ENDOSCOPIC LASER CO2 SURGERY IN LARYNGEAL CANCER

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IEO Internal Clinical Practice Guidelines

<table>
<thead>
<tr>
<th>cTNM</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
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<tbody>
<tr>
<td>N0</td>
<td>Mini-invasive surgery</td>
<td>Mini-invasive surgery</td>
<td>Conservative surgery +ND Vs CT+RT</td>
<td>CT+RT Vs Total laryngectomy + ND+RT</td>
</tr>
<tr>
<td>N1</td>
<td>Mini-invasive surgery + ND</td>
<td>Mini-invasive surgery + ND</td>
<td>Conservative surgery +ND Vs CT+RT</td>
<td>CT+RT Vs Total laryngectomy + ND+RT</td>
</tr>
<tr>
<td>N2a-c</td>
<td>Mini-invasive surgery + ND +/- RT</td>
<td>Mini-invasive surgery + ND +/- RT</td>
<td>Conservative surgery +ND Vs CT+RT</td>
<td>CT+RT Vs Total laryngectomy + ND+RT</td>
</tr>
<tr>
<td>N3</td>
<td>CT+RT</td>
<td>CT+RT</td>
<td>CT+RT</td>
<td>CT+RT</td>
</tr>
</tbody>
</table>
ADVANTAGES OF ENDOSCOPIC LASER CO2 SURGERY

Transoral approach:
- Avoids removing healthy tissue don’t involved from disease
- Preserves important structures facilitating rehabilitation of swallowing (sensitive nerves)
- Very short hospitalization (24 h)

Microsurgery:
- Magnification of surgical field

Laser Co2:
- Precise cut
- Hemostasis (vessels < 0.5 mm diameters)
- No oedemas

“IEO Indications”

1. Suspicious superficial lesions (without previous biopsy)
2. Glottis cancer (cTis, T1, T2N0)
3. Early recurrence after RT (ycT1-2N0)
4. Supraglottic cancer (cT1-2,N0-2c)
1- Suspicious superficial lesions

Standard Diagnostic Procedure

Two steps:
- a) diagnosis
- b) therapy

MLSD: biopsy

SCC

NO SCC

? 

Surgery
- Open surgery
- Laser surgery

Radiotherapy

IEO Procedure

One step procedure: diagnostic and therapeutic

• Complete removal of the lesion in healthy tissue
• Orientation of specimen
• Assessment of resection margins

Further procedure according to post-op histology

• Negative margins: follow up
• 1 positive margin: II endoscopic surgery
• >1 positive margin: Radiotherapy
  (if not possible II endoscopic surgery)
One step procedure in our experience avoid over treatment

22% cT1/pT0

ENDOSCOPIC CO2 LASER SURGERY FOR EARLY GLOTTIC CANCER IN PATIENTS WHO ARE CANDIDATES FOR RADIOTHERAPY: RESULTS OF A PROSPECTIVE NONRANDOMIZED STUDY

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Abstract: Background. Treatment of early glottic carcinoma is controversial, particularly if postoperative endoscopy shows normal vocal cord. Methods. In a prospective nonrandomized study, we performed endoscopic laser surgery with cautery until in 11 patients with early glottic carcinoma presented for endoscopy after the procedure. A total of 74 patients were included. Results. Clinical staging whenever did not correspond to postoperative endoscopy in 39 (52.7%). In 22% no tumor was identified on histologic examination. After 2 years of follow-up the recurrence rate was 15.6% with 6 patients with recurrent disease. Conclusions. Biopsy/striping are best abandoned for persistent glottic lesions. A single laser endoscopic procedure provides reliable staging and definitive treatment in most cases. Long-term results are awaited. Keywords: early cancer; larynx; CO2 laser

22% cT1/pT0

60.7% cT ≠ pT

Conventional diagnostic endoscopy in some cases requires multiple random punch biopsies or mucosal stripping, both under general anesthesia. If
our study shows one step procedure:

- Allow an accurate staging
- Avoid overtreatment (more conservative corpectomy)
- Avoid some rare early and late post-RT complications (chondronecrosis, Fibrosis)
- Spare radiotherapy

