Early Glottic Cancer

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Definition

- High-grade dysplasia
- Carcinoma in situ
- Micro-invasive carcinoma
- Invasive carcinoma
  - One anatomical sub-site
    - T1a one vocal fold
    - T1b both vocal folds
  - Two anatomical sub-sites
    - T2
Clinical Presentation

T1

T2

Clinical Presentation versus Histologic Presentation

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# History of Treatment

- Transoral excision of an obstructing lesion
  - Horace Green – 1850 unrepeatable and fell into disrepute

- Laryngofissure – did not become accepted until early 20th century
  - Problems with knowledge of laryngeal anatomy
  - Disease extent
  - Early pioneers
    - Gordon Buck – 1851 reported a 15 month survival
    - Jacob Solis-Cohen – 1867 20 year survival
History of Treatment

- Total Laryngectomy
  - Difficult due to lack of adequate anesthesia
  - 50% mortality rate of surgery
  - Billroth 1873
    - Subglottic tumor
    - 7 month survival

History of Treatment

- Hemilaryngectomy
  - Initially reported by Billroth and Gluck – 1870’s
  - Divided into
    - Vertical
    - Horizontal
  - Inability to adequately reconstruct
    - Aspiration
    - Poor airway
History of Treatment

- Conservation laryngeal surgery
  - Tucker and Smith – 1960
    - Studied whole organ section to determine spread of disease
    - Anatomic sections of larynx
  - Supracricoid laryngectomy – Piquet 1974

- Radiation therapy
  - Finzi – 1909
  - Coutard at the Curie Foundation in Paris
  - 1940 – 1980 Radiation preferred to surgery
    - Less morbid
    - Better Voice and Swallowing Outcome than obtained with open surgical techniques
**History of Treatment**

- **Rebirth of Transoral**
  - Historical aspect
    - Greene – 1850
    - Fraenkel – 1886
  - Scalco – 1960
    - Combined suspension laryngoscopy with the microscope
  - Jako and Strong – 1972
    - Introduction of the CO2 laser
    - Very limited tumors
  - Steiner and Ambrosch – 1980’s to present
    - Demonstrating equal cure rates to open resection and RT

**Treatment Options**

1. Open Surgical Excision
   - Cure Rates of 90-95%
2. Radiation Therapy
3. Endoscopic Excisions
Challenges in Treatment and Rehabilitation

1. Cure/control rate
2. Quality of Life
   - Voice
   - Swallowing
3. Options for further treatment
   - Recurrent disease
   - Metachronous disease
4. Fair assessment of surgical skills

How Did We Get Here?
Treatment Options in View of Historical Developments

- Open Resection
  - First viable treatment option
  - High morbidity
- Radiation Therapy
  - Gained a strong hold 1940’s to 80’s
  - Less morbid than open surgery
- Endoscopic Resection
  - Relies on facility with endoscopic techniques
  - Not always part of training program
Endoscopic Management

- Lagged behind other treatment options
- Requires facility with endoscopic techniques
  - Ability to obtain exposure
  - Surgical skill
  - Familiarity with endoscopic equipment
    - Cold steel
    - Lasers
      - CO2
      - KTP/PDL

Cure Rate

- Radiation therapy
- Open partial laryngectomy
- Endoscopic excision
  - Konig, Bockmuhl, Haake – Berlin, Germany
    - Compared open resection to endoscopic resection
    - Equal cure rate T1 97%, T2 83%
Patient Needs/Morbidity of Treatment

- Radiation therapy
- Open partial laryngectomy
- Endoscopic excision
  - Rosier et al Brussels, Belgium
    - T1 cancer 106 patients 3 groups (RT, Endo, Open)
    - Perceptual and self voice ratings
      - Same for RT and endo
      - Significantly worse for open

Results After Endoscopic Resection

- Survival
  - Eckel et al Annals 1992
    - Comparable with other modalities of treatment

- Voice Outcome – How do we choose endoscopic management or RT?
  - Sjogren et al Archives Otolaryngology Head Neck 2008
    - Comparable or better than other modalities
  - Vilaseca et al Head and Neck 2008
    - Dependent on amount of tissue removed
    - Used ELS classification system
Voice Outcome
RT vs Endoscopic Resection

- Voice quality is dependent on the amount of vocal fold tissue removed
  - Vilaseca et al Head and Neck 30:43-49

- Goor et al 2007 The Netherlands
  - Patients who underwent type 1 or type 2 cordectomy according to the European classification system had similar voice outcome compared to patients treated with RT
  - Patients with more infiltrative tumors were sent for RT

Spectrum of T1 Disease
Limitations with Endoscopic Resection

- Surgeon’s abilities
- Patient desires for
  - Voice outcome
  - Length of treatment
- Tumors requiring muscular resection will result in significant voice change postoperatively

Local Recurrence after CO2 Laser Cordectomy for Early Glottic CA

- Predictive failures of local recurrence for TIS T1 and T2
- Retrospective review of 110 patients treated at a single institution 1990 to 2000
- Overall cure 97% 85% and 90% respectively
- Predictive factors of failure
  - Muscle invasion
  - Subglottic involvement

- Motuaire, Francois, Wiel and Chevalier – Lille, France
Laryngeal Function for Voice after T2
Guiding Your Patient Through Options of Treatment
What to Keep in Mind

- Radiation therapy
  - 5 to 7 weeks
  - Good voice
  - May interfere with further treatment
    - Recurrence
    - Second primary tumors

- Open partial laryngectomy
  - 5 to 7 days hospitalization
  - Poor Voice Outcome
  - May have alterations in swallowing
**Guiding Your Patient Through Options of Treatment**

**What to Keep in Mind**

- Endoscopic excision
  - Outpatient or 23 hour observation
  - What are your surgical abilities
  - If muscle is resected to obtain free margins, then voice outcome is unpredictable.

