Transnasal oesophagoscopy (TNO)-guided secondary tracheoesophageal puncture (TEP) under local anaesthesia

BY JANE FANG FOO, IRFAN KHAN, SAMIT MAJUMDAR AND JAIGANESH MANICKAVASAGAM

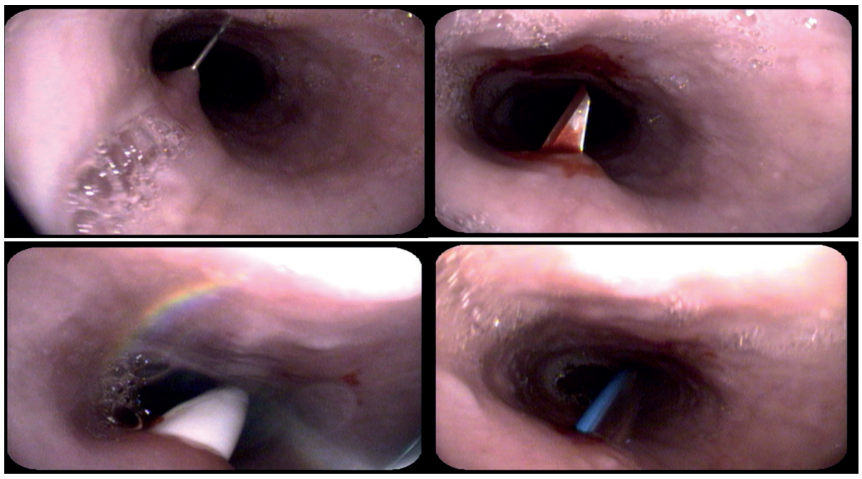
Here, the authors describe a convenient use of the transnasal oesophagoscope to create a new tracheoesophageal puncture in the outpatient clinic setting.

Tracheoesophageal puncture (TEP) with voice prosthesis insertion is a reliable and effective technique for surgical voice restoration (SVR) following laryngectomy. TEP can be performed either as a primary procedure during the initial surgery or as a secondary procedure after surgery and adjuvant radiotherapy. In certain cases, revision TEP may be necessary due to complications such as valve extrusion, infection, poor healing or suboptimal placement of the primary TEP.

Evidence suggests that the functional voice outcomes and lifespan of voice prostheses are comparable whether secondary TEP is performed under general anaesthesia (GA) or local anaesthesia (LA) [1]. The benefits of TEP under LA include reduced time and cost, elimination of general anaesthesia risks, faster patient recovery and easier neck manipulation to facilitate insertion [1]. However, drawbacks include variable patient tolerance and a risk of creating a false passage [1].

The incorporation of TNO offers the added benefits of air insufflation and direct visualisation during the procedure, reducing the risk of injury to the posterior oesophageal wall, and allowing for surveillance of any tumour recurrence [2]. This approach requires a two-person team, involving a trained TNO endoscopist and a surgeon.

> “The incorporation of TNO into many otolaryngology practices offers the added benefits of air insufflation and direct visualisation during the procedure, reducing the risk of injury to the posterior oesophageal wall”



Top L-R: insertion of 22G needle; Incision with Size 11 blade. Bottom L-R: Insertion of 18 French TEP dilator; Insertion of 16 French nasogastric tube.

This article describes the TNO-guided TEP procedure conducted in an outpatient clinic setting. We performed this procedure on a small series of three patients, all of whom experienced good functional voice outcomes with no immediate complications. The procedure was well tolerated by the patients, using basic equipment that is readily available in standard clinic or theatre supply stores.

Equipment

- TNO stack and scope
- Anaesthetic: Co-phenylcaine/Xylocaine/Lidocaine spray, Lignospan Special
- Headlight
- Skin marker
- Puncture needle (22G)
- Size 11 blade
- Curved artery forceps
- 18 French TEP dilator or 16 French Ryles tube
- Sterile swabs
- Skin tapes

Technique

Patient preparation, set up and local anaesthesia

The patient is seated comfortably in an upright position. It is crucial that the patient is well informed about the nature of the procedure to ensure maximum co-operation. The nasal cavity is anaesthetised and decongested bilaterally using Co-phenylcaine 5% / 0.5% spray. About 2–3 mls of Xylocaine 10% is sprayed into the oropharynx, and the patient is instructed to swallow. The puncture site is identified and marked with a skin marker. The optimal puncture site is on the posterior tracheal wall at the 12 o’clock position, approximately 5 mm inferior to the mucocutaneous junction. Approximately 1 ml of 4% lidocaine is sprayed into the laryngectomy stoma. A 10-minute period is allowed for the topical anaesthesia to take effect, during which the remaining equipment is prepared. After this interval, 1 ml of

Lignospan Special 2% is carefully infiltrated at the designated puncture site.