II INDICATION OF ENDOSCOPIC LASER CO2 SURGERY

2- Early glottic cancer
Endoscopic laser CO2 surgery

a) Preoperative procedures
b) Intraoperative diagnostic procedures
c) Surgical devices
d) Therapeutic procedures
e) Pathologic procedure
f) Follow-up

a) Preoperative evaluation
   (Diagnostic work up)

- Fibroscopy/ videoscopy
- Laryngostroboscopy
- CT scan
b) Intraoperative diagnostic procedures
c) Treatment procedures

T2N0M0
9/2007

20/2013

Laser Surgery for Early Glottic Cancer

Impact of Margin Status on Local Control and Organ Preservation

Mohsen Ansarin, MD, Luigi Santino, MSc; Augusto Cattaneo, MD, Maria Angela Massara, PhD; Luca Calabrese, MD, Giacchino Giugliano, MD, Fausto Magrini, MD, Angelo Onati, MD, Fausto Chirva, MD

Objective: To assess the impact of margin status on disease-free survival, overall survival, and organ preservation in early glottic cancer treated by endoscopic laser surgery.

Design: Prospective nonrandomized study.

Setting: Tertiary referral center.

Patients: A total of 214 patients with unresected (possibly biopsied) cTis, cT1a, cT2, cN0 glottic cancer; adequate exposure of the glottic region; no contraindications to general anesthesia; and the ability to give informed consent.

Interventions: European Laryngological Society laser cordectomy. Patients with negative margins (>1 mm) were followed, patients with close margins (1-1 mm) or 1 positive margin (tumor on margin) had another operation, and patients with more than 1 positive margin had postoperative radiotherapy. Median follow-up was 58 months.

Main Outcome Measures: Eight-year disease-free survival, 5-year overall survival, and organ preservation rate.

Results: Margins were negative in 180 patients, close in 30, and positive in 14. A second laser resection was performed in 36 of 64 patients with close or positive margins. Radiotherapy was administered to 36 patients. Patients with close or positive margins who did not undergo further treatment had a greater recurrence risk than did those with negative margins, mainly owing to relapses in 5 of the 8 protocol breakers with positive margins not treated further. Eight-year relapse-free survival was 88%, 8-year overall survival was 90%, and the larynx was preserved in 97.1%.

Conclusions: Laser removal of early glottic cancer is oncologically adequate with margins greater than 1 mm from the tumor edge. Positive margins require further treatment; close margins may require further treatment depending on tumor characteristics.

Follow-up, Recurrences, and Recurrence Treatment in 274 Patients With Early Glottic Cancer

Table 4. Follow-up, Recurrences, and Recurrence Treatment in 274 Patients With Early Glottic Cancer

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Follow-up duration, median (range), mo</td>
<td>58 (7-104)</td>
</tr>
<tr>
<td>Vital status, No. (%)</td>
<td></td>
</tr>
<tr>
<td>Alive without disease</td>
<td>243 (88.7)</td>
</tr>
<tr>
<td>Alive with disease</td>
<td>1 (0.4)</td>
</tr>
<tr>
<td>Dead with disease</td>
<td>6 (2.2)</td>
</tr>
<tr>
<td>Dead without disease</td>
<td>24 (8.8)</td>
</tr>
<tr>
<td>Postcorrection recurrence, No. (%)</td>
<td></td>
</tr>
<tr>
<td>No recurrence</td>
<td>248 (89.8)</td>
</tr>
<tr>
<td>Recurrence</td>
<td>28 (10.2)</td>
</tr>
<tr>
<td>Treatment of recurrence, No. (%)</td>
<td></td>
</tr>
<tr>
<td>Total laryngectomy</td>
<td>8 (2.9)</td>
</tr>
<tr>
<td>Endoscopic laser surgery</td>
<td>14 (5.1)</td>
</tr>
<tr>
<td>Neck dissection + RT</td>
<td>3 (1.1)</td>
</tr>
<tr>
<td>RT + chemotherapy</td>
<td>3 (1.1)</td>
</tr>
<tr>
<td>Time between surgery and recurrence, mo</td>
<td>12 (3-72)</td>
</tr>
<tr>
<td>Abbreviation: RT, radiotherapy</td>
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</tbody>
</table>

