

Clinical Paper
Head and Neck Oncology

Comparison of related complications: sentinel node biopsy versus elective neck dissection

J. Hernando¹, P. Villarreal²,
F. Álvarez-Marcos³, L. Gallego⁴,
L. García-Consuegra⁵, L. Junquera⁵

¹Department of Oral and Maxillofacial Surgery, Donostia University Hospital, San Sebastián, Spain; ²Oral and Maxillofacial Surgeon, Private Practice, Oviedo, Spain; ³Department of Surgery, University Central Hospital, Oviedo, Spain; ⁴Department of Oral and Maxillofacial Surgery, Cabueñes Hospital, Gijón, Spain; ⁵Department of Oral and Maxillofacial Surgery, University Central Hospital, Oviedo, Spain

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Abstract. Sentinel node biopsy (SNB) is considered a feasible neck staging tool in early oral squamous cell carcinoma. The aim of this study was to compare postoperative morbidity in patients who had undergone SNB and elective neck dissection (END). Seventy-three consecutive patients were included between the years 2005 and 2009. The patients were divided into two groups according to neck management: SNB and END groups. Kaplan–Meier survival analysis was used to compare disease-free survival (DFS) and overall survival (OS) between the groups. Shoulder function, length of the surgical scar, and the degree of cervical lymphoedema were assessed. Neck haematoma and the presence of oro-cervical communication were also analyzed. Thirty-two patients underwent SNB and 41 underwent an END (levels I–III). Seven regional recurrences were recorded in the END group. Three neck recurrences occurred in the SNB group. No significant differences were found in DFS or OS between the groups. There were statistically significant differences between the groups in shoulder function and average scar length. However, differences in degree of lymphoedema were not statistically significant. Neck hematomas and oro-cervical communications occurred only in the END group. From this study, it can be concluded that SNB presents less postoperative morbidity than END.

Key words: sentinel node biopsy; elective neck dissection; oral cancer; morbidity.

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The rate of occult metastasis in the early stages of oral squamous cell carcinoma ranges from 20 to 30%. The ideal treatment procedure for the neck of these patients remains the subject of controver-

sy.¹ Approximately half of the patients with oral cancer present stage I/II disease at the time of diagnosis. Even though the recommended treatment method is an elective neck dissection (END) when the

risk of occult neck metastasis is higher than 20%, up to 80% of patients can be overtreated.^{1,2} An END is often proposed for oral cancer patients with clinically negative lymph nodes (N0), regardless

of the tumour (T) stage. However, in patients with clinically staged N0 oral cancer, there is controversy regarding whether supraomohyoid neck dissection or extended supraomohyoid neck dissection should be performed. Supraomohyoid neck dissection is a selective neck dissection in which the submandibular lymph nodes (level I), upper jugular lymph nodes (level II), and middle jugular lymph nodes (level III) are removed. Extended supraomohyoid neck dissection encompasses dissection of the lower jugular lymph nodes (level IV) in addition to the supraomohyoid neck dissection. Dissection of the lower jugular lymph nodes (level IV) has been advocated as part of END for oral cavity cancers because of the possibility of 'skip metastases' to level IV. Skip metastasis is defined as metastasis to level IV without involvement of levels I–III. On the other hand, neck dissection is associated with a longer duration of surgery and is not free of morbidity.³

Sentinel node biopsy (SNB) has been proposed as an alternative to END in T1–T2 N0 patients. There are numerous studies validating the efficacy of this technique.^{1,4–7} In 2012, Thompson et al.⁸ published the largest meta-analysis of SNB in patients with oral cavity and oropharyngeal squamous cell carcinoma, and the first to include tumours of the hypopharynx and supraglottis. All patients had sentinel lymph node biopsy performed followed by a concurrent neck dissection. The overall sensitivity and negative predictive value of SNB in the subset of oral cavity tumours were 94 and 96%, respectively. The data presented by Thompson et al. demonstrate quite clearly that oral cavity squamous cell carcinoma patients with negative SNB results can be assured, with a very high degree of certainty, that subsequent END results will also be negative. At present, it appears that SNB allows us to select those patients who could benefit from END, thereby reducing the costs and secondary morbidity resulting from more aggressive and unnecessary methods. Shoulder function has been reported to be altered in 29–39% of patients after neck dissection procedures, depending on the type of dissection and the series.^{9–12}

The aim of this study was to compare, prospectively, the differences in shoulder function, neck lymphoedema, surgical scar characteristics, and possible complications between patients with radiologically staged T1–T2 N0 oral squamous cell carcinoma who had undergone SNB and END (levels I–III). At the present time our work represents the first study to compare

the observed complications in patients for whom SNB was performed as a single staging procedure against secondary complications to patients subjected to END (levels I–III).

