Neck and mediastinal node dissection in pharyngolaryngeal tumors

D. Dequanter a,*, M. Shahla a, K. Zouaoui Boudjeltia b, P. Paulus a, P. Lothaire a

a Head and Neck Department, hôpital Vésale, CHU Charleroi, rue de Gozée 706, 6110 Montigny-le-Tilleul, Belgium
b Research Unit, hôpital Vésale, CHU Charleroi, rue de Gozée 706, 6110 Montigny-le-Tilleul, Belgium

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Advanced head and neck squamous cell carcinoma; Mediastinal dissection; Hypopharynx

Introduction

(Pharyngo-)laryngeal squamous cell carcinoma (SCC) is a very aggressive cancer that is generally diagnosed at advanced stages, with consequently poor prognosis and a low survival rate. More than 75% of patients with (pharyngo-) laryngeal SCC present with stage III or IV disease [1]. Cervical metastases are present in 60–80% of cases [2,3], often associated with multiple lymph node metastases in the superior mediastinum (SM) and paratracheal area. Neck dissection is the surgical standard for the treatment of cervical lymph node metastasis, but is not routinely extended to the SM nodes, despite the fact that paratracheal lymph node metastasis is found in 30% of patients, mostly associated with hypopharyngeal tumors [4]. A 20% rate of occult metastasis to the ipsilateral paratracheal lymph nodes was reported in laryngeal cancer patients with postcricoid or pyriform fossa involvement [5]. Moreover, laryngeal/hypopharyngeal cancer with metastasis to the paratracheal nodal chain was implicated in recurrent disease, particularly in patients with parastomal recurrence;

* Corresponding author. Maandal 6, 1652 Alsemberg, Belgium. E-mail address: Didier.dequanter@pandora.be (D. Dequanter).

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this finding suggests a prognostic significance of paratracheal metastasis [6,7].

The purpose of the present study was to assess paratracheal nodal yield and frequency of metastases, and to determine the indications for SM dissection.

Methods

The study comprised a retrospective review of 31 patients undergoing primary surgery for advanced squamous cell carcinoma (SCC) of the (pharyngo-)larynx, between May 2007 and September 2010. Diagnostic assessment at presentation included a complete physical examination, panendoscopy, CT and/or MRI scans of the head and neck, chest X-rays, and blood tests. The CT and/or MRI scans were examined to determine regional lymph node status. No patients showed radiological evidence of remote metastasis at presentation. All patients were treated with curative intent. In our institution, the primary attitude for advanced tumor is surgical; cervical lymph node metastasis is treated by neck dissection, with adjuvant radio/chemotherapy in case of multiple lymph node metastasis.

Correlations between presence of paratracheal lymph node metastasis and clinical factors (age, gender, primary tumor site, TN stage, pTN stage) were assessed on Chi² test, Fisher’s exact test, multiple logistic regression analysis, multiple linear regression analysis and correlation analysis, as appropriate. A P-value of less than 0.05 was considered statistically significant.

Results

Median age was 58 years (range, 43–90 years); there were 26 males and five females. Mean follow-up was 27 months (range, 3–41 months).

The primary tumor site was known in all cases: 18 laryngeal and 13 hypopharyngeal. Laryngeal SCC was supraglottic in eight cases and glottic in 10; three glottic tumors showed subglottic extension.

Cervical lymph node disease stage was N0 in seven patients, N1 in 4 and N2 in 20.

Pathological stage was T3 in 14 patients and T4 in 17.

In terms of cell differentiation, 13 cases were welldifferentiated, nine moderately differentiated and nine poorly differentiated.

Tumor resection involved total laryngectomy for 18 patients and pharyngolaryngectomy for 13. Laryngeal resection was performed under visual control, according to degree of invasion. Surgical defects were reconstructed with pectoralis major myocutaneous flap in 13 cases. All patients underwent modified bilateral radical neck dissection and bilateral paratracheal lymph node dissection during primary surgery. Paratracheal node dissection included all nodes between the carotid artery laterally and the trachea medially, and inferiorly as far into the superior mediastinum as possible through the cervical approach (level VI). Prophylactic ipsilateral thyroid lobectomy and isthmectomy was performed for large laryngeal SCCs (T3, T4) involving the anterior commissure and subglottic area. Routine thyroidectomy was associated to laryngectomy only in case of subglottic extension exceeding 1 cm, thyroid cartilage invasion or advanced hypopharyngeal cancers.

There was no short-term postoperative mortality. The rate of paratracheal lymph node metastasis was 6/31 ipsilaterally and zero contralaterally.

The mean number of paratracheal lymph nodes dissected per side was 2.3.

In clinically positive patients, paratracheal metastasis was confirmed histologically exclusively in cases of pyriform sinus cancer, systematically associated with tumor size greater than 35 mm. In clinically negative patients, no paratracheal metastases were found on histology.

By end of follow-up, 10 of the 31 patients had died. More specifically, three of the six patients positive for paratracheal nodes died (50%).

