Abstract. Background: The dissection of level V neck lymph nodes often results in a decline of postoperative quality of life due to shoulder dysfunction and pain. The necessity of level V dissection is debatable. The aim of the present study was to evaluate the prevalence of level V metastases in patients with node-positive squamous cell carcinomas of the head and neck. Patients and Methods: A review of the clinical and pathological reports was conducted to ascertain the prevalence and distribution of cervical metastases according to neck level V. Statistical analysis was performed using Fisher’s exact test. Results: Level V metastases were found in 19 out of 104 (18.3%) patients. There was only one patient with level V metastases without involvement of other levels. There was no statistically significant correlation between level V lymph node metastasis and several clinical factors. Conclusion: It seems to be feasible to omit dissection of level V in patients without clinical evidence for level V disease without compromising oncological safety.

In recent decades, the extent of neck dissection for squamous cell carcinoma of the head and neck has been a topic for debate (1, 2). The lymph nodes of the neck are divided into six levels according to the neck dissection classification proposed by the American Head and Neck Society and the American Academy of Otolaryngology–Head and Neck Surgery (3). The extent of lymph node dissection during treatment of squamous cell carcinoma of the head and neck is a subject of increasing importance with several studies suggesting that extended neck dissections not improve outcome (4, 5). Extensive radical neck dissection and modified radical neck dissection (ND) leads to an increase in morbidity, mainly due to injury of the spinal accessory nerve which may result in shoulder pain and dysfunction (6); such injury is a typical complication after dissection of levels II and V.

Level V refers to the lymph nodes located in the posterior triangle of the neck which is bound anteriorly by the posterior border of the sternocleidomastoid muscle and posteriorly by the anterior border of the trapezius muscle. Lymph nodes compromising level V are those located along the lower half of the spinal accessory nerve and the transverse cervical artery, as well as the supraclavicular lymph nodes. Level V is subdivided into level Va and Vb by a horizontal plane defined by the lower border of the cricoid cartilage (7). There are some studies suggesting that metastases in level V of squamous cell carcinomas of the head and neck are very rare (8, 9).

Therefore the aim of the present study was to evaluate the incidence of lymph node metastases in level V in patients with squamous cell carcinoma of the head and neck and N+ neck status.

Patients and Methods

Medical records of 104 patients with squamous cell carcinoma of the head and neck and pathological N1-3 neck nodal status who underwent neck dissection with inclusion of level V were retrospectively reviewed. During neck dissection, the content of lymph node metastases in level V was counted. Possible correlations to age, sex, TNM classification, localization of primary tumor and presence of other positive nodes were evaluated. Statistical analysis was performed using Fisher’s exact test.

Results

A total of 104 patients with pathological N+ neck and dissection of level V were investigated, with 91 (87.5%) males and 13 (12.5%) females. The mean age at the time of treatment was 58.6 years (range 42-82 years). The most common primary site was the oropharynx (47 cases; 45.0%), followed by the hypopharynx (29 cases; 27.9%) and the larynx (16 cases; 15.4%). The complete list of primary sites is shown in Table I. In 29 cases, neck dissection was performed after primary radiochemotherapy. Staging of the primary tumor revealed 17 T1 carcinomas (16.3%), 45 T2 carcinomas (43.2%), 18 T3...
carcinomas (17.3%), and 22 T4 carcinomas (21.2%) and 2 patients with cancer of unknown primary (Tx 1.9%). The neck was classified as N1 in 18 patients (17.3%), N2a in 8 patients (7.7%), N2b in 47 patients (45.2%), N2c in 26 patients (25%), and N3 in 5 patients (4.8%). Bilateral neck dissection with inclusion of level V was carried out in 23 patients, resulting in a total of 127 neck dissections being evaluated.

Level V metastases were found in 19 out of 104 (18.3%) patients. Overall incidences were 18.3% (19 out of 104) and 4% (1 out of 23) in the ipsilateral and contralateral neck, respectively (Table I). Patients with level V metastases were classified as N2b in 12 cases, as N2c in 5 cases and as N3 in 2 cases. In 5 out of 19 (26.3%) patients with lymph node metastases in level V, neck dissection was performed after primary radiochemotherapy. Level V was involved in only one patient who had no metastatic disease in any other level (0.96%) (Table I). This patient was a 63-year-old female with a T1N2bM0 oropharyngeal carcinoma. She had two metastases in level V on the ipsilateral side; in all, 52 lymph nodes were dissected on the ipsilateral side. The patient already had a clinical N+ status.