Materials and methods

We conducted a prospective study of 73 patients with stage I and II squamous cell carcinoma of the oral cavity. Resection of the primary tumour was carried out between 2005 and 2009. Patients were enrolled consecutively into the study. All patients visited the same oral and maxillofacial department of a tertiary-level hospital. The European Sentinel Node Biopsy Trial protocol was performed for the management of SNB patients.¹³

Preoperative images of the sentinel nodes (SNs) were obtained within 2 h of surgery by lymphoscintigraphy method. Tc-99m nanocolloid (Nanocoll/Nanocis) was injected using a standardized technique at four points around the tumour. A dynamic study was carried out during the first 10 min post-injection, and static images were obtained every 10 min for 120 min thereafter. The position of the SN was marked on the neck. At the time of surgery, the SNs were detected primarily by hand-held gamma probe. After excision of the primary tumour, the SN was identified in the neck by searching for node radioactivity using a gamma probe. The excised SN was fixed in 10% neutral buffered formalin. Five serial sections were cut every 150 µm through the block, and one from the centre of each series was stained with haematoxylin and eosin (H&E). If metastasis was still not detected, an adjacent section at each level was stained with anti-pan cytokeratin antibody AE1/3.

An END was performed in patients without evidence of neck disease; these patients underwent unilateral or bilateral selective neck dissection of levels I–III.

All patients who had undergone previous neck treatments were excluded from the sample. None of the patients with positive SNB results was included in the study. All patients who underwent an END were included in the study regardless of the status of the lymph nodes isolated—positive or negative.

Clinical assessment

The variables studied included socio-demographic data (age and sex) and follow-up data. Recurrence rates and false-negative rates were calculated. Kaplan–Meier survival analysis was used to compare

disease-free survival (DFS) and overall survival (OS) between the SNB and END groups. Shoulder function was rated by means of the Constant–Murley score.¹⁴ The Constant–Murley score is calculated using a 100-point scale composed of a number of individual parameters. These parameters define the level of pain and the patient's ability to carry out their normal daily activities. The Constant–Murley score was introduced to determine functionality following the treatment of a shoulder injury. The test is divided into five subscales: pain (0–15 points), daily activity (0–10 points), ability to elevate the arm (0–10 points), strength (0–25 points), and range of motion: forward elevation, external rotation, abduction, and internal rotation of the shoulder (0–40 points). A plastic universal two-arm goniometer was used to measure the active movements of the shoulder. The higher the score, the better the quality of the function. All observations were carried out by a single specialist at 3 months after initial treatment (FA).

The length of the surgical scar was measured in millimetres (mm), and the degree of neck lymphoedema was assessed by means of Földi's scale.¹⁵ Other complications analyzed were the presence of neck haematoma and of oro-cervical communication.

Statistical analysis

The statistical analyses were performed using SPSS version 20.0 software (IBM Corp., Armonk, NY, USA). The Student's *t*-test was used to compare the results of the Constant–Murley score for the specific items and the length of the surgical scar. Fisher's exact test was used to compare the degree of neck lymphoedema, the presence of cervical haematoma and oro-cervical communication, and cervical recurrences. Kaplan–Meier survival analysis was used to compare DFS and OS between the SNB and END groups. *P*-values of <0.05 were considered statistically significant.

Results

Seventy patients were included in the study; three SN-positive patients were excluded. Table 1 shows the characteristics of the patients in the two treatment groups. The average age of patients was 66.5 years (range 40–90 years) and the average follow-up was 31.5 months (range 7–70 months). None of the SNB patients were subject to stage IIb lymphatic drainage (Fig. 1). The average number of

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