Correlations between presence of paratracheal lymph node metastasis and various clinical factors in the 31 patients were analyzed (Table 1).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>pTN positive (n = 6) (%)</th>
<th>pTN negative (n = 25) (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt; 60 yrs</td>
<td>3 (17)</td>
<td>16 (83)</td>
<td>0.57</td>
</tr>
<tr>
<td>≥ 60 yrs</td>
<td>3 (25)</td>
<td>9 (75)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (24)</td>
<td>20 (76)</td>
<td>0.54</td>
</tr>
<tr>
<td>Female</td>
<td>0 (0)</td>
<td>5 (100)</td>
<td></td>
</tr>
<tr>
<td>Primary site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Larynx</td>
<td>0 (0)</td>
<td>18 (100)</td>
<td>0.08</td>
</tr>
<tr>
<td>Hypopharynx</td>
<td>6 (38)</td>
<td>7 (62)</td>
<td></td>
</tr>
<tr>
<td>T clinical stage</td>
<td></td>
<td></td>
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<tr>
<td>T3</td>
<td>0 (0)</td>
<td>7 (100)</td>
<td>0.77</td>
</tr>
<tr>
<td>T4</td>
<td>6 (26)</td>
<td>18 (74)</td>
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</tr>
<tr>
<td>T anatomopathological stage</td>
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<td></td>
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</tr>
<tr>
<td>T3</td>
<td>0 (0)</td>
<td>14 (100)</td>
<td>0.54</td>
</tr>
<tr>
<td>T4</td>
<td>6 (38)</td>
<td>11 (62)</td>
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<tr>
<td>N clinical stage</td>
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</tr>
<tr>
<td>N0</td>
<td>0 (0)</td>
<td>7 (100)</td>
<td>0.58</td>
</tr>
<tr>
<td>N1</td>
<td>0 (0)</td>
<td>4 (100)</td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>6 (30)</td>
<td>14 (70)</td>
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<td>N anatomopathological stage</td>
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</tr>
<tr>
<td>N0</td>
<td>0 (0)</td>
<td>10 (100)</td>
<td>0.36</td>
</tr>
<tr>
<td>N1</td>
<td>0 (0)</td>
<td>4 (100)</td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>6 (38)</td>
<td>10 (62)</td>
<td></td>
</tr>
</tbody>
</table>

There was a strong trend for presence of paratracheal lymph node metastasis to show association with the primary site (hypopharynx vs. larynx), although the analysis lacked statistical power to demonstrate a significant correlation;
no trends were observed for age, gender, or clinical staging or pathological staging.

**Discussion**

Advanced laryngeal and hypopharyngeal carcinomas have a strong tendency to invade cervical lymph nodes. This extension pattern is a well-known prognostic factor [7–10].

Although neck dissection is the surgical gold standard for the treatment of cervical lymph node extension, the superior mediastinal and paratracheal nodal chains are not routinely included.

Welsh [11] first reported the importance of the paratracheal nodes in lymphatic drainage of the larynx and hypopharynx. Harrison [12] later confirmed that carcinomas of the larynx (especially in the subglottic region), trachea and cervical esophagus are at risk for paratracheal and tracheobronchial lymph node metastasis, and recommended resection of the manubrium to remove these lymph nodes and reduce the risk of parastomal recurrence. Weber et al. [7] reported paratracheal lymph node metastasis in 17.6% of laryngeal tumors, 8.3% of pharyngeal tumors and 71.4% of esophageal tumors.

Harrison suggested that ipsilateral paratracheal node dissection should be included in selective neck dissection in all patients with tumors invading the subglottis, pyriform fossa apex or postcricoid region [12]. In the present study, neck dissection was extended to the superior mediastinum in all patients with advanced laryngeal or hypopharyngeal SCC. Most patients with hypopharyngeal SCC had positive paratracheal lymph nodes, but only ipsilaterally to the primary tumor. All patients with hypopharyngeal SCCs exceeding 35 mm showed paratracheal lymph node metastasis, which was also systematically associated with presence of cervical lymph node metastasis. There was also a marked trend associating presence of paratracheal lymph node metastasis and hypopharyngeal tumor location, although statistical power was lacking to demonstrate a significant correlation.

We recommend that ipsilateral paratracheal node dissection should be included in selective neck dissection in all patients with tumors invading the hypopharynx, and certainly in tumors greater than 35 mm.

In terms of survival rates, in a prospective study of 50 patients with carcinoma of the larynx, hypopharynx or cervical esophagus, Timon et al. [13] reported a 26% rate of paratracheal nodal metastasis, with a trend towards poorer survival in patients with vs. without positive paratracheal nodes; concomitant involvement of both cervical and paratracheal nodal chains was associated with the poorest survival.

In their study, Weber et al. [7] confirmed that survival was significantly reduced by the presence of paratracheal lymph nodes. In the present study, 50% of the patients with positive paratracheal nodes died.

**Conclusion**

There is little controversy about the necessity of neck dissection in advanced tumors of the larynx and hypopharynx. The same should hold for mediastinal dissection in hypopharyngeal carcinoma, and certainly in tumors exceeding 35 mm.

**Disclosure of interest**

The authors declare that they have no conflicts of interest concerning this article.

**References**