42 Single-Stage Tracheal and Esophageal Reconstruction after Failure of Tracheal End-to-End Anastomosis for Poorly Differentiated Papillary Thyroid Carcinoma Invading the Trachea and Esophagus

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Case Report

A 39-year-old woman with a 2-month history of gradually increasing dysphagia and dysphonia was referred to our service for assessment of upper aerodigestive tract. The patient was known to have a simple nodular goiter of the left lobe of the thyroid gland, for which she was in charge AQ1 by endocrinologists. Laryngeal fiberoptic examination revealed paralysis of the left vocal cord in paramedian position. Contrast-enhanced computed tomography (CT) of the neck and mediastinum showed a left thyroid lobe tumor invading both the trachea and esophagus (**Fig. 42.1**).

Preoperative fine needle aspiration cytology detected papillary thyroid carcinoma. Bronchoscopy revealed infiltration of the tracheal lumen mucosa. The patient underwent total thyroidectomy, bilateral and central neck dissection, tracheal resection (from second to eight tracheal ring) with end-to-end anastomosis, and partial esophageal wall resection (repaired by direct suture) (**Fig. 42.2**). During surgery, due to tumor invasion, left recurrent laryngeal nerve was resected. Intraoperative frozen section confirmed clear resection margins (**Fig. 42.3**). Tracheal anastomosis was carried out with nonabsorbable sutures. To prevent tracheal anastomosis dehiscence, tracheal and suprahyoid muscles release was

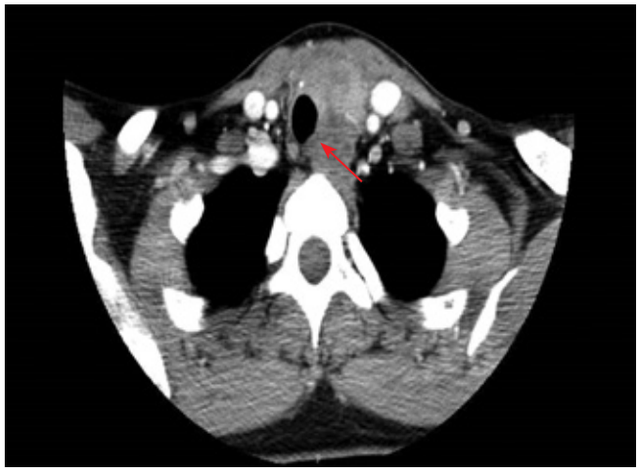

Fig. 42.1 Computed tomography (CT) scan showing the extent of the thyroid carcinoma. The *red arrow* indicates tracheal and esophageal invasion.

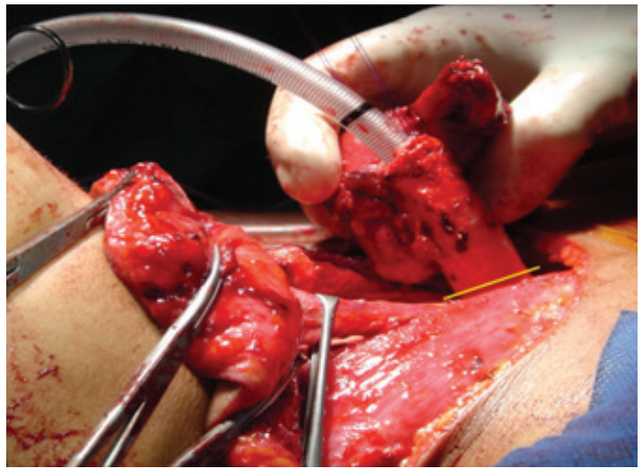

Fig. 42.2 Intraoperative view: the *yellow line* indicates distal resection margin.

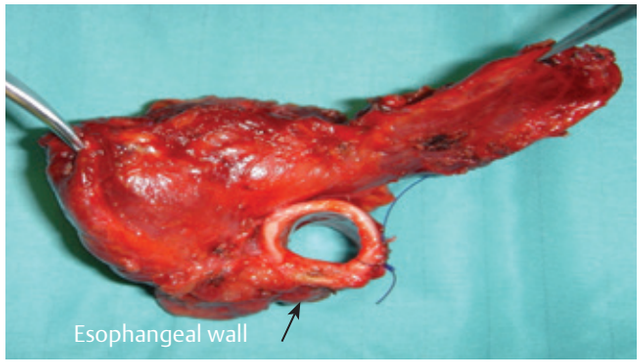

Fig. 42.3 Surgical specimen.