Follow-up data

Median range 58 months (7-104)

Recurrences 28 (10.2%)

- Local 25 (9.1%)
- Regional 3 (1.1%)

Total Laryngectomy 8 (2.9%)
- Endoscopic laser 14 (5.1%)
- Neck dissection + RT 3 (1.1%)
- RT/CHT 3 (1.1%)

Alive without disease: 243 (88.7%)
- Alive with disease: 1 (0.4%)
- Died from disease: 6 (2.2%)
- Died from other cause: 24 (8.7%)
Functional results

Good quality of voice after (I-III) type cordectomy

Functional results

bad quality of voice after (IV-V) type cordectomy
III INDICATION OF ENDOSCOPIC LASER CO2 SURGERY

3- Early recurrence after RT(yT1-2N0)

Early glottic cancer
Conservative surgery is feasible in about 1/3 of radiation failures

IEO EXPERIENCE

Patients and method
Endoscopic Laser Surgery
May 1999 - Sett 2005

Observed pts: 86 (77 m and 9 f)
Eligible pts: 37 (33 m and 4 f)

ELIGIBILITY CRITERIA:

• Tis-T1-2 glottic cancer (staging before RT)
• rTis-rcT1-rcT2N0
• Good exposure of the larunx
• No previous open larynx surgery
• Written informed consent

Endoscopic Carbon Dioxide Laser Surgery for Glottic Cancer Recurrence After Radiotherapy

Oncological Results

Mohsen Anvari, MD; Marek Planicky, MD; Silvana Rotundo, MSc; Luigi Santoro, MSc; Valeria Zarlo, PhD; Fausto Maffini, MD; Daniela Alleva, MD; Augusto Catapano, MD; Fausto Chien, MD

Objective: To evaluate local control, organ preservation, and complications after endoscopic laser surgery for early recurrent glottic cancer after radiotherapy.

Design: Retrospective study.

Setting: European Institute of Oncology, Milan, Italy.

Patients: The study, which was conducted between May 1999 and September 2005, included 37 consecutive patients (33 men and 4 women) with recurrent glottic cancer after radiotherapy. Selection criteria were as follows:

- T1a, T1b, T1c, or T2 with submucous or supraglottic involvement of less than 3 mm and no arytenoid invasion; adequate laryngeal exposure; no previous open surgery; no contraindications to general anesthesia; and signed consent.

Intervention: Endoscopic laser surgery with curative intent using types II to IV laryngeses according to the European Laryngological Association.

Main Outcome Measures: Five-year actuarial recurrence-free and overall survival, complications, and rate of laryngeal preservation.

Results: The clinical classifications of the recurrences were: TisT1 (n = 4), T1a (n = 10), T1b (n = 11), and T2 (n = 12). The pathologic classifications of the recurrences were: tisT0 (n = 2), tisT1a (n = 5), tisT1b (n = 9), tisT1b (n = 3), tisT2 (n = 3), and tisT3 (n = 4). The median follow-up was 44 months (range, 10-86 months). New recurrences developed in 13 patients (35%): 9 were treated by total laryngectomy, 1 by supracricoid laryngectomy, and 1 by chemotherapy. Three patients died of laryngeal cancer, 1 is alive with disease, and 1 died of a second cancer. Five-year actuarial recurrence-free and overall survival rates were 70% and 90%, respectively. The larynx was preserved in 26 patients (70%). Laryngeal stenosis was the most common major complication (in 3 of 4 women and 1 of 33 men).

Conclusions: Endoscopic laser surgery is a safe and effective salvage procedure in selected cases involving glottic recurrence after radiotherapy. Oncological results are satisfactory, and organ preservation can be achieved in a high proportion of cases; however, the risk of laryngeal stenosis is high in women.

