FOCUSED REVIEW

Current status of the EasyTube: a review of the literature

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Abstract

EasyTube is an esophageal-tracheal double lumen airway device that combines the features of an endotracheal tube with a supraglottic airway device, enabling ventilation with either tracheal or esophageal insertion. EasyTube can be inserted blindly or by using a laryngoscope. Its main indication is for airway emergencies both in pre-and in-hospital areas. In this article we review the current knowledge on the use of the EasyTube.

Keywords: EasyTube, airway device, double lumen, ventilation, emergency

Introduction

EasyTube (EZT) (Teleflex, Rüsch, Research Triangle Park, NC) is a new second generation extraglottic airway device. It is a disposable esophageal-tracheal double lumen tube for emergency intubation or difficult airway management [1-5]. The Esophageal Tracheal Combitube (ETC), also an esophageal-tracheal double lumen device, has gained worldwide interest and has a long record of successful use for airway emergencies, both in pre-hospital and in-hospital settings [5-8]. While similar in design and function to the ETC, the EZT was developed in an attempt to improve the ETC [5]. ETT was approved for use in the European Union (2003) and the United States (2005).

The EZT has two lumens (pharyngeal and tracheal-esophageal lumen), two balloons (oropharyngeal proximal balloon and a distal balloon) and a single supraglottic ventilation aperture. The single supraglottic ventilation aperture is situated just below the oropharyngeal proximal balloon (Fig. 1).

The two lumens are separated by a partition. At the proximal end both lumens are linked via short tubes to universal 15 mm connectors. The pharyngeal lumen is open at the distal end. The tracheal-esophageal lumen has a distal end similar to an endotracheal tube (ETT) with an internal diameter of 7.5 mm (41 Fr) for the adult and 5.5 mm (28 Fr) for the pediatric size. Printed black ring marks indicate the recommend depth of insertion. EZT, like the ETC, has the unique advantage of combining the features of an (Endotracheal Tube) ETT with a supraglottic airway device, enabling ventilation with either tracheal or esophageal insertion (hence the term “tracheal-esophageal” for this lumen) [9]. Similar to other second generation extraglottic devices the EZT allows for passage of a gastric tube through the tracheal-esophageal lumen.

EZT is available in two sizes: 28 F (“pediatric size”) for patients with a height ranging from 90 to 130 cm and the 41 F for patients taller than 130 cm.

Insertion technique

EZT can be inserted blindly or by using a laryngoscope.

Blind insertion: With the patient’s head in neutral position, the mouth is opened by grasping the back of
EasyTube

Fig. 1.

Fig. 1. EasyTube

the tongue and jaw between thumb and forefinger and lifting the jaw. EzT is inserted with a curved downward movement parallel to the frontal axis of the patient, until the printed black ringmarks lie between the teeth, or alveolar ridges in edentulous patients. The colored oropharyngeal balloon and the distal cuff are inflated with 80 and 10 mL of air, respectively, using the two separate syringes provided in the package. Inflation of the oropharyngeal cuff seals the oropharynx and prevents aspiration of blood or secretions from the oral or nasal cavity. The distal cuff occludes the esophagus and prevents aspiration of gastric contents. The stems and the pilot balloons are color coded to help identify the lumens.

Ventilation should be tested through the longer blue tube leading to the esophageal lumen, because of the high probability that the EzT will be placed into the esophagus following blind insertion. Air passes into the pharynx and from there over the epiglottis into the trachea since the mouth, nose and esophagus are blocked by the balloons (Fig. 2). Auscultation of breath sounds in the absence of gastric insufflations and the presence on the monitor of a CO$_2$ waveform confirms adequate ventilation when the EzT is in the esophagus. Ventilation is then continued through this lumen. Gastric contents can be suctioned through the other unused “tracheal” lumen. If no breath sounds are heard over the lungs in the presence of gastric insufflations, most likely, the EzT has been placed into the trachea. In this case ventilation is switched to the shorter clear tube leading to the tracheal lumen, and position is again confirmed by auscultation. In addition, capnography is mandatory to confirm adequate ventilation. In clinical studies, the reported time for insertion has been dependent on the definition of “achieving an adequate airway”, and has ranged from 15 to 31 seconds [2-9].

