

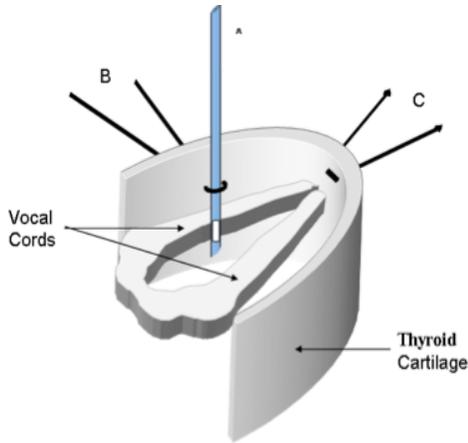


The Yale Larynx Laboratory

A Clinical Review

Cancer of the Anterior Glottic Commissure

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Case Presentation

A 78-year-old former smoker presented with a history of T1a left true vocal cord cancer diagnosed and treated in 2014 with radiotherapy. Follow-up 4 years later revealed a concerning lesion on the anterior membranous cords bilaterally which, upon biopsy, was found to represent persistent, moderately differentiated squamous carcinoma. A CT scan showed no surrounding cartilaginous involvement.

Clinical findings

On examination, the patient had a tight raspy voice with no inspiratory stridor or increased work of breathing. His neck examination revealed no palpable lymph nodes. Fiberoptic laryngoscopy was performed and the arytenoids were noted to be mobile bilaterally with an ulcer visible at the anterior commissure. The remainder of his examination was unremarkable.

Course

Surgical options were discussed with the patient including salvage total laryngectomy, which the patient declined, as well as anterior commissure conservation laryngectomy that he was interested in pursuing. A staging endoscopy was performed revealing no mid-cord, vocal process, or subglottic pathology. The patient subsequently underwent an anterior commissure partial laryngectomy with a tracheotomy and silastic keel insertion (Fig 1). He recovered well with removal of his keel and decannulation six weeks later. At 7 months post-operatively, he has a serviceable voice quality, no dietary restrictions, and shows no evidence of disease.

Laboratory Note

The purpose of this newsletter is to update our readers with the evidence-based management of certain Head & Neck disease presentations. In this issue we shall focus on SCC of the anterior glottic commissure.

The Yale Larynx Laboratory was founded by John A. Kirchner in 1967. Since 1975 this laboratory has been in continuous operation under the direction of Clarence T. Sasaki, the Charles W. Ohse Professor and has been funded by the National Institutes of Health and by endowments of grateful patients.

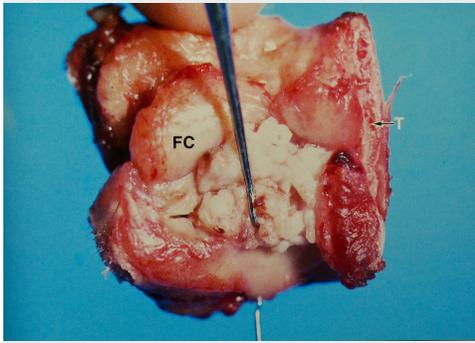


Figure 1 - Resected Specimen

FC = False cords

T = Thyroid cartilage

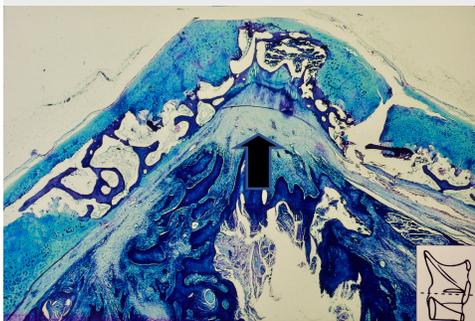


Figure 2 - Whole organ axial section:
Broyle's ligament (arrow) *

Bilateral tumor present

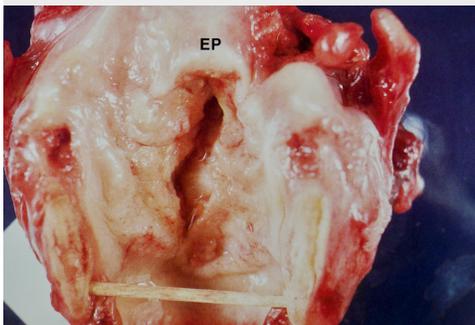


Figure 3 - Excised larynx with tumor
at AC extending to base of epiglottis
(EP) *

* Kirchner collection

Discussion

Squamous cell carcinoma (SCC) of the larynx comprises 30-50% of all head and neck cancers, the majority of which arise in the glottic region.¹ The goal of treatment for SCC of the glottis is two-fold: to ensure adequate local control of the disease, and to provide the best quality of life for the patient. For early glottic cancer (T1N0 - T2N0), both radiotherapy and surgery have been shown to provide excellent local control.

