Secondary tracheoesophageal puncture in the setting of trismus and neopharyngeal stricture: A novel technique for safe insertion

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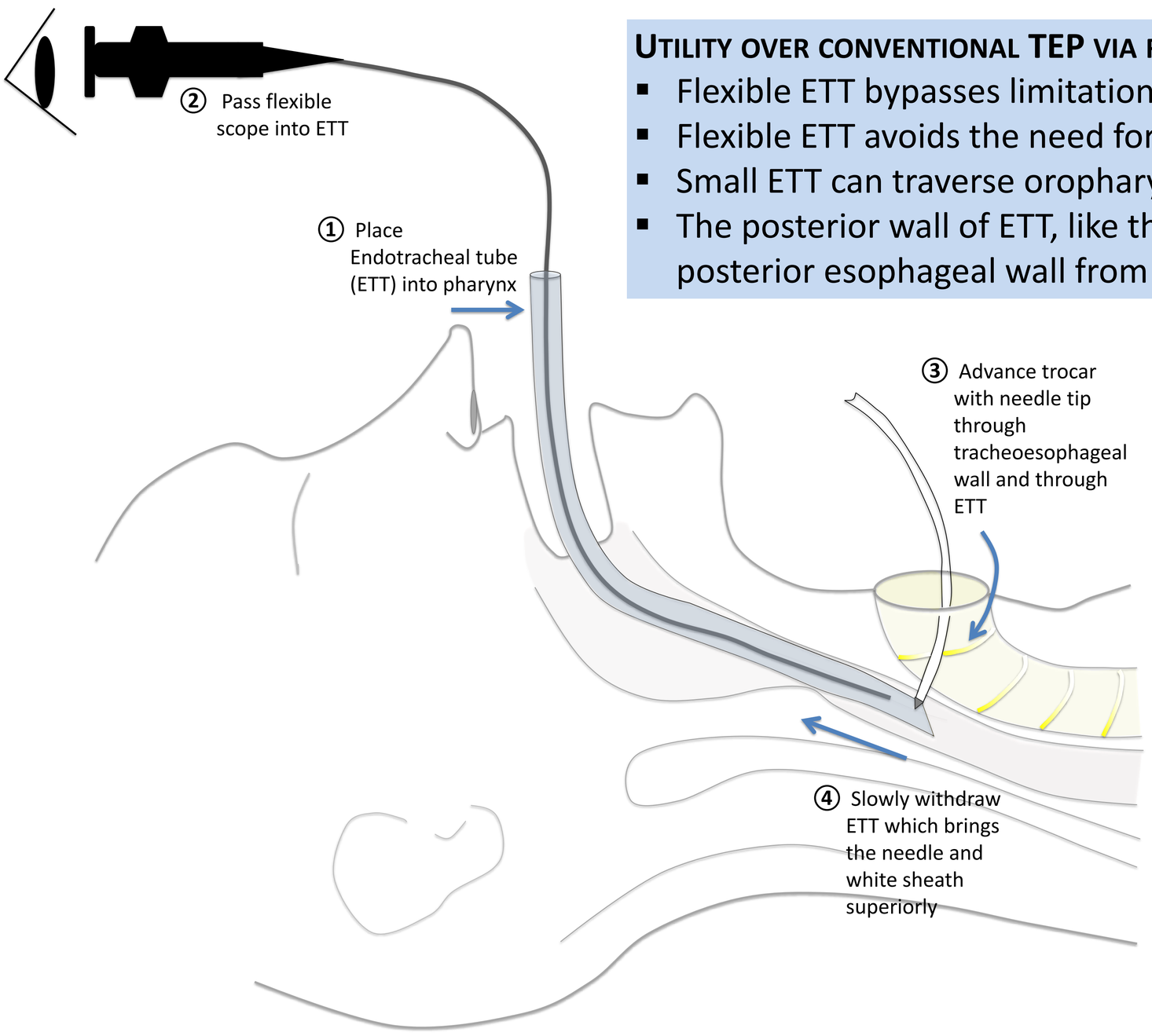
Objective:
We present a novel technique for secondary tracheoesophageal puncture (TEP) in patients with anatomic limitations of trismus and neopharyngeal stricture that preclude standard placement using a rigid esophagoscope.

Introduction:

Tracheoesophageal punture (TEP) has been the leading method to restore speech after laryngectomy, undergoing advances since it was first described by Blom and Singer three decades ago [1]. The TEP can be performed in the primary setting at the time of laryngectomy or secondarily as a separate procedure. Traditionally, secondary TEP is performed under general anesthesia with the use of a rigid endoscope to guide safe puncture of the tracheosophageal wall and insertion of voice prosthesis via Seldinger technique.