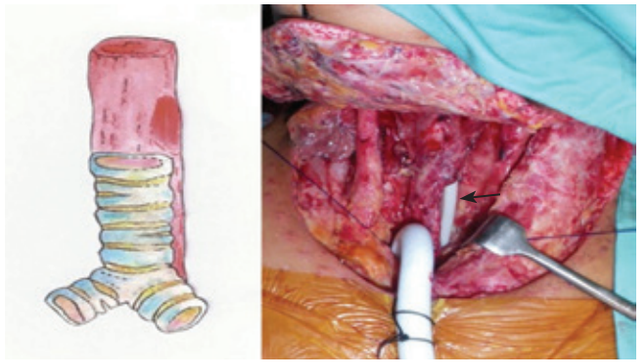

Fig. 42.4 Intraoperative view of emergency surgical exploration. *Black arrow* indicates nasogastric tube through esophageal dehiscence.

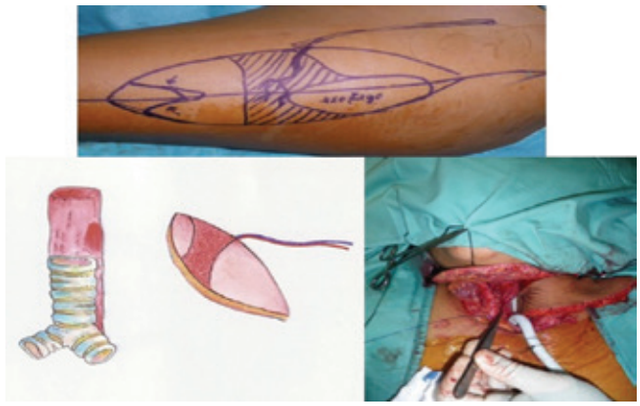

Fig. 42.5 Harvesting and initial insetting phase of the anterolateral thigh (ALT) flap.

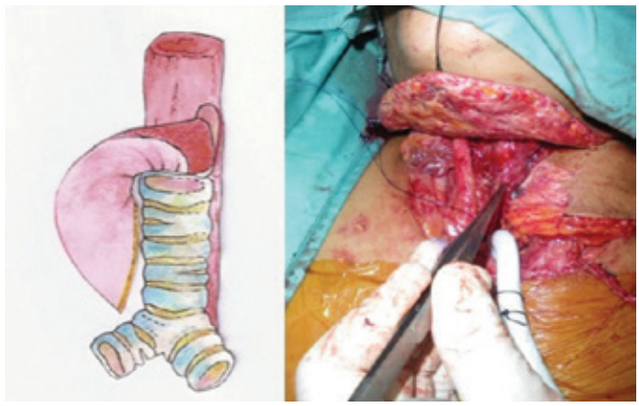

Fig. 42.6 Reconstruction of the esophageal wall with the proximal portion of the flap.

performed, and the chin was flexed to the chest position with two interrupted sutures.[1] To reduce the effects of positive ventilation on the tracheal suture line, the patient was extubated 48 hours after surgery.

Scary Time Started

On postoperative day 9, after an episode of violent coughing, the patient developed sudden subcutaneous emphysema and respiratory distress. In an effort to stabilize the airway, the cervical incision was reopened at bed side and the distal airway was cannulated by a Montandon tube. After airway stabilization the patient was taken immediately to the operating room.

How We Handled

Surgical exploration confirmed anastomotic dehiscence with complete disruption of the suture line. The dehiscence was found due to necrosis of the proximal and distal tracheal rings. The resection of the necrotic tracheal rings was planned, contraindicating direct tracheal closure. Moreover, the esophageal suture line was found unhealed (**Fig. 42.4**). In this emergency setting and considering that direct tracheal suture was impossible, a total laryngectomy was performed. To prevent mediastinal tracheostomy, reconstruction of the esophageal and tracheal defects was performed with an anterolateral thigh free flap consisting of two different skin islands separated by a de-epithelialized area (**Fig. 42.5**). The distal island of the flap was used to reconstruct the tracheal defect as well as a permanent tracheostoma, while the proximal island was used for the reconstruction of the esophageal wall.

