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Prognostic Value of Delphian Lymph Node in T1b Glottic Carcinoma

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Abstract. *Background: The published papers concerning Delphian lymph node (DN) involvement in laryngeal tumours generally consider advanced laryngeal and hypopharyngeal cancer. We investigated the role of DN in a selected group of patients with T1b glottic squamous cell carcinoma. Materials and Methods: The study involved 53 patients with T1b glottic squamous cell carcinoma who underwent horizontal glottectomy. DN was isolated in 46 (86.8%). Histological evaluation of the isolated nodes revealed the presence of metastases in three cases (6.5%). Results: Forty-six of the 53 patients (86.8%) are still alive and disease-free; four (7.5%) died because of their disease and three (5.7%) because of unrelated causes. The 3- and 5-year overall survival was, respectively, 94.3% and 90.6%. Both the 3- and 5-year disease-free survival was 92.5%. Two of the three patients with a metastatic DN died because of a recurrence: laterocervical lymph node metastases in one case and parastomal recurrence in the other. The frequency of local relapse was at the threshold of significance in the patients with a positive DN ($p=0.0540$). Of the four patients who died of their disease, two were DN-positive. Mortality was statistically higher in the DN-positive patients ($p=0.0166$). Conclusion: The presence of DN metastases was statistically associated with recurrence and overall survival in T1b glottic cancer.*

Laryngeal squamous cell carcinoma (LSCC) has a high tendency to metastasize to the regional lymph nodes of the neck before giving distant metastases, thus making neck node status one of the most important prognostic factors (1-3). It is therefore fundamental to consider the site of the tumour and the lymphatic drainage of the larynx in order to establish the frequency and pattern of lymph node spread to the neck and to define the most effective treatment.

In the case of glottic tumours, it must be borne in mind that the subepithelial space of the true vocal cords contains few lymph vessels so lymph node metastases is a rare event (4) and that tumour extension to the anterior commissure permits metastases *via* the small anterior lymphatic pathway (5). Transglottic and subglottic tumours and those with a subglottic extension may also drain through the cricothyroid membrane into the lymph nodes of the central compartment of the neck including the paratracheal, cricothyroid (Delphian) lymph nodes, as well as the nodes located along the recurrent laryngeal nerve (5-6). The Delphian lymph node (DN) is located on the fascia above the thyroid isthmus and lies between the cricoid and the thyroid cartilage (7). It receives lymph from the laryngeal efferent lymphatic system through a small anterior drainage system that pierces the cricothyroid membrane (8).

The aim of this study was to evaluate the frequency and prognostic value of the involvement of DN in a selected group of 53 patients with glottic carcinoma extending to the anterior commissure who underwent horizontal glottectomy.

Materials and Methods

The 53 patients (45 males and 8 females; mean age 61.7 years: range 39-77) attended the ENT Department of the University of Milan, Italy, between 1992 and 1999 because of persistent dysphonia.

After laryngeal endoscopy had revealed the presence of a glottic lesion in all cases, they underwent contrast CT of the larynx and neck and biopsy of the laryngeal lesion in microlaryngoscopy. True vocal folds mobility was normal in all cases. The patients were staged as having T1b glottic squamous cell carcinoma according to the 2002 UICC-TNM classification (9). All of them had clinically-negative cervical lymph nodes and radiologically-negative findings. None had received any previous radiation or chemotherapy. Horizontal glottectomy was performed in all cases. DN was sought in all cases and isolated in 46 (86.8%); histological evaluation of the isolated nodes revealed the presence of metastases in three cases (6.5%).

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Two patients with DN metastases and five whose surgical margins were positive also underwent postoperative radiotherapy (46-60 Gy). The follow-up period was 18-112 months (mean 55.7 months). The prognostic relevance of the patients' baseline characteristics to disease-free survival and overall mortality due to cancer and other causes was assessed by means of survival analysis based on the Kaplan and Meier product limit estimate of the cumulative probability of survival.

Results

Forty-six of the 53 patients (86.8%) are still alive and disease-free; four (7.5%) died because of their disease and three (5.7%) because of unrelated causes. The 3- and 5-year overall survival was, respectively, 94.3% and 90.6% and both the 3- and 5-year disease-free survival was 92.5% (Figures 1,2).

Seven patients (13.2%) relapsed a mean of 43.6 months after surgery, two of whom had undergone postoperative radiotherapy for histologically-positive margins. Five of these patients had local recurrences and underwent total laryngectomy with neck dissection: three of them are still alive and disease-free; the other two (both DN-positive) died, one because of laterocervical lymph node metastases and the other because of parastomal recurrence. The other two patients with recurrence received palliative chemo/radiotherapy because of simultaneous lung metastases and died within two years of treatment. The third patient with a positive DN is still alive after 49 months of follow-up. The frequency of local relapse was at the threshold of significance in the group of DN-positive patients ($p=0.0540$). In terms of overall survival, two of the four patients who died of their disease were DN-positive; mortality was statistically higher in the DN-positive patients ($p=0.0166$) (Table I).

All of the patients underwent tracheostomy and postoperative decannulation was possible within a mean of 17.1 days (range 8-31 days). The nasogastric tube was removed on postoperative days 3-10 (mean 5.1 days) and adequate swallowing was soon obtained. No major postoperative complications were observed and hospitalisation ranged from seven to 31 days (mean 16.2 days). Three patients (5.7%) underwent laser surgery in order to remove a mucosal flap and restore an adequate glottic airway. During the follow-up evaluation, granulation tissue was found and biopsied in three cases (5.7%). One patient (1.9%) had neoglottic synechia requiring surgery. All of the patients underwent speech rehabilitation in order to restore vocal function.

