Laryngeal carcinoma
Laryngeal carcinoma

- **Work-up procedure**
- TNM staging
- Primary treatment
- Follow-up
- Treatment of recurrent and/or metastatic disease
- References
Clinical evaluation

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type C</td>
<td>Std.</td>
</tr>
</tbody>
</table>

- complete history of the disease
- weight and weight loss
- performance status (Karnofsky / ECOG-WHO)
- fiberoptic examination of H&N mucosa
- neck examination
- drawing of any lesions
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<table>
<thead>
<tr>
<th>Endoscopic evaluation</th>
<th>Evidence</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>endoscopy under general anesthesia with biopsies of any suspicious site</td>
<td>Type C</td>
<td>Std.</td>
</tr>
</tbody>
</table>
### Advanced clinical evaluation

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Type C</td>
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<td>Type C</td>
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</tr>
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<td>Std.</td>
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</tbody>
</table>

- dental examination by oral surgeon
- nutritional assessment
- others (if required)
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Head and Neck Oncology Programme

<table>
<thead>
<tr>
<th>Laboratory tests</th>
<th>Evidence</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>hemogram, coagulation tests, liver enzymes, kidney function</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>thyroid function: TSH</td>
<td>Type C</td>
<td>Std.</td>
</tr>
</tbody>
</table>
Catholic University of Louvain, St - Luc University Hospital
Head and Neck Oncology Programme

<table>
<thead>
<tr>
<th>Imaging</th>
<th>Evidence</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Loco-regional: CT scan (or MRI)(^1)</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>- Metastatic work-up: chest X-ray, thoracic spiral CT scan</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>- Additional examination depending on previous findings</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>- PET scan</td>
<td>Type 3</td>
<td>Invest.</td>
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</tbody>
</table>

\(^1\)See guidelines for loco-regional imaging
<table>
<thead>
<tr>
<th>Pathologic examination</th>
<th>Evidence</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standards of the British Royal College of Pathologists (endorsed by EORTC)(^1)</td>
<td>Type C</td>
<td>Std.</td>
</tr>
</tbody>
</table>

\(^1\)See pathology guidelines
Laryngeal carcinoma

- Work-up procedure
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### Staging

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</table>

- TNM classification *(6th ed., 2002)*
- WHO International Classification of Diseases for Oncology *(ICD-O 9 or ICD-O 10)*

T4 divided into T4A (resectable) and T4B (unresectable) leading to the division of stage IV into stage IVA, stage IVB, and stage IVC

<table>
<thead>
<tr>
<th>Stage</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVA</td>
<td>T4aN0M0, T4aN1M0, T1N2M0, T2N2M0, T3N2M0, T4aN2M0</td>
</tr>
<tr>
<td>IVB</td>
<td>T4b any N M0, any T N3 M0</td>
</tr>
<tr>
<td>IVC</td>
<td>any T any N M1</td>
</tr>
</tbody>
</table>
Supraglottis:

- Tx  primary tumor cannot be assessed
- T0  no evidence of primary tumor
- T1  one subsite, normal mobility
- T2  involving mucosa of more than one adjacent subsite of supraglottis or glottis or adjacent region outside the supraglottis; without fixation
- T3  limited to larynx with vocal cord fixation or invades postericoid area, pre-epiglottic tissues, base of tongue
- T4a  invades through thyroid cartilage, and/or extends into tissues beyond the larynx (e.g., trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, esophagus)
- T4b  invades prevertebral space, encases carotid artery, or invades mediastinal structures
TNM/AJCC 2002 Staging

Glottis:

- **T4a** invades through thyroid cartilage, and/or extends into tissues beyond the larynx (e.g., trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, esophagus)
- **T4b** invades prevertebral space, encases carotid artery, or invades mediastinal structures

Subglottis:

- **T4a** invades through thyroid cartilage, and/or extends into tissues beyond the larynx (e.g., trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, esophagus)
- **T4b** invades prevertebral space, encases carotid artery, or invades mediastinal structures
TNM/AJCC 1997 Staging

