



Management of small tumours involving the true vocal folds can be contentious. Tumour control is achieved in over 95% of patients presenting with T1 glottic cancer employing external beam radiation therapy, vertical hemilaryngectomy, or transoral endoscopic resection. Given adequate resources, the weight of evidence favours endoscopic transoral resection as the most cost-effective approach with very high rates of tumour control.

Patient Selection

Young patients presenting with involvement of the anterior commissure or partial impairment of motion (T2) and those who have failed attempts at curative irradiation therapy for small glottic lesions may be suitable candidates for **vertical partial laryngectomy**.

When the tumour requires removal of the **anterior commissure**, the proper term for this procedure is **frontolateral partial laryngectomy**. Frontolateral vertical hemilaryngectomy can be accomplished to include one arytenoid and, when necessary, both true vocal folds. Under these circumstances, some surgeons may choose **supracricoid partial laryngectomy with cricohyoidoepiglottopexy** to manage extensive cancer of the anterior commissure involving both vocal cords and the paraglottic space.

Vertical partial laryngectomy is **not suitable** for tumours involving the supraglottic larynx and the paraglottic space. Similarly, it is not appropriate for patients with greater than 10mm of subglottic extension. Involvement of both arytenoids is also a strict contraindication.

Patients presenting with multifocal lesions, diffuse dysplasia and carcinoma in situ, in-

volvement of the arytenoids and the posterior commissure, and those in whom poor health compromises suitability for surgery may be better served with external beam irradiation.

Preoperative Planning

When considering surgical intervention for cancer involving the true vocal cords, precise staging and patient selection are crucial for good outcomes. High resolution fine-cut CT compliments microlaryngoscopy and examination under anaesthesia.

In the setting of failed prior irradiation therapy, the surgeon must be aware of the potential for multifocal persistent cancer. In general, the entire field of the original tumour should therefore be considered for removal.

Careful preoperative tumour mapping employing flexible fiberoptic endoscopy and fine cut CT allows the surgeon to estimate the extent of resection and the reconstructive needs of each individual patient. For instance, patients requiring frontolateral hemilaryngectomy in which both arytenoids are intact and 80% of one vocal cord can be maintained will require no added tissue for reconstruction. Conversely, if an arytenoid is resected or if more than 20% of the contralateral vocal fold must be removed, some reconstruction must be undertaken to afford good swallowing without aspiration and to allow adequate diameter of the lumen for respiration.

Operative steps

- The procedure is undertaken under general anaesthesia
- Perioperative prophylactic antibiotics are administered for 24 hrs

- Do a tracheostomy through a separate neck incision
- Make a second horizontal incision approximately at the level of the thyroid notch (*Figure 1*)
- Take care to ensure separation of the tracheostomy incision from the partial laryngectomy incision

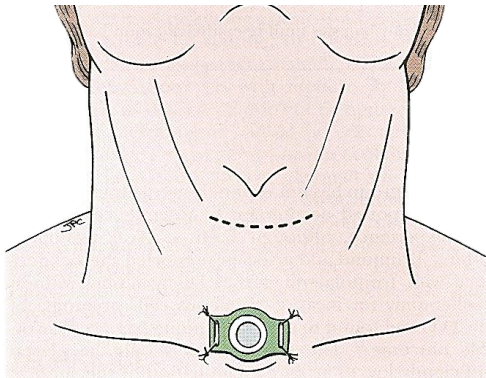


Figure 1: Incision for vertical partial laryngectomy

- Elevate skin flaps superiorly up to the hyoid bone, and inferiorly to the cricoid cartilage
- Separate and elevate the strap muscles to expose the thyroid lamina (*Figure 2*)

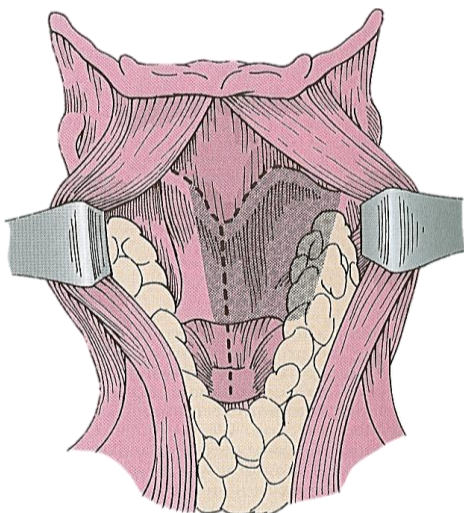


Figure 2: Incision of the perichondrium to expose the thyroid ala

- Incise the external perichondrium of the thyroid cartilage at the midline and

elevate a posteriorly based perichondrial flap is bilaterally (*Figures 2 & 3*)