In all, Level V metastases were more prevalent in the presence of other lymph node metastases compared with the absence of other positive lymph nodes, however this result was not significant. Table II shows the metastatic involvement of other levels in patients with level V metastases.

The relationship between level V lymph node metastasis and several clinical factors was analyzed. There was no statistically significant correlation with age, sex, or T stage. According to T stage, the incidence of level V metastasis was as follows: 23.5% (4 out of 17) in T1, 15.6% (7 out of 45) in T2, 11.1% (2 out of 18) in T3, and 18.1% (4 out of 22) in T4 and 50% (1 out of 2) in Tx. Three of the patients with level V metastases suffered from distant metastases at diagnosis.

Discussion

Lymph node status in patients with squamous cell carcinomas of the head and neck remains an important factor in the prognosis and therapy of this disease (10). Accurate knowledge of node-positive disease also alters treatment decisions. Currently there is debate regarding which patients would benefit from neck dissection, as well as the extent of the neck dissection (11). In the past decades, there was a refinement of the various selective neck dissections to achieve oncologic control and minimize morbidity. A major complication of dissecting level V is paralysis of the accessory nerve. Accessory nerve dysfunction can also appear when the nerve remains intact secondary to traction or to an ischemic injury of the nerve. Several reports have shown that patients with dissection of level V had significantly more shoulder dysfunction, pain, and electrophysiologic abnormalities in contrast to patients who did not have level V dissected (12-14). The more extensive the neck dissection, the greater the negative impact on quality of life, especially with regard to shoulder function (15).

The aim of the present study was to evaluate the prevalence of lymph node metastases in level V in patients with node-positive squamous cell carcinoma of the head and neck. The incidence of level V metastases was 18% which is rather high compared to data from the literature (16, 17), however, level V metastases were more prevalent in the presence of other positive lymph nodes. There was only one patient with two level V metastases without any other positive lymph node in the neck dissection specimen. In different studies on this topic, even smaller incidences of level V metastases were found. In a study of 107 patients with squamous cell carcinomas of the head and neck, none of the patients had single level V metastases, while 15% with lymph-node positive disease suffered from level V metastases (9). Shah et al. reported that in squamous cell carcinomas of the oral cavity, level V was rarely involved and was always accompanied by metastases in other lymph node levels (8). In all, in this study a prevalence of level V metastases of 4% was found (8). In a study of patients with oral and oropharyngeal carcinomas, a prevalence of 5% of level V metastases in clinically positive necks was detected (16). In a large study of patients with carcinomas of the upper aerodigestive tract, 5% of the patients with pN+ neck

<table>
<thead>
<tr>
<th>Primary site</th>
<th>No. of patients</th>
<th>No. of patients with level V metastases</th>
<th>No. of patients with level V metastases and no involvement of other levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oropharynx</td>
<td>47</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Hypopharynx</td>
<td>30</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Larynx</td>
<td>15</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Oral cavity</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Nasopharynx</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Esophagus</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skin</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cancer of unknown primary</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table I. Distribution of level V metastases according to localization of the primary tumor.
revealed level V metastases (17). Furthermore, several studies showed that the presence of metastasis in level V is associated with metastases to multiple nodal levels in the neck (8, 17, 18).

Based on these results, there are several authors who recommended preserving level V during neck dissection to minimize morbidity. Hamoir et al. suggested that dissection of the apex of level V is not necessary in mucosal head and neck carcinomas since the prevalence of lymph nodes was only 30% in neck dissection specimens of level V (19). Other authors recommended preserving level V, especially in clinically N0 patients, due to the low likelihood of metastases in level V (9, 17).

In the present study, a possible relationship between level V lymph node metastasis and several clinical factors was analyzed but no statistically significant correlation with age, sex, T stage or localization of the primary tumor was found. However, the lack of correlation between level V metastasis and tumor localization may be due to the small number of patients in the particular groups. Moreover, due to the retrospective nature of the analysis, there might have been selection bias; interobserver variability among pathologists and surgeons may also affect the section and analysis of each individual node.

Compared to other studies on the same topic, the present study revealed a rather high prevalence of level V metastases in patients with node-positive squamous cell carcinomas. However, cases with single level V metastases are only rarely analyzed but no statistically significant correlation with age, sex, T stage or localization of the primary tumor was found. It should always be considered that patients with two or more lymph node metastases normally receive postoperative radiotherapy. Therefore, a selective neck dissection which omits level V would seem not to affect the oncologic result in patients without clinical evidence of level V metastases. Consequently, it seems to be feasible to omit dissection of level V in patients without clinical evidence for level V disease without compromising oncological safety.

References