Arch Otolaryngol Head Neck Surg. 2007;133(12):1193-1197
Oncological results
May 1999- Oct 2005
Median follow up: 44 m (18-88 m)

<table>
<thead>
<tr>
<th>Recurrence</th>
<th>13 (35%)</th>
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<tbody>
<tr>
<td>-T</td>
<td>10</td>
</tr>
<tr>
<td>-TN</td>
<td>2</td>
</tr>
<tr>
<td>-TM</td>
<td>1</td>
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<tr>
<th>Treatment of recurrence:</th>
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<tr>
<td>-T</td>
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<tr>
<td>-TN</td>
</tr>
<tr>
<td>-TM</td>
</tr>
<tr>
<td>-TL</td>
</tr>
<tr>
<td>-SPL</td>
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<tr>
<td>-CT</td>
</tr>
</tbody>
</table>

II primary: 5 (13.5%) (2: lung, 2: prostate, 1: pancreas)

Time between laser surgery and recurrence: 9 months (2-32)

- Alive without disease: 32 (86.4%)
- Alive with disease: 1 (2.7%)
- Died of disease: 3 (8%)
- Died of tumor: 1 (2.7%)
- Larynx preservation: 26 (70%)

Five-year recurrence-free survival (RFS) curve

Five-year overall survival (OS) curve


Functional results

Tracheotomy: 0  
feeding tube: 0  
78% of patients discharged on the 3rd postoperative day

Quality of voice:

Only 6 (16%) complained of their quality of voice.

The late complication was laryngeal stenosis (4/37) mainly in the female patients(3/4)(75%)
IV INDICATION OF ENDOSCOPIC LASER CO2 SURGERY

Supraglottic cancer (cT1-2, N0-2c)

ELIGIBILITY CRITERIA:

- Supraglottic cancer: T1, T2 and selected T3; N0-2; M0
- No involvement of the vocal cords
- No involvement of the laryngeal framework
- Minimal involvement of pre-epiglottis space
- Good exposure of the larynx
- No contraindications to general anaesthesia
- Written informed consent

LARYNGOLOGY

Transoral CO2 laser microsurgery for Tis-T3 supraglottic squamous cell carcinomas

Giorgio Peretti · Cesare Piazza · Mohsen Amarin ·
Luigi De Benedetto · Daniela Cocco ·
Auguste Cottu · Peter Niemierko · Enrico Chiesa

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Abstract Eighty patients affected by supraglottic cancer were treated by transoral carbon dioxide laser surgery between 1989 and 2006 in two Italian institutions. Patient staging was as follows: 2 pTis, 20 pT1, 38 pT2, and 20 pT3. Simultaneous or 1-month delayed neck dissection (ND) was performed on 27 (34%) patients, unilaterally in 10 and bilaterally in 17. The pN category was as follows: 9 pN0, 6 pN1, 8 pN2a, and 4 pN2c. A total of 16 (20%) patients received complementary radiotherapy (RT) and 5 (6%) were subjected to chemo-RT for persistent tumor after re-excision due to positive margins, multiple lymph nodes, and/or extracapsular spread after ND. The last follow-up was in December 2008. The 5-year overall, disease-specific and disease-free survivals, local control with laser alone, and organ preservation rates calculated by Kaplan-Meier analyses demonstrated that transoral CO2 laser surgery is a reliable therapeutic option for Tis-T3 supraglottic squamous cell cancers (SCC) with a high local control rate. The ideal treatment for supraglottic squamous cell carcinoma (SCC) is still a matter of debate. Radiotherapy (RT) with or without chemotherapy (CHT) and open neck conservative surgery such as horizontal supraglottic laryngectomy (HSL) or, in case of glottic involvement, supracricoid laryngectomies...
Supraglottic cancer(cT1-2,N0-2c) Oncological outcome

- The 5-year overall: 84.4%
- Disease-specific: 97.4%
- Disease-free survivals: 88.3%
- Local control with laser alone: 96%
- Organ preservation rates: 97.2%

CONCLUSION

The role of endoscopic laser co2 surgery in laryngeal cancer in IEO 1999-2009 953 Pz