**Surgical Management**

- Open resection
- Endoscopic resection
  - Cold steel
  - Laser resection
    - CO2 must be PULSED and SHUTTERED
    - Wave guide
    - New lasers without proven advantage
      - PDL
      - Pulsed KTP

OHNS Website: http://ohns.ucsf.edu
Endoscopic excision of laryngeal cancers existed long before laser came into use

- 19th century, endoscopic excision of vocal fold cancer
  - Elsberg 1886, Fraenkel 1886, 1887, Schnitzler 1888
- 20th century
  - Lynch 1915, 1920
  - Kleinsasser
  - Lillie and De Santo, 1973

Suspension Microlaryngoscopy

Fulcrum

Suspension
Suspension Microlaryngoscopy

Microlaryngeal Instrumentation

- Knives
  - Curved sickle blades
  - Universal handle
  - Disposable
**Microlaryngeal Instrumentation**

- **Scissors**
  - 2 mm
  - Multiple angles
  - Curved and straight

- **Flap elevators**
  - Universal handle
  - Multiple sizes
  - Multiple angles
  - Sharp and blunt
**Microlaryngeal Instrumentation**

- **Grasping forceps**
  - Atraumatic tissue retraction

![Grasping forceps](image)

- **Cup forceps**
  - 1 mm size
  - Multiple angles
    - Straight
    - Up
    - Left
    - Right

![Cup forceps](image)
Microlaryngeal Instrumentation

- Suctions
  - 3 to 7 french
  - Open and velvet eye
  - Excellent for retraction

Endoscopic Excision Techniques for Glottal Cancers

- Cold knife
  - Microflap
  - Excellent for small lesion
  - Allows identification of deep involvement

- Laser
  - Hemostasis
  - Excellent tissue response
  - Operative time reduced
ELS Classification System of Endoscopic Resection

- Remacle et al 2000
- System to evaluate results based on precise amount of tissue excised

Subepithelial cordectomy (Type I)

- DIAGNOSTIC AND THERAPEUTIC
- CHRONIC AND HYPERTROPHIC LARYNGITIS
Subepithelial cordectomy (Type I)

Subligamental cordectomy (Type II)

- DIAGNOSTIC AND THERAPEUTIC
- DOUBTFUL RECURRENCE OF KERATOSIS
- MICROINVASIVE CARCINOMA
Subligamental cordectomy (Type II)

Transmuscular cordectomy (Type III)

Transmuscular cordectomy (Type IV)
**Extended Cordectomy**

- **Type Va**
- **Type Vb**

**Problems with Tumor Classification**

- T1 can range from exophytic to infiltrative
- Outcomes are best appreciated by the type of resection required to excise the tumor
Patient Example

- 47 year old non-smoking male
- Dysphonic for several months
- Biopsy by referring OHNS positive for invasive squamous cell CA
Patient Example

- 50 year old male
- 4 months history of dysphonia
- Smokes pot daily
- Alcohol daily
Transmuscular cordectomy (type IV)

Transmuscular cordectomy (Type Va)
Endoscopic Surgical Excision

- Salvage after failed RT – 65%
  - Motamed, Laccourreye and Bradley, Laryngoscope 2006
  - Meta-analysis
    - Studies with greater than
      - 10 patients
      - 24 month follow-up
    - Conservation laryngeal surgery is safe and effective for treatment of recurrent localized disease after radiotherapy for early stage laryngeal cancer
Endoscopic Resection after Failed RT

- Literature
  - Steiner et al 2004
    - 21 of 34 (71%) patients cured with one OR MORE endoscopic procedures
  - Goor et al 2007
    - 6 of 7 (83%) patients with one procedure
  - Mortuaire et al 2006
    - 84 to 90%

- Interpretation
  - Possible but not easy
  - Requires close follow-up
  - Use of video monitoring Konrad et al, Laryngoscope 1980

Case Example

- 63 year old male
- Smoker who smoked through therapy
- Completed RT and noted continued vocal fold changes at 6 months post operative
- Outside biopsy inconclusive for CA
Conclusions

- Endoscopic Resection of early laryngeal cancer
  - Cure Rate is similar to radiation therapy
  - Morbidity is less than RT (VOICE) if resection can be limited to the superficial vocal fold
  - Resection is possible after radiation failure

- Muscle involvement portends
  - Increased risk of recurrence
  - Poor voice outcome
Conclusions

Survival is dependent on the quality of Surveillance/Follow Up.

Thank You