In-Office Secondary Tracheoesophageal Puncture with Immediate Prosthesis Placement

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Tracheoesophageal puncture (TEP) is the preferred method for voice restoration following total laryngectomy. While several techniques for secondary puncture have been described, most require general anesthesia or intravenous sedation.¹ Techniques for in-office, unsedated secondary TEP have been developed but are limited due to patient discomfort, inability to maintain direct visualization of the puncture, damage to the posterior esophageal wall, return visit for prosthesis placement, and an irregular puncture site.²-⁴ We present a novel and effective technique for in-office secondary TEP that features immediate placement of a voice prosthesis via the Seldinger technique to prevent false passage and that includes visualization with a transnasal esophagoscope (TNE).

Methods

After total laryngectomy, all patients return to the clinic in approximately 2 to 4 weeks; however, this technique can be used for closed puncture sites or delayed prosthesis placement. Patients do not need to be nil per os, and those intolerant of TNE are deemed poor candidates. The nasal cavity, posterior oropharynx, and stoma are anesthetized with aerolized 4% tetracaine and phenylephrine. The pharynx and esophagus are anesthetized with 8 mL of 2% viscous lidocaine and 2 mL of milk of magnesia.

The TNE is placed in the proximal esophagus. The TEP site is identified 10 to 12 mm from the superior aspect of the stoma. This area is transilluminated with the TNE and injected with 1 mL 1% lidocaine with 1:100,000 epinephrine.

We use a multilumen central venous catheter kit (Arrow, Reading, Pennsylvania; Figure 1). The 18-g introducer needle is bent at the distal 2-cm tip at an 160-degree angle (Figure 1C). This bend allows for perpendicular entry. The posterior tracheal wall is entered with the bevel facing superiorly (Figure 2A), then rotated 180 degrees so that it faces inferiorly. The guidewire is inserted through the needle (Figure 2B). The needle is removed, and the dilator is inserted into the esophageal lumen via the Seldinger technique⁵ (Figure 3A). A mark is placed on the dilator at the posterior tracheal wall and again when that mark is seen within the esophageal lumen. These marks determine prosthesis length.

Placement of the voice prosthesis is done through a gel capsule insertion method. A 16-Fr Classic Indwelling Blom-Singer voice prosthesis is used (Inhealth Tech, Carpinteria, California). A 10-mm prosthesis is typically placed, although prosthesis length is based on the markings on the dilator. A hole is made with an introducer needle at the top of the gel capsule (Figure 1D, magnification). The capsule is placed onto the guidewire, followed by the voice prosthesis. The esophageal retention collar is hand-loaded into the gel capsule. An insertion stick is placed, and via the Seldinger technique, the apparatus is advanced through the puncture site (Figure 4A). The esophageal lumen is visualized throughout the procedure (Figure 4B). Once the gel capsule enters the esophagus, it quickly dissolves, releasing the retention collar, with placement confirmed via direct visualization (Figure 4B). The insertion stick is then removed, and gentle probing through the center of the prosthesis is performed to ensure proper valve function. Patients are instructed on use, care, and maintenance of the voice prosthesis. This study was approved by the University of Michigan’s Institutional Review Board (HUM00103264).

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Results

We performed 37 in-office secondary TEPs on 34 patients using this technique. There were no aborted procedures. The median puncture took place 35 days after laryngectomy, and follow-up time was 12 months. Free tissue transplantation was used in 79.4% of the population, and all punctures were placed below the distal anastomosis in these cases.

Immediate vocalization was possible in all patients. We had no placement of the prosthesis in a false passage, and there were no bleeding complications. No patients required immediate downsizing of their prosthesis; however, 2 patients were downsized at approximately 6 months after prosthesis placement. Three patients (8.8%) required a second in-office TEP placement procedure for dislodgement.

Discussion

Multiple techniques of secondary TEP placement already exist, but all have disadvantages. Techniques utilizing retrograde procedures are uncomfortable in the office setting.\(^1\) Other procedures are done without direct visualization, increasing the false passage rate, causing injury to the posterior esophageal wall, and possibly forming an irregular-shaped puncture site, which can lead to an ill-fitting voice prosthesis.\(^2\)\(^-\)\(^4\) Finally, many techniques place a red rubber catheter as a staged procedure, which requires a second visit, causes potential catheter migration, and creates temporary problems with swallowing due to the catheter’s position within the esophagus.

Our prosthesis dislodgement rate (8.8%) is lower than that stated in the literature (15%-85%), probably due to immediate prosthesis placement and the Seldinger technique. In addition, our technique did not have any patients who required immediate downsizing, although 2 did require downsizing of their prostheses approximately 6 months after placement, consistent in the literature.\(^4\)

Our technique offers cost savings when compared with intraoperative placement. Professional charges are comparable between in-office and intraoperative placement. Hospital and anesthesia charges at our institution are approximately $9300, compared with $3300 for in-office placement. Insertion kits for antegrade placement of the prosthesis are approximately $285. The central venous catheter kit (Arrow) is approximately $115. We believe that the extra $115 cost for the central venous catheter kit is justified to be able to use the Seldinger technique. While the exact
central venous catheter kit may not be readily available at every institution, we hope that our figures nicely explain the parts of the kit used to broaden applicability.

Conclusion
Our novel technique for in-office secondary TEP with immediate placement of a voice prosthesis using the Seldinger technique is effective without significant adverse events. Further research is needed to compare multiple techniques for efficacy and cost-effectiveness.

Author Contributions
Tiffany A. Glazer, gathering data, drafting the manuscript; final approval of the version to be published; agreement to be accountable for all aspects of the work; Taha Meraj, gathering data, drafting the manuscript; final approval of the version to be published; agreement to be accountable for all aspects of the work; Teresa H. Lyden, conception, design; revising and editing manuscript; final approval of the version to be published; agreement to be accountable for all aspects of the work; Matthew E. Spector, conception, design; revising and editing manuscript; final approval of the version to be published, corresponding author and responsible for all content.

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References