Direct visualisation with the TNO scope

The TNO scope is advanced through the nasal cavity and into the cervical oesophagus. If passage through either nasal cavity is not feasible, transoral oesophagoscopy can be performed using a mouth guard. The position of the scope can be confirmed by trans-illumination, allowing the light to shine through the posterior tracheal wall. To facilitate trans-illumination, the room lighting should be dimmed. Continuous air insufflation is essential to maintain a clear visual field and to prevent oesophageal wall collapse.

Puncture

A 22G needle is inserted through the posterior tracheal wall, and its tip is identified in the oesophageal lumen under direct visualisation. Without removing the needle, a stab incision is made through the same tract using a size 11 blade, which is then carefully rotated 180 degrees to enlarge the tract. An artery forceps is used to spread and dilate the tract, minimising the risk of false passage formation. An 18 French TEP dilator is then passed through this tract, and the artery forceps is removed. The TEP dilator is then secured to the patient's skin above the stoma with tapes to facilitate tract maturation. Alternatively, a size 16 Ryles tube can be used in place of the TEP dilator.

Placement of voice prosthesis

The patient returns within two to seven days for sizing and insertion of the speech valve by the speech and language therapist.

Discussion

We are pleased to report that all three patients underwent uneventful TEP on the first attempt, followed by successful speech valve insertion, with functional voice outcomes. Although the needle and scalpel technique could theoretically result in an ovoid-shaped fistula causing peripheral valve leakage, we have not encountered this issue in our practice. This observation aligns with another published case series (n = 55) utilising the same technique, which reported no instances of peripheral leakage [3]. Based on our literature review, potential minor complications include bleeding from the puncture site requiring silver nitrate cautery, closure of the tract after prosthesis dislodgement, formation of a false passage, and mild postoperative cellulitis [2,4].

Immediate speech valve insertion at the time of puncture has been described in the literature [3,5]. Additionally, the availability of pre-prepared kits such as the Provox Vega for retrograde speech valve insertion supports immediate speech valve insertion [5]. However, delaying valve sizing and insertion has advantages, including allowing for proper healing and preventing valve embedding due to oedema. Delayed insertion also facilitates tract maturation, simplifying subsequent valve sizing and insertion. For patients facing logistical issues returning to the unit, immediate insertion during the same visit post one to two hours of dilation with the TEP dilator is an option. While a size 16 Ryles tube can be used to keep the tract open, we find the TEP dilator is easier to insert and secure, ensuring safe discharge. Additionally, it attaches more conveniently to the skin compared to the Ryles tube.

Our small case series shows promising initial results. Our technique, which requires no specialised equipment, has proven well-tolerated and successful.

Key learning points

1. Ensure adequate patient explanation, positioning and sufficient topical local anaesthesia to maximise patient compliance.
2. We found the TEP dilator a suitable alternative to the conventional Ryles tube placement, and can be safely left in the tract to allow maturation.
3. Active involvement of the speech and language therapists is important in the patient's care journey.

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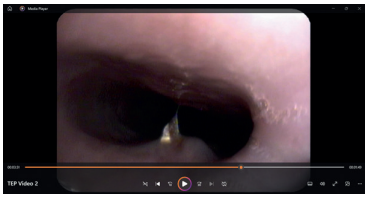

To watch a video of the TNO-guided TEP procedure under local anaesthesia, scan this QR code.

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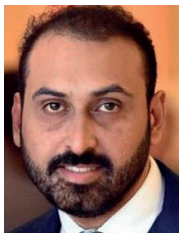

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Declaration of competing interests:
None declared.

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