- The extent of the elevation should reflect the intended thyroid cartilage resection

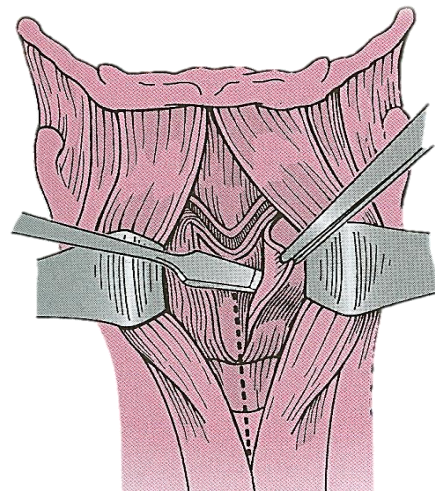


Figure 3: Elevation of perichondrium with overlying strap muscles

- Make vertical cuts through the thyroid cartilage, preserving as much of the posterior lamina of the cartilage as basic oncologic principles will allow
- Design the cuts to correspond with soft tissue resection margins within the larynx (*Figure 4*)

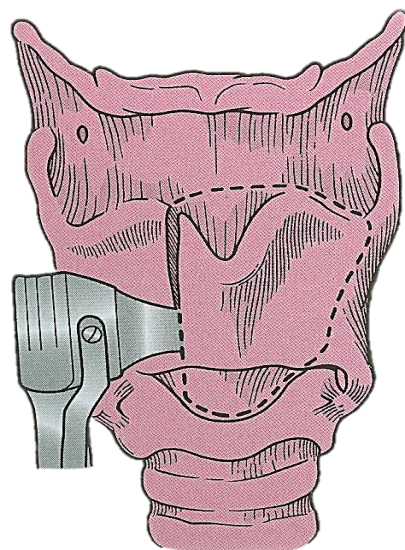


Figure 4: Vertical cartilage cuts are designed to correspond with soft tissue resection margins within the larynx

- It is essential that the cartilage cuts be made perpendicular to the plane of the cartilage and that soft tissue cuts be made with a knife, and not with the saw (Figure 5)

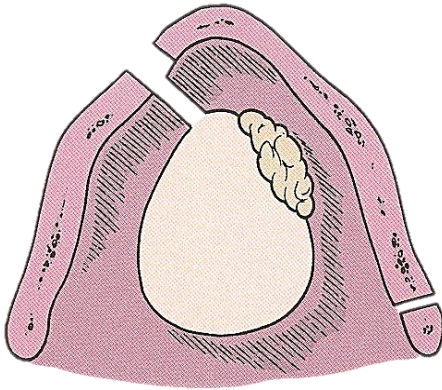


Figure 5: Cartilage cuts must be perpendicular to the cartilage to allow for corresponding soft tissue cuts in the larynx

- Make a wide cricothyrotomy to allow access to the subglottis so that the surgeon working with a headlight and a knife can visualise the undersurface of the vocal cords
- Place the initial cut in the vocal cord to allow a 2mm margin from the tumour without unnecessarily removing uninvolved vocal cord
- Then open the thyrotomy widely so that the cut across the posterior aspect of the involved vocal fold can be accomplished with a 2mm margin
- Remove the hemilaryngectomy specimen
- New margins from both sides of the vocal cord should ideally be submitted for frozen section assessment
- Insert a nasogastric tube

When two-thirds or more of one vocal fold has been preserved, no extra soft tissue reconstruction is required.

