
HOW I DO IT: CLOSURE OF TRACHEOESOPHAGEAL PUNCTURE SITE

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Abstract: *Background.* Tracheoesophageal voice prosthesis is highly effective in providing speech after total laryngectomy. Although it is a safe method, tracheoesophageal fistulas occasionally need to be closed, usually at the request of the patient, because of leakage through an enlarging fistula. We present our technique for closure of tracheoesophageal fistula.

Methods. An incision is made at the mucocutaneous junction of the stoma from the 9 to the 3-o'clock position. Tracheoesophageal space is dissected down to and beyond the fistula. The tracheoesophageal tract is divided. The esophageal mucosa is closed with inverted sutures. After multiple layer closure of the esophageal fistula, the tracheal mucosa is closed with everted sutures.

Results. This technique has been used in nine patients. Eight were successful. The remaining patient had radiation therapy failure.

Conclusion. This method of closure is simple and effective for those patients who require permanent closure of the tracheoesophageal fistula. © 2001 John Wiley & Sons, Inc. *Head Neck* 23: 214–216, 2001.

Keywords: tracheoesophageal puncture; voice prosthesis; speech restoration

Tracheoesophageal puncture with the insertion of a voice prosthesis represents a useful and safe method for voice restoration after total laryngectomy. Most patients do well with tracheoesophag-

geal puncture, but a leakage of saliva or ingested food around the prosthesis does occur occasionally. This is often due to a fistula that is too large to accommodate a valve without leakage. In addition, when the prosthesis is too long for the tract, it enlarges the fistula. Also situations occur in which a stenosis is below the puncture site, which allows pooling of secretions in the area and leakage around a properly fitted prosthesis. If the fistula does leak, the puncture site should be closed. Another group of patients does not have speech develop or does not want to use the prosthesis even though they are able to function with it and they request closure of the fistula.

Discussion of the management of speech production has been focused on the methods of rehabilitation.¹ The techniques regarding closure of the fistula have not been addressed as much as creating the fistula. We describe a simple, but effective, surgical technique for those patients who require permanent closure of the tracheoesophageal fistula.

TECHNIQUE

The procedure may be performed under local or general anesthesia. The patient is prepared and draped in the usual manner. The area that surrounds the superior aspect of the tracheostoma is

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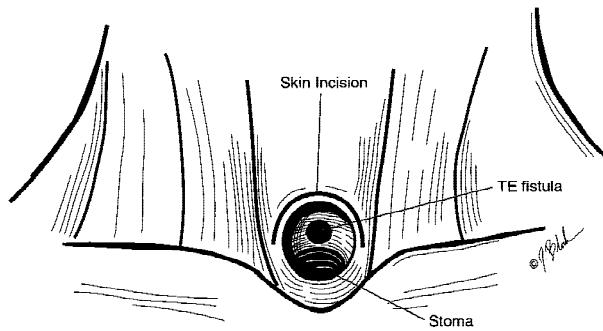


FIGURE 1. Incision from the 9 to the 3-o'clock position at the mucocutaneous junction.

infiltrated with 1% lidocaine with epinephrine 1:100,000. An incision is made in the mucocutaneous junction of the tracheal stoma from the 9 to the 3-o'clock position (Fig 1). The posterior wall of the trachea is undermined inferiorly and separated from the esophagus down to and beyond the tracheoesophageal fistula (Fig 2). After the tracheoesophageal tract is divided, the mucosa of the esophagus is closed with inverted interrupted sutures using 4-0 absorbable Vicryl with a P-2 (small circle) lacrimal needle (Figs 3 and 4). Multiple-layer closure of the esophageal fistula is suggested to prevent leakage. Subsequently, the mucosa of the tracheal lumen is freshened and closed with everted sutures in a single layer with the same suture material. After the complete closure, the stomal incision is closed without a drain. The patient begins a pureed diet on the same day.

DISCUSSION

The most common problem with tracheoesophageal puncture is the leakage of saliva or food with

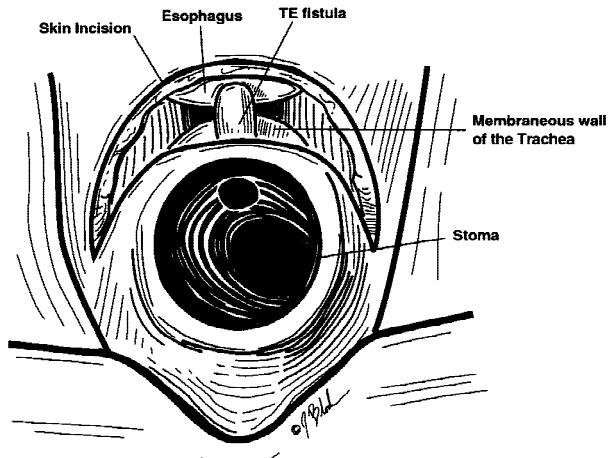


FIGURE 2. Exposure of the fistula.