First, the proximal paddle was oriented to reconstruct the esophagus (**Fig. 42.6**). Subsequently, the other paddle of the flap was tubed on itself, obtaining a funnel to reconstruct the tracheal defect and the definitive tracheostoma (**Fig. 42.7**). The operation lasted 9 hours and allowed to reconstruct the defect by suturing the tracheal remnant to skin edges without any tension. The patient was decannulated on postoperative day 38. Currently, a firm airway with a patent tracheostoma is maintained (**Fig. 42.8**).

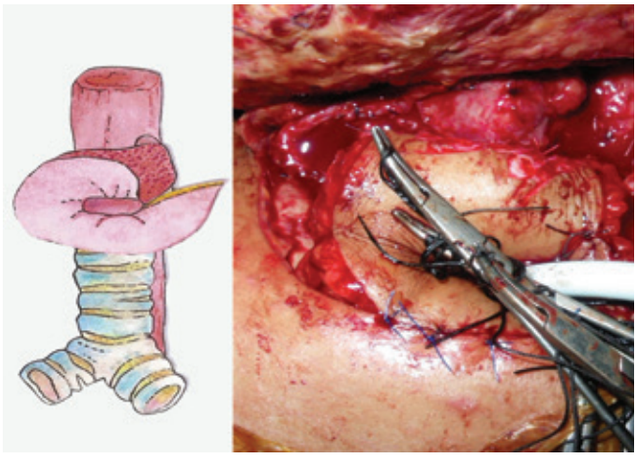

Fig. 42.7 The distal paddle of the flap was tubed and shaped like a funnel to reconstruct the tracheal defect and the definitive tracheostoma.

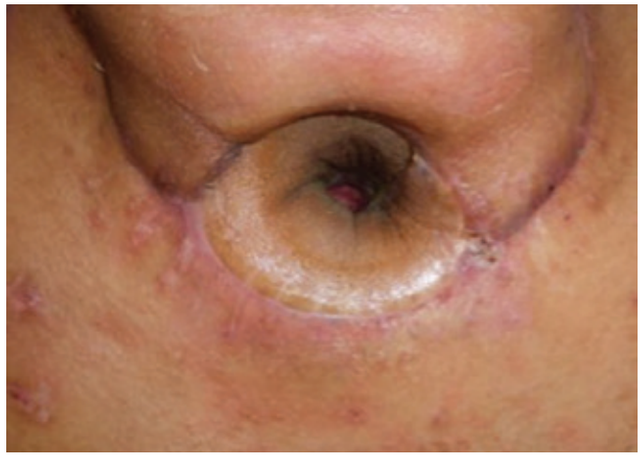

Fig. 42.8 Long-term follow-up shows patent tracheostoma without requiring stomal stenting.

Lessons Learnt from This Case

One of the most feared complications after tracheal reconstruction is dehiscence of the airway.[2] Tension on the suture line resulting from the length of the resected tracheal segment is crucial for anastomotic dehiscence.[3,4] We took all the cautions to avoid anastomotic AQ2 tension, including mobilization of the trachea, chin to chest position, and laryngeal release.

An additional risk factor of anastomotic dehiscence is the impairment of the tracheal blood supply, which originates from the inferior thyroid artery and passes laterally along the tracheal wall.[5,6] Probably thyroidectomy associated with extensive nodal dissection (including six and seven levels) injured the tracheal vascular supply promoting the necrosis of the anastomosis and resulting in complete disruption of the suture line.

Clinical Pearls and Pitfalls

- Tracheal resection with end-to-end anastomosis is a challenging procedure, with results depending on precise surgical technique.
- Tracheal resection involving more than eight tracheal rings is associated with a remarkable increase in anastomotic dehiscence rate.
- Surgery must minimize suture line tension and preserve blood supply.

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Author queries

AQ1. AU: The sense of the phrase “she was in charge by endocrinologists” is not clear. Please consider revising for clarity.

AQ2. AU: Please check if the edits made in the sentence “We took all the cautions to avoid anastomotic” retain your intended sense.