- Fix the free end of the residual vocal fold anteriorly to the residual thyroid

cartilage with a Vicryl suture (Figure 6)

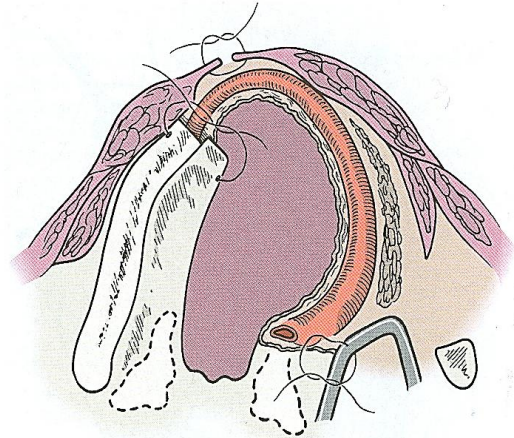


Figure 6: Reattachment of vocal cord remnant to thyroid ala

- Close the external perichondrium in the midline with Vicryl (Figure 7)

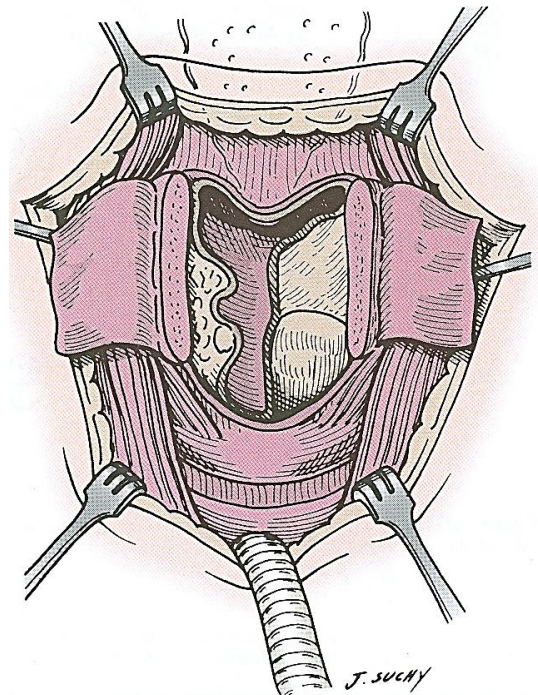


Figure 7: The larynx after the specimen has been removed. Closure is initiated by suturing the external perichondrium in the midline

- Reapproximate the strap muscles in the midline with Vicryl as a second layer of closure (Figure 7)

- Insert a **Penrose drain**. Suction drains should be avoided because they will tend to draw secretions from the airway through the wound
- Close the skin in layers
- Insert a cuffed tracheostomy tube

When more than 80% of the contralateral vocal fold cannot be preserved, some form of tissue reconstruction is required to re-constitute the lumen to maintain an adequate airway. The author prefers employing an epiglottopexy:

- Grasp the petiole of the epiglottis with Allis forceps
- Free and divide the hyoepiglottic ligament by undermining the lingual surface of the epiglottic cartilage in a sub-perichondrial plane
- Mobilize and pull the epiglottis inferiorly
- Fix the epiglottis to the superior surface of the cricoid cartilage (Figures 8 & 9)

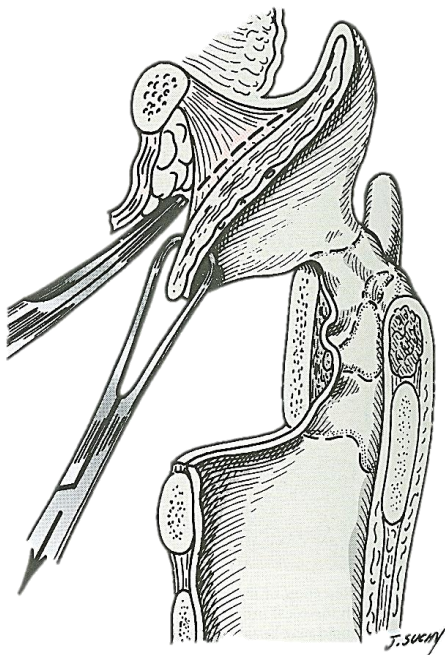


Figure 8: Epiglottopexy: The lingual surface of the epiglottic cartilage is undermined in a subperichondrial plane to divide the hyoepiglottic ligament