Discussion

There are few published papers concerning DN involvement in glottic tumours, and most of the data relate to advanced laryngeal and hypopharyngeal cancer (7-11) and show that the

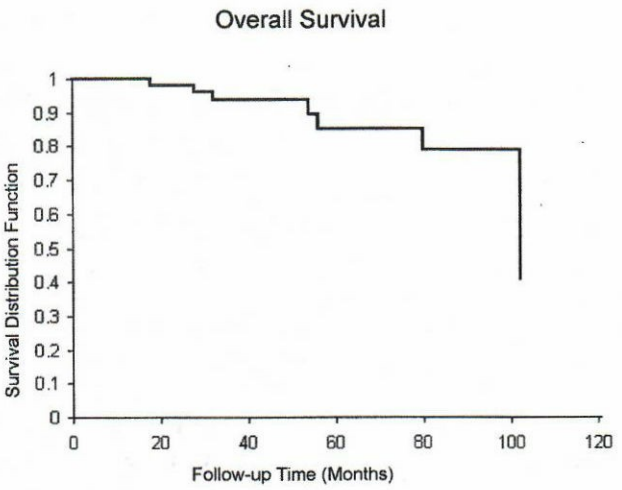

Figure 1. *Overall survival rates of 53 patients with T1b glottic cancer treated by horizontal glottectomy.*

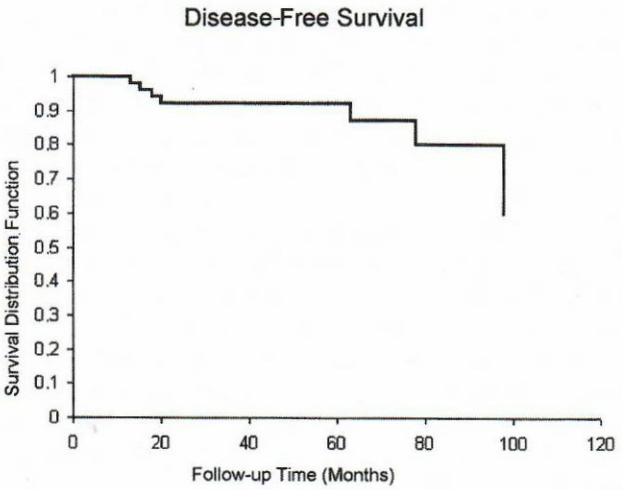

Figure 2. *Disease-free survival rates of 53 patients with T1b glottic cancer treated by horizontal glottectomy.*

Table I. *Recurrence and mortality rate in patients with both positive and negative Delphian node.*

Delphian Node	Patients	Recurrence Rate Number	%	Mortality Rate Number	%
Positive (pN+)	3	2/3	66.7	2/3	66.7
Negative (pN0)	43	5/43	11.7	2/43	4.7
		$p=0.0540$		$p=0.0166$	

incidence of DN metastases is higher in these patients. Resta reported DN metastases in 21% of the total number of their cases as against only 7% of their glottic tumour cases (11).

Our study describes the oncological results in a selected group of 53 patients with T1b glottic carcinoma, who underwent horizontal glottectomy and a DN search. DN was isolated in 86.8%, which is in line with the percentage reported by Gawlak-Prycka (12). Three of our cases (6.5%) showed DN metastatic involvement, similar to the findings of other authors in unselected patients: Szmeja found DN metastatic involvement in 7.3% of patients surgically treated for laryngeal carcinoma (13) and Thaler *et al.* observed that 8 out of 92 patients (8.7%) undergoing total laryngectomy showed DN involvement (7). Our findings are probably related to anterior commissure involvement as the lymph flow drainage of the tumours generally permits metastases *via* the small anterior lymphatic pathway through the cricothyroid membrane and into the lymph nodes of the central compartment of the neck.

The detection of DN metastases in 6.5% of our cases was associated with recurrence and overall survival. Two DN-positive patients died of their disease, one because of laterocervical metastases and the other because of a parastomal recurrence. These findings are in keeping with those reported by Olsen *et al.* and Gawlak *et al.*(8, 12) who concluded that a positive DN is a predictor of an increased frequency of recurrence. In particular, Olsen sustains that a positive DN is a predictor of increased frequency of lateral lymph node metastases and a decreased probability of survival, regardless of the primary site or stage (8). Gawlak observed tumour recurrence in 62.5% (15 out of 24) of DN-positive patients as against 17.4% (23 out of 132) of cases without DN involvement (12). Finally, Thaler reported that 3 out of 8 patients with DN metastases died because of parastomal recurrence and emphasized the importance of this lymphatic drainage pathway (7).

In conclusion, the presence of DN metastases in patients with T1b glottic squamous cell carcinoma is statistically associated with recurrence and overall survival, as reported by others (8,11,13). In order to choose the most adequate therapy for the management of a laryngeal lesion, it is therefore important to classify its anatomical location and extension. The site of a primary laryngeal tumour is a factor indicating the frequency and localisation of neck node involvement, thus allowing the most appropriate patient management and follow-up strategy.

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