Recurrent tracheoesophageal puncture fistula closure using a previous flap as donor: a case report
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Tracheoesophageal puncture (TEP)-site fistula dysfunction is a serious complication of TEP prosthesis. We successfully addressed a recurrent TEP-site fistula dysfunction by utilizing the previously done deltopectoral flap. This avoided a fresh donor site. Utilization of sound plastic surgery principles helps in tackling these problems effectively.

Keywords: deltopectoral flap, neotracheostoma, random pattern flap, tracheoesophageal puncture fistula, tracheoesophageal puncture prosthesis

Introduction
Tracheoesophageal puncture (TEP) with prosthesis was described by Singer and Blom in 1980 [1]. In this procedure a one-way valve is placed between the tracheostoma and the neopharynx, which allows air to be shunted on demand through the neopharynx and produce speech similar to esophageal speech.

There are various complications related to this procedure – namely, leakage through and around the prosthesis, hemorrhage, infection, extrusion of prosthesis, etc.

In such cases the prosthesis needs removal and closure of the TEP fistula.

Case report
A 64-year-old male patient with carcinoma of the larynx underwent total laryngectomy with bilateral neck dissection with TEP and prosthesis placement, followed by adjuvant radiation therapy. Eight years later he developed enlargement and dysfunction at the TEP site. Prosthesis removal and fistula closure were carried out with a two-layered closure and reinforcement with a deltopectoral (DP) flap cover over the esophagus.

Postoperatively there was breakdown of the DP flap and the fistula reformed. The neck tissues and esophagus were extremely fibrotic. Four months later fistula closure was performed by utilizing the DP flap already present at the fistula site along with creation of a neotracheostoma.

Operative technique
Circumferential incision was made around the tracheostoma. Dissection from the normal cartilaginous trachea anterior and lateral to the fistula site was carried out with minimal excision of the esophageal wall. Excision of the fistula track was done. Securing of a single-layer horizontal esophageal closure using 4-0 PDS taking simple sutures with knots placed outside was carried out. End stoma was relocated at the inferior edge of the fistula site. Barrier vascularized tissue coverage of the raw area and esophagus was completed. For this a 6×2 cm random pattern flap superiorly from the distal part of the previously operated DP flap was harvested.

The flap donor area was closed primarily. The standby back-up plan was pectoralis major muscle flap with skin...
graft if the random pattern flap did not bleed adequately (Figs 1–5).

**Discussion**

In laryngectomized patients, tracheoesophageal speech is the endpoint for voice rehabilitation. There are various complications related to this procedure, such as prosthesis-related complications, which is seen in 77.3% of cases. Other common complications are leakage (82.5%), prosthesis displacement (41.2%), intractable aspiration (29.4%), and aspiration of the prosthesis (23.5%) [2]. In such cases the prosthesis
needs to be removed and the TEP fistula needs to be closed.

Principles of fistula closure are complete excision of the fistula track, secure closure of the epithelial surfaces, and barrier vascularization between the two epithelial surfaces. The traditional surgical closure of a tracheoesophageal fistula includes fistula tract division and three-layer closure of the esophageal and tracheal linings with or without interposition of a pedicle regional skin or muscle flap [3].

Different methods of TEP fistula closure have been described in the literature: closure of the esophageal mucosa with inverted sutures and of the tracheal mucosa with everted sutures [4] and three-layered closure of a tracheoesophageal puncture site [5]; three-layer technique for closure by utilizing an interpositional dermal graft [6]; interposition of muscle between suture lines for leak-proof closure [7]. Use of a pedicled DP flap on the basis of a single perforator for the closure of fistulae has been published with good success rate [8].

We have tried to close a recurrent fistula by utilizing the locally available flap part and thus sparing a new flap surgery. This works perfectly on basic plastic surgery reconstructive principles where nothing is discarded, and it can be used efficiently for neoreconstruction if the tissue is viable. We have used an old flap as a donor for harvesting a new flap. Thus, the patient benefitted and his recurrent fistula problem could be resolved effectively.

**Conclusion**
Recurrent TEP fistula is a serious complication of TEP prosthesis, which needs prosthesis removal and fistula closure. Utilization of locally available flaps and sound plastic surgical principles help in tackling these problems effectively.

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**conflicts of interest**
There are no conflicts of interest.

**References**