- N0: no regional node metastasis
- Nx: regional nodes cannot be assessed
- N1: single ipsilateral node, ≤ 3 cm
- N2a: single ipsilateral node, > 3 cm and ≤ 6 cm
- N2b: multiple ipsilateral nodes, ≤ 6 cm
- N2c: controlateral or bilateral nodes, ≤ 6 cm
- N3: node > 6 cm
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TNM/AJCC 1997 Staging

- Mx: Distant metastasis cannot be assessed
- M0: No distant metastasis
- M1: Distant metastasis
Laryngeal carcinoma

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Head and Neck Oncology Programme

Treatment of Glottic Cancer

Superficial lesion, T1

- EUA + biopsy (excisional when possible)

Dysplasia

- Observe, Smoking cessation, ±Antireflux treatment

Cis

- Subligamental cordectomy
  - Invasion ?
    - NO
      - Reevaluate 2-3 months
    - YES
      - Transmuscular Endosc. cordectomy

T2

- EUA + biopsy
  - Paraglottic space involvement ?
    - NO
      - RxTh
    - YES
      - Partial laryngeal surgery (SCL + CHEP)
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Treatment of glottic cancer

T3 - T4

No cartilage destruction or cartilage minimally invaded

Thyroid cartilage massively invaded

Tumor extending beyond larynx

++ Postop RxTh

Total laryngectomy

Locally advanced RxTh protocol

++ Postop RxTh

Candidate for conservative surg ?

YES

Supracricoid L + CHEP + THEP

+ Postop RxTh

Recurrence

Surgical salvage

NO

Surgical salvage

Candidate for conservative surg ?

YES

Supracricoid L + CHEP + THEP

+ Postop RxTh

Recurrence

Surgical salvage
Catholic University of Louvain, St - Luc University Hospital
Head and Neck Oncology Programme

### Primary treatment: general strategy: glottic carcinoma

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</table>

- **T1, N0, M0**
  - CO2 laser cordectomy ± RxTh (if positive margin)<sup>1</sup>
  - T1a away from the ant. commissure and the arytenoid cartilage
  - External RxTh:
    - T1a reaching or slightly invading the ant. commissure
    - T1b not originating from the ant. commissure
    - T1 invading the post. Commissure
    - T1a with inadequate exposure for laser cordectomy
  - Partial laryngectomy
    - Tumor of the ant. commissure
    - Patients with poor compliance for follow-up

<sup>1</sup> see guidelines for post-operative radiotherapy
Catholic University of Louvain, St - Luc University Hospital Head and Neck Oncology Programme

Primary treatment: general strategy: glottic carcinoma

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<tr>
<td>Type 3</td>
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</tbody>
</table>

- T2, N0-N1, M0
  - Partial laryngectomy (supracricoid laryngectomy) + bilateral ND ± RxTh\(^1\)
  - “Moderately advanced” RxTh protocol (T+N bilateral)\(^2\) + ND\(^3\)
    - tumor not suitable for conservative surgery
    - poor general health, poor pulmonary reserve
    - patient’s wish to preserve excellent voice
  - CO2 laser “extended” cordectomy
    - only in very specific cases: T2a (normal V.C. mobility) easily exposed by endoscopy
    - surgeon’s feeling to obtain free margins

---

\(^1\) see guidelines for post-operative radiotherapy
\(^2\) see guidelines for RxTh regimen (slide 28)
\(^3\) see guidelines for post radiotherapy ND (slide 30)
Primary treatment: general strategy: glottic carcinoma

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- T2, ≥ N2a, M0
  - “Locally advanced” RxTh protocol (T+N bilateral)\(^1\) + ND\(^2\)
  - Partial laryngectomy (supracricoid laryngectomy) + bilateral ND + RxTh\(^3\)

\(^1\) see guidelines for RxTh regimen (slide 28)
\(^2\) see guidelines for post radiotherapy ND (slide 30)
\(^3\) see guidelines for post-operative radiotherapy
Primary treatment: general strategy: glottic carcinoma

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</tbody>
</table>

- **T3-T4, any N, M0**
  - "Locally advanced" RxTh protocol (T+N bilateral)\(^1\) ± ND\(^2\)
  - Conservative surgery (SCL+CHEP, SCL+CHP, SCL+THEP)
  - bilateral ND + RxTh\(^3\)
    - limited subglottic extension
    - no fixation of the arytenoid cartilage
    - no postcricoid extension or extension to the post. commissure
    - no extralaryngeal extension
    - adequate general status and pulmonary reserve
    - permission for total laryngectomy, if needed
  - Total laryngectomy + bilateral ND + RxTh\(^3\)
  - very advanced T4