Special consideration has been given to SCC that involves the anterior commissure (AC) – the part of the larynx where the true vocal cords affix the thyroid cartilage. At this site, the vocal ligament, the thyro-epiglottic ligament, the conus elasticus, and the internal perichondrium of the thyroid together form a “dense mass of fibroelastic tissue” aka Broyle’s ligament (Fig 2).² The anterior commissure seems to provide a site through which cancer may cross to the opposing cord.

Historically, involvement of the AC was considered to confer poor prognosis as in Kirchner’s original series published in 1970 when he described a 40% cure rate by orthovoltage radiotherapy.³ Several reasons for treatment failure are likely:

1. The AC is difficult to clinically evaluate even under operative magnification, raising the likelihood of under-staging disease.
2. The close proximity of mucosa to thyroid cartilage predisposes to radiation damage as cartilage is readily exposed, often resulting in post-radiation infection and chondronecrosis.
3. Because the anterior borders of the thyroid cartilage are joined at an acute angle, they are exposed to “crossfire damage” from opposing radiation fields. Historically this technique ran the risk of under-treating the AC in order to avoid radiation chondronecrosis.

- Under-staging, with invasion of thyroid cartilage by cancer of the AC may be accurately predicted by its surface presentation. Clinical under-staging may be avoided by observing the following tumor features:⁴

1. Tumor extension from AC exceeding 1cm subglottically is invariably associated with cartilage invasion (Fig 3,4).
2. Tumor extension cephalad from AC to involve the petiole of epiglottis always results in thyroid cartilage invasion. The tumor is typically ulcerated (Fig 5,6).

- Cartilage invasion predicts poor tumor control by either external beam radiation, transoral CO2 laser resection or open conservation laryngectomy.
- For cancer of the AC, cure rates by radiotherapy and surgery both approach 94% in a small series by Kirchner and Fischer (1975).⁵
- For radio-recurrent early T1-2 glottic cancers, open partial laryngectomy is verifiably sound in a salvage setting carrying a high rate (91.2%) of disease free survival.⁶

Technique ^{7,8}

1. After tracheotomy, a subperichondrial exposure of the thyroid cartilage is accomplished.
2. Bilateral vertical thyrotomies are made with a vibrating saw about 1cm from the midline without incising the underlying soft tissues (Fig 7).
3. The laryngeal lumen is entered through the cricothyroid membrane.
4. Bilateral vertical mucosal incisions traverse the true and false cords separating the specimen from the inner aspect of the thyroid alae, with removal of the AC and its tumor (Fig 8).
5. A silastic keel is anchored between the stumps of both vocal cords (Fig 9) to prevent webbing.
6. The strap muscles are approximated in the midline over a keel.
7. The tracheotomy tube and keel are removed 6 weeks later.



Figure 7 (left)

Bilateral vertical thyrotomies ⁷

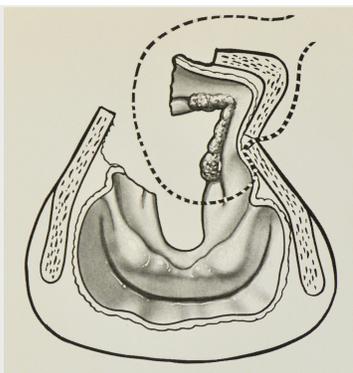


Figure 8 (right)

Delivery of anterior commissure ⁷



Figure 4 - Whole organ parasagittal section demonstrating cartilage invasion (arrow) *

TC = Thyroid cartilage

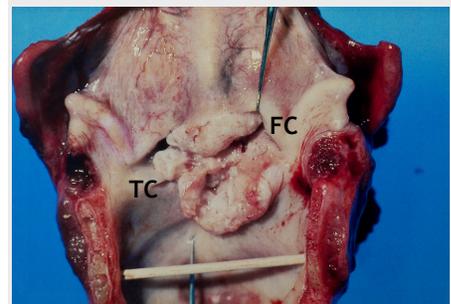


Figure 5 - Excised larynx with tumor extending >1cm subglottically *

FC = False cord; TC = True cord

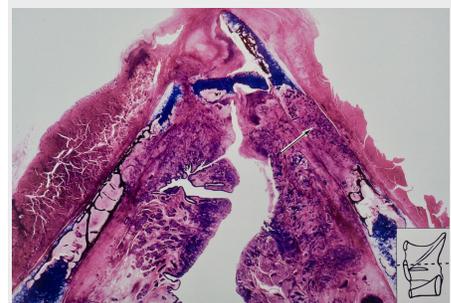
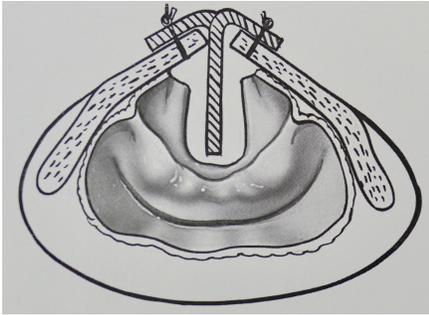


Figure 6 - Whole organ axial section demonstrating cartilage destruction by tumor *

* Kirchner collection

**Figure 9**Keel insertion ⁷

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