The role of sentinel lymph-node biopsy in managing lip squamous cell carcinoma patients without clinical evidence of nodal metastasis

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Abstract

Aim

Squamous cell carcinoma (SCC) of the lip is a common oral malignancy. Lymph node metastasis occurs lately in the natural history of the disease but it is associated with poor outcome. Sentinel lymph node biopsy (SLNB) is an option that determines the potentially affected lymph nodes especially in clinically negative-node patients. The study aims to determine the feasibility of SLNB as a reliable staging tool in N0 stage lip SCC patients.

Methods

Eighteen patients with N0 stage lip SCC were enrolled in the study. They were subjected to SLNB using the injection of the radiocolloid material and the Blue dye. The procedure was followed by bilateral supraomohyoid neck dissection in all patients. The pathological results of the harvested sentinel lymph nodes (SLNs) were compared with that of the dissection specimen in each patient.

Results

The patent blue dye could localize the SLN in 15/18 patients whilst the radioisotope scanning could successfully identify it in 17/18 patients. On average, 1.8 SLNs were harvested from each patient. Two of seventeen patients with identified SLNs (11.8%) have positive nodal metastases. One of them has two SLNs and the other has only one. No false negativity was reported in the study as all the excised SLNs reflected correctly the status of the lymph node basin.

Conclusion

Sentinel lymphadenectomy is a safe and feasible procedure in managing neck of patients with node-negative lip SCC. It can accurately stage these patients.

Keywords

sentinel lymph node, lip, cancer

Introduction

Lip cancer remains the most frequent malignant tumor of the oral cavity. It represents more than 50% of oral cancers in white Australians while it reaches 36.8% in the Middle East (¹-³). As most lip cancers are SCC, they spread primarily via lymphatics to submandibular and cervical lymph nodes. The outcome of the diseases depends mainly on affection of these nodes. With early diagnosis and proper management by surgery or radiotherapy when necessary, the 5-year survival rate reaches 95% (⁴).

The approach to clinically impalpable neck nodes in the management of early SCC of the lip represents one of the current dilemmas facing the surgeon. Currently, common practice involves elective block neck dissection or radiotherapy to the neck because of the significant risk (>20%) of occult nodal metastases. However, this policy has been shown to be an over-treatment in a large percentage reaching more than 80% of patients. The “wait and see policy” is another choice.
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of treatment for the clinically negative neck nodes patients but it may delay the