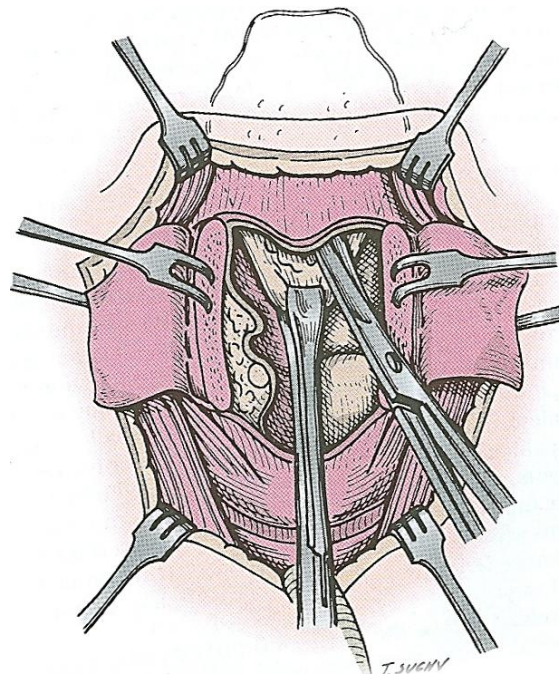


Figure 9: Epiglottopexy with epiglottis pulled inferiorly with Allis forceps

When tumour considerations require removal of the body of the arytenoid, it, too, must be reconstructed. The critical aspect is to re-establish the height of the arytenoid to prevent secretions from flowing directly from the pharynx into the larynx. A multitude of techniques have been reported employing cartilage, muscle or just fat. The tissue needs to be fixed to the top of the cricoid and then covered by advancing mucosa from the medial wall of the pyriform sinus over the reconstructive materials. Patients requiring arytenoid reconstruction invariably have prolonged recovery and temporary dysphagia.

Postoperative Care

At completion of the procedure, the patient should have a cuffed tracheostomy tube in place with the balloon inflated. Antibiotic administration is terminated on the first postoperative morning. The patient's nutritional needs are supported by feeding via a nasogastric tube.

The dressing supporting the Penrose drain should be changed for good hygiene. The drain can be removed when it is no longer producing mucoid secretions, commonly on the 3rd or the 4th postoperative day.

Routine tracheotomy care is provided. The tracheotomy cuff should be kept inflated for 4-5 days to divert coughed secretions through the tracheotomy tube rather than into the newly reconstructed wound. The tracheotomy cuff can be deflated on the 5th postoperative. This allows the treatment team to determine if the patient can protect the airway without aspiration. Patients who were previously treated with radiation may have a delayed decannulation process.

If a patient tolerates deflating the cuff of the tracheotomy tube, then the tube can be changed to a smaller, uncuffed tube. The adequacy of the reconstructed airway can then be tested by plugging the tracheotomy tube. Patients who tolerate this overnight are candidates for decannulation. Soft foods are reintroduced, and the patient can be discharged.

Salvage following radiation: Special considerations and problems

The most common indication for frontolateral partial hemilaryngectomy in the era of transoral endoscopic technology is to treat patients with persistent cancer after having had radiation therapy. Such patients have increased oedema, slower healing, and a high incidence of chondritis. The drain frequently needs to be maintained beyond the first week. Antibiotics should be instituted for cellulitis and erythema. Return to oral eating is often delayed and the nasogastric tube may need to be maintained for 2-3 weeks. Most patients can be discharged to home with home nursing and care of the tracheotomy and nasogastric tube until the wound has stabilized, oedema has resolved at which time the treatment team can

proceed with the decannulation and an oral feeding process.

Therapeutic Expectations

Partial vertical hemilaryngectomy is highly effective (>90%) in properly selected patients. Surgical removal of previously irradiated tumours always has the potential that **multifocal tumour** is overlooked and if not completely removed, will recur.

All patients having open partial laryngectomy have **dysphonia** postoperatively. The overwhelming majority do however have a serviceable voice.

Longstanding dysphagia and aspiration are unusual if both arytenoids are preserved or, when one arytenoid has been removed, it has been appropriately reconstructed.

Failure to properly reconstruct the glottis after resection of most of both vocal folds will result in **laryngeal stenosis**. Prevention is the key to relief of this problem. The treatment team must recognise the need for extra soft tissue and incorporate the reconstruction at the time of resection. Reconstructing the stenotic larynx is beyond the scope of this chapter.

Useful reference

[AfHNS Clinical Practice Guidelines for Glottic Cancers in Developing Countries and Limited Resource Settings](#)

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