standard cricothyroid puncture site, thereby reducing the chance of directly injuring the vocal cords when the needle is introduced. Other authors have suggested that the cricotracheal membrane may be a more suitable site for RI,[4 5] but to our knowledge no published studies comparing the different techniques exist. We have had great success teaching our residents this technique on a manikin developed for teaching RI and cricothyroidotomy (Laerdal Medical, Wappingers Falls, NY, USA). We replace the removable latex neck with a square Tegaderm™ (3M Corporation, St Paul, MN, USA) to allow identification of the subcricoid region (Fig. 1). We use a Cook Retrograde Intubation Set (Cook Medical, Bloomington, IN, USA) with a lubricated 7.5 ETT (Coviden-Nellcor™, Boulder, CO, USA).

While RI may never ascend to the popularity of other techniques, it still presents a viable alternative for management of the anatomically challenging airway in which adequate ventilation (either spontaneous or assisted) is ensured. As such, we feel that it should be included in any thorough anesthesiology curriculum. Its limited teaching and scarce use is likely due to two separate factors: the misperceived, exaggerated invasive nature of the procedure, and the fact that the proximity of the cricothyroid puncture site to the vocal cords leaves little room for error. Further study using cadavers or live patients is warranted to see whether the cricotracheal puncture site may result in a higher degree of accurate ETT positioning.

Declaration of interest

None declared.

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