---

1. see guidelines for RxTh regimen (slide 28)
2. see guidelines for post radiotherapy ND (slide 30)
3. see guidelines for post-operative radiotherapy
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Treatment of Supraglottic Cancer

Tis, T1, T2

Good performance status
Good pulmonary function (VEMS ≥ 1L)

Yes

Partial laryngeal surgery
- Supraglottic L
- Supracricoid L (+ CHP)
- Endoscopic (limited T1
  suprahyoid epiglottis)

No

RxTh ± ND

Complete response

Positive nodes ?
Positive margins ?

Observation
Postop RxTh
Observation
Surgical salvage

RxTh ± ND

Yes

No

YES

NO

Postop RxTh
Observation

Surgical salvage
Treatment of Supraglottic Cancer

**T3 - T4**

- **Thyroid cartilage intact or moderately invaded**
  - **Candidate for conservation surgery ?**
    - **YES**
      - Supraglottic L Extend SGL Supracricoid L + CHP
    - **NO**
      - Locally advanced RxTh protocol

- **Thyroid cartilage massively invaded**
  - **•Thyroid cartilage massively invaded**
  - **•Tumor extending beyond larynx**
    - Total laryngectomy
      - + postop RxTh

**Surgical salvage**

**Recurrences**

Larynx 23
Mar. 2006
Primary treatment: general strategy: supraglottic carcinoma

- **T1-T2, N0-N1, M0**
  - External surgery: supraglottic laryngectomy or supracricoid laryngectomy (T2 invading glottis) + bilateral ND ± RxTh
  - adequate general health and pulmonary reserve
  - “Moderately advanced” RxTh ± ND
  - not suitable for conservative surgery based on medical or oncologic reason
  - Endoscopic laser supraglottic laryngectomy
  - only for selected superficial and suprahypoid T1

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1 see guidelines for post-operative radiotherapy
2 see guidelines for RxTh regimen (slide 28)
3 see guidelines for post radiotherapy ND (slide 30)
Primary treatment: general strategy: supraglottic carcinoma

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</tr>
<tr>
<td>Type 3</td>
<td>Std.</td>
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</tbody>
</table>

- T2, ≥ N2a, M0
  - “Locally advanced” RxTh protocol (T+N bilateral)\(^1\) + ND\(^2\)
  - External surgery: supraglottic laryngectomy or supraccricoid laryngectomy (T2 invading glottis) + bilateral ND + RxTh\(^3\)
    - adequate general health and pulmonary reserve

---

\(^1\) see guidelines for RxTh regimen (slide 28)
\(^2\) see guidelines for post radiotherapy ND (slide 30)
\(^3\) see guidelines for post-operative radiotherapy
Primary treatment: general strategy: supraglottic carcinoma

- T3-T4, any N, M0
  - “Locally advanced” RxTh protocol (T+N bilateral)\(^1\) + ND\(^2\)
  - Conservative surgery (SGL, ESGL, SCL,+CHP)
     + bilateral ND + RxTh\(^3\)
       - no subglottic extension
       - no fixation of the arytenoid cartilage
       - no postcricoid extension or extension to the post. commissure
       - limited invasion of the thyroid cartilage
       - adequate pulmonary reserve
       - permission for total laryngectomy if needed

- Total laryngectomy + bilateral ND + RxTh\(^3\)
  - very advanced T4

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</table>

\(^1\) see guidelines for RxTh regimen (slide 28)
\(^2\) see guidelines for post radiotherapy ND (slide 30)
\(^3\) see guidelines for post-operative radiotherapy
Primary treatment: surgical procedure of the “N” site

<table>
<thead>
<tr>
<th>N site:</th>
<th>Evidence</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>- N0: bilateral selective ND (II-IV)¹</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>- N1: homolateral MRND + contralateral selective ND</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>- N2a-b: homolateral MRND + contralateral selective ND (or RND)</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>- N2c: bilateral MRND (or RND + MRND)</td>
<td>Type C</td>
<td>Std.</td>
</tr>
<tr>
<td>- N3: homolateral RND + contralateral SND</td>
<td>Type C</td>
<td>Std.</td>
</tr>
</tbody>
</table>