an enlarging fistula. In up to 10% of patients, extravasation of saliva and food does occur from the puncture site.² Radiation therapy may result in enlargement of the fistula.³ Conservative measures are usually effective in the management of the fistula. Spontaneous closure generally occurs within 2 weeks after removing the voice prosthesis. If the fistula does not close spontaneously, attempts have been described to induce closure by repeated cauterization with silver nitrate or electrocautery.² A small number of patients in whom conservative measures fail may require surgical intervention for the permanent closure of the fistula. However, the fistula may leak because of an inappropriate voice prosthesis for the patient's tract. So before closing or applying any of other measures, the puncture site should be checked for a properly fitted prosthesis.

Most techniques described in the literature for

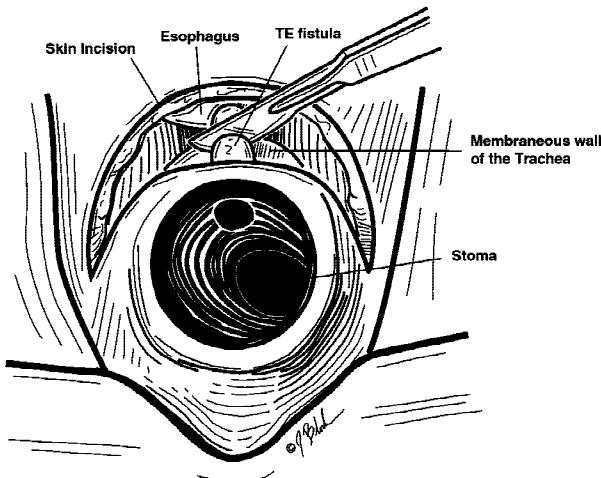


FIGURE 3. Division of the fistula.

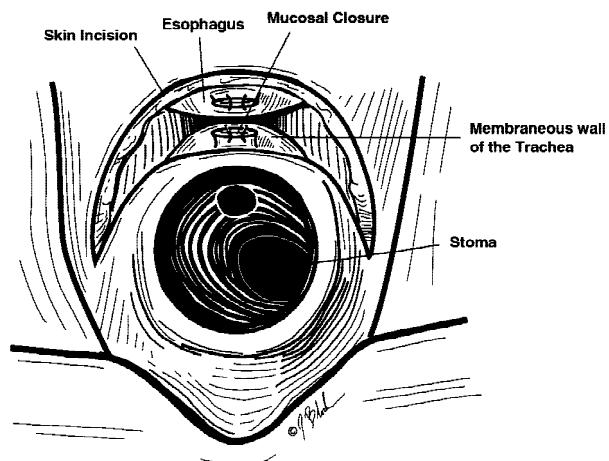


FIGURE 4. Closure of the tracheal and esophageal mucosa.

closure of the tracheoesophageal tract include interposition of tissue between the trachea and esophagus. Muscle rotation flaps such as the sternocleidomastoid and pectoralis major muscles have been recommended for the closure of the fistula.⁴ However, these muscle flaps are too bulky, and it has been suggested that they may compromise the lumen of the trachea or esophagus.⁵ Instead, some authors advocate interposition of dermal grafts.^{5,6} At the other extreme method of closure, the bipaddled radial forearm free flap with vascular anastomosis has also been reported.⁷ All these local or distant tissue interposition techniques may be used especially in heavily irradiated patients. When using tissue interposition, the area can be repunctured in patients who do wish to keep their voice prosthesis.

Our method of surgical closure does not require a separate skin incision, a muscle flap, or a dermal graft interposition. Other advantages include simplicity in technique and the ability to treat the patient without nasogastric tube feeding. The operation may be performed with the patient under local anesthesia as an outpatient procedure, making it simple, safe, and cost-effective.

We have used this technique in nine patients. All of these patients except one healed well and had no problems with the procedure. One patient who had been heavily irradiated around the stoma had difficulty with healing and ended up with a fistula that was approximately 1 cm in

diameter that later, using conservative treatment and the placement of a cuffed laryngectomy tube, healed down to the size of the original fistula but never closed. On the basis of this experience, we find radiation of the stoma to be a contraindication to this procedure. If the patients are symptomatic from the fistula, we think that a separate skin incision with a muscle flap interposed between the trachea and the esophagus would be better suited to the patient's needs.

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