Laryngoscopically-guided insertion: can be performed similarly to an ETT insertion. In a case of difficult airway, if the glottis opening is difficult to visualize, the device can be inserted into the esophagus. Laryngoscopic placement may mitigate potential trauma, given improved visualization of the anatomical structures and displacement of the tongue.

Uses and indications

The EzT is used mainly as a rescue device in difficult airway situations in pre-hospital or in-hospital areas. Its first clinical use was described in 2004 by Thierbach et al. [4]. The EzT is especially useful in patients who have a small mouth opening, with an inter-incisor distance as small as 12 mm [5] and in circumstances where there is difficult access to the patient. A major advantage of the EzT over conventional endotracheal intubation is that insertion can be per-
formed without head and neck movement, with the patient’s head in neutral position, which may be beneficial in trauma patients. Since the distal balloon (oropharyngeal balloon) safely seals the esophagus against aspiration [10], the EzT may be of special benefit in patients with massive upper bleeding or vomiting, when visualization of the vocal cords is impossible.

Mannequin studies have shown that the EzT can be inserted by medical personnel with minimal formal training. In a study by Bolling et al. [11], 26 paramedics with previous training in endotracheal intubation, and a only brief training session for the ETC and EzT, were able to obtain an effective airway, in an airway mannequin, in a significantly shorter time with the ETC (36.0 ± 8.6 seconds) and EzT (38 ± 15.3 seconds) as compared to the ETT (45.2 ± 15.8 seconds) (p = 0.0001). Robak et al. [12] studied the speed of insertion of seven supraglottic airway devices (Laryngeal Mask Unique, Laryngeal Mask Supreme, Fastrach single use, Laryngeal Tube King-LTS-D, I-Gel, ETC and EzT), under simulated airway conditions, by 50 medical students with no experience in airway management. All studied devices proved to be successful in establishing an airway, in simulated difficult airway conditions. The authors concluded that the ETC and the EzT may offer advantages in difficult airway situations such as trismus, limited mobility of the cervical spine, as well as in combined airway pathological conditions.

Continued airway management with an EzT that has been already placed is a reasonable option in many cases. Recently, Sethi et al. [13] suggested that EzT is suitable for continued use for general anesthesia in patients undergoing elective nonlaparoscopic surgeries of moderate duration (94 minutes). Although it is possible to maintain an airway with the EzT, exchange with an endotracheal tube is often desirable for definitive airway control, especially if prolonged mechanical ventilation is expected.

Exchange of an EzT for an ETT can be done with a fiberoptically-guided method described for the ETC [14]. After partial deflation of the oropharyngeal balloon a fiberoptic bronchoscope can be passed extraluminally (alongside the EzT) and guided by the visualization of the ventilation outlet ending just below the oropharyngeal balloon (Fig. 3). Although this airway exchange technique is time-consuming, it offers the advantage of continued ventilation and oxygenation during fiberoptic placement of an ETT.

Comparison with the combitube

While similar to ETC, the EzT has several advantages. The “pharyngeal” lumen of the EzT ends just below the oropharyngeal balloon and, therefore, the tracheo-esophageal lumen is significantly thinner than that of the ETC. The oropharyngeal balloon of the EzT complies with the mandate for latex-free devices in medical practice. The pharyngeal lumen can be used to pass a fiberoptic scope since it is open at the distal end. In addition, a larger suction catheter can be passed via both lumens (14 F or 41 F EzT). The ETC has eight ventilation apertures that can lead to significant airflow resistance [15] as opposed to the single ventilation aperture in the EzT.

Clinical studies have compared the EzT to the ETC in patients undergoing elective general anesthesia with mechanical ventilation. Gaitini et al. [1] studied 50 ASA I and II, Mallampati I and II adult patients, with blind insertion of ETC (n = 25) or EzT (n = 25). There were no failures on inserting either device. While both devices were effective for airway management using mechanical ventilation in adult patients during elective
general anesthesia, the EzT required a shorter time to achieve an effective airway (22 ± 2 seconds for EzT and 34 ± 4 seconds for ETC), (p < 0.05), a higher oropharyngeal leak pressure (33 ± 6 cm H₂O for the EzT and 29 ± 2 cm H₂O for the ETC) (p < 0.05) and a better fiberoptic position score (2.8 for the EzT and 1.4 for the ETC (p < 0.05). These features could represent an advantage of the EzT as an airway rescue device in emergency medicine.

Sethi et al. [13] studied 90 ASA I and II, Mallampati I and II adult patients, ETC (n = 30) or EzT (n = 30) and ETT (n = 30), with laryngoscopic insertion. No episodes of hypoxia or hypercapnia were noted. They reported a more difficult placement for the EzT compared with the ETC and the ETT, with a longer insertion time for the EzT, (55 ± 11 seconds for the EzT and 46 ± 10 seconds for the ETC) (p = 0.01).

Comparison with the ETT

There are conflicting reports regarding the comparison of the EzT with the ETT. Lorenz et al. [2] reported for 200 patients, EzT (n = 100) or the ETT (n = 100), with blind insertion of the EzT. Ease of insertion on a nominal scale (as easy, moderate, difficult or impossible) was in favor of the EzT (p < 0.043). The number of insertions was equal in both groups. The insertion time was shorter with EzT (15.5 ± 3.6 seconds vs 19.3 ± 4.6 seconds) (p < 0.0001). With laryngoscopic insertion, Sethi et al. [13] reported a significantly longer time for the successful insertion of the EzT (EzT 55 ± 11 seconds and 32 ± 9 seconds for ETT) (p = 0.0001).

Contraindications

Contraindications in the use of the EzT are similar to those for the ETC: esophageal abnormalities, ingestion of caustic substances, intact gag reflexes, as well as glottic and supraglottic airway obstruction [8].

Complications

To date, no major complications with the use of the EzT have been reported. Possible complications can be similar to the ETC: damage, bleeding or perforation of the oral, pharyngeal or esophageal mucosa. However, because of the slimmer distal outer diameter of the EzT’s tracheoesophageal lumen, the chance of traumatic injury is expected to be lower.

Similar to other extraglottic devices, high intracuff pressure could potentially result in surrounding oropharyngeal tissue trauma. Frequent intracuff pressure check with a manometer is recommended to avoid excessive pressure [16]. Minor trauma as defined by identification of blood on the airway device after its removal was 70% after laryngoscopically-guided insertion [13] and 17.5% after blind insertion [1]. The incidence of a sore throat is similar to the ETC and ETT, ranging between 17.5% [1] with blind insertion and 50% after laryngoscopically guided insertion [13].

Conclusions

EzT is a valuable device to secure the airway in emergency conditions. The major indication for use of the EzT is as a back-up device for airway management, both in pre- and in-hospital settings after failure of direct laryngoscopy. While the EzT perpetuates the concept of the ETC, it offers several advantages, one of which is minimal training required for its correct use. Studies to compare blind and laryngoscopically-guided insertion are required to clarify the preferred method of insertion.

Conflict of interest

Nothing to declare

References

EasyTube – o actualizare

Rezumat

EasyTube este un dispozitiv esofago-traheal cu dublu lumen destinat menţinerii căii aeriene care combină un tub endotraheal cu un dispozitiv supraglotic de menţinere a căii aeriene, asigurând posibilitatea ventilării pacientului indiferent de modul de inserţie: traheal sau esofagiană. EasyTube poate fi inserat orb sau utilizând laringoscopia. Indicaţia principală a acestui dispozitiv o constituie calea aeriană dificilă în urgenţă, atât în prespital cât şi în situaţiile intraspitaliceşti. Acest articol şi-a propus să treacă în revistă stadiul actual al cunoaşterii în cea ce priveşte utilizarea clinică a dispozitivului EasyTube.

Cuvinte cheie: EasyTube, dispozitiv de cale aeriană, dublu lumen, ventilaţie, urgenţă