¹see clinical target volume for the nodes (slide 29)
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Primary treatment: RxTh regimen

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<tr>
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<td>Std.</td>
</tr>
<tr>
<td>Type 3</td>
<td>Std.</td>
</tr>
<tr>
<td>Type 3</td>
<td>Invest.</td>
</tr>
</tbody>
</table>

- **Target volumes**
  - T: CTV = GTV + margin according to anatomical barriers
  - N: see table on node levels according to T site
- **Technique**
  - conformal radiotherapy
  - IMRT radiotherapy
- **Dose / fractionation / treatment time**
- **Early stage:**
  - prophylactic dose: 50 Gy,
  - therapeutic dose: 66-70 Gy, 2 Gy daily
- "moderately advanced" / "locally advanced" stage
  - on protocol: GORTEC 99-02 / IMCL CP02-9815
  - off protocol: moderately accelerated regimen (concomitant boost)
- post-operative RxTh
  - dose: 60-64 Gy, 2 Gy daily

1 T1 N0-N1
2 T2 N0-N1
3 any T N2a-N3
4 See guidelines for post-operative radiotherapy
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Head and Neck Oncology Programme  

Target Volumes: larynx  
Level of evidence : type 3 / option : standard  

<table>
<thead>
<tr>
<th>Stage</th>
<th>Ipsilateral neck</th>
<th>Controlateral neck</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0-N1</td>
<td>II(^1)-III-IV + VI for trans- or sub-glottic ext.</td>
<td>II(^1)-III-IV + VI for trans- or sub-glottic ext.</td>
</tr>
<tr>
<td>N2a-N2b</td>
<td>II-III-IV-V + VI trans- or sub-glottic ext.</td>
<td>II-III-IV-V + VI trans- or sub-glottic ext.</td>
</tr>
<tr>
<td>N2c</td>
<td>According to N stage on each side of the neck</td>
<td>According to N stage on each side of the neck</td>
</tr>
<tr>
<td>N3</td>
<td>Ib-II-III-IV-V+VI (trans- or sub-glottic ext.) ± adjacent structures according to clinical and radiological data</td>
<td>II(^1)-III-IV + VI for trans- or sub-glottic ext.</td>
</tr>
</tbody>
</table>

\(^1\)level IIb could be omitted for N0 patients
Primary treatment: neck dissection following a primary radiotherapy

- Planned ND (SND, RMND, RND or extended ND) 2-3 months after completion of RxTh in patients with a controlled primary site and in case of residual or suspected residual, resectable N disease irrespective of the initial N stage

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- **Follow-up**
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Catholic University of Louvain, St - Luc University Hospital  
Head and Neck Oncology Programme

Follow-up

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- Clinical examination
  - fiberoptic examination and neck palpation
    - every 2 months (first 2 years), every 6 months (3<sup>rd</sup>-5<sup>th</sup> year), then every year (> 5 years)
    - dental examination every 6 months
- Imaging
  - chest X-ray every year
- Laboratory tests
  - thyroid function (TSH) every year
- Evolution of late toxicity (EORTC/RTOG) scale
Laryngeal carcinoma

- Work-up procedure
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Salvage treatment for recurrent disease: general principle

Treatment will depend on:
- Site and extension (rTNM stage)
- Previous treatment(s)
- Performance status
- Patient wishes
Salvage treatment for recurrent disease

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1. depending on previous radiotherapy; see guidelines for post-operative radiotherapy

- anyT-N0-M0
  - surgery ± RxTh
  - RxTh
  - chemotherapy
- T0-anyN-M0
  - ND ± RxTh
  - RxTh
  - chemotherapy
- AnyT-anyN-M0
  - surgery ± RxTh
  - chemotherapy
  - best supportive care
- Metastasis
  - chemotherapy
  - best supportive care
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• Skolnik EM, Yee KF, Wheatley MA, Martin LO. Carcinoma of the laryngeal glottis therapy and end results. Laryngoscope. 1975;85(9):1453-66.
References