Patient ID	Primary cancer	Secondary Cancer	Date of Salvage Laryngectomy	Reconstruction	Reason for limited rigid esophagoscopy	Date of TEP	Currently using TEP?	Speech intelligibility
57yo M	T4N3 SCC of L supraglottis s/p chemoXRT, radical ND 2002	Recurrent SCC at anterior commissure and R TVC 2013	5/6/13	Radial forearm free flap	Severe Trismus	10/22/13	Yes	Excellent
71yo M	T2N2c SCC of R BOT s/p chemoXRT, MRND 2001	Recurrent SCC in epiglottis and BOT 2013	6/18/13	Pectoralis flap	Neopharyngeal stricture	11/5/13	Yes	Good



Utility over conventional TEP via rigid esophagoscopy

- Flexible ETT bypasses limitation of rigid esophagoscope in patient with trismus
- Flexible ETT avoids the need for neck extension
- Small ETT can traverse oropharyngeal and/or neopharyngeal stricture
- The posterior wall of ETT, like the bevel of the esophagoscope, protects the posterior esophageal wall from injury and guides the catheter superiorly

Protocol for Tracheoesophageal Puncture

The Blom-singer® (www.inhealth.com) voice prosthesis placement kit was adapted for this approach [4].

① Following anesthesia, perform a direct laryngoscopy and introduce a 5.5 (or smaller) uncuffed endotracheal tube (ETT) to the level of the tracheostoma.
② Pass a flexible scope (pediatric esophagoscope or laryngoscope) through the ETT for translumination and direct visualization. Palpate the membranous posterior tracheal wall to confirm positioning.
③ With direct visualization intraluminally with the flexible scope positioned in the ETT, advance the curved trocar and needle (Blom-Singer ®) through the tracheoesophageal wall and pierce through the anterior aspect of ETT.
④ Withdraw ETT slowly out of mouth, driving the needle and white sheath superiorly. Once the white sheath is in position, remove the needle and advance the dilating catheter wire through the sheath and thread it out the mouth. At this point, follow standard instructions for placing the voice prosthesis attached to the catheter and advancing into position via Seldinger technique.

Limitations to standard approach, particularly in the post-radiated patient, include inability to perform rigid esophagoscopy due to trismus, limitations in neck extension and proximal neopharyngeal stricture. Alternatives to rigid endoscopy have been proposed, such as use of a flexible esophagoscope for visualization; however, this approach does not afford the same protection to the esophagus which is created by the bevel of the rigid scope and an adult-size esophagoscope still can have difficulty traversing a narrow area of stricture [2]. Others have reported successful prosthesis placement guided by transnasal esophagoscopy under local anesthesia in the awake patient using a small caliber scope [3]. However, this technique also has potential for esophageal injury during puncture.

Herein, we describe a novel modification to standard TEP which overcomes the limitations of trismus and stricture often seen in the post-radiated laryngectomy patient. We describe two cases in which we have successfully used this technique and their outcomes long term.

Method:

Two patients underwent laryngectomy as part of multimodality, salvage therapy for squamous cell carcinoma (SCC) of the head and neck with complications of neopharyngeal stricture and trismus limiting TEP via standard approach [4].
Main outcome measures include:
(1) the ease, efficacy and safety of this new technique, and
(2) clinical and speech related data regarding the outcome of voice rehabilitation.

Results:

Two patients with aphonia following salvage laryngectomy in whom rigid esophagoscopy was contraindicated in setting of neopharyngeal stricture or trismus underwent secondary TEP with this approach. There were no complications.
By three month follow-up and until present time, both patients were using their voice prosthesis as their primary mode of communication. Both had intelligible speech, with one rated as having excellent intelligibility and the other as good intelligibility.

Conclusions:

Effective restoration of speech in post-laryngectomy patients directly impacts quality of life and facilitates return to normal activity. Neopharyngeal stricture, fibrosis and trismus are common complications after treatment of laryngeal and pharyngeal cancer. In these cases, secondary TEP guided by flexible endotracheal tube placed through the mouth under direct visualization of an endoscope through the tube can be safely performed, with excellent speech results.

References:

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2. Hong GS, John AB, Theobald D, Soo KC. Flexible endoscopic tracheo-esophageal puncture under local anaesthetic. J Laryngol Otol. 1995;109(11): 1077-1079.
3. LeBert B, McWhorter AJ, Kunduk M, et al. Secondary Tracheoesophageal Puncture With In-Office Transnasal Esophagoscopy . Arch Otolaryngol Head Neck Surg. 2009 Dec;135(12):1190-4
4. http://www.inhealth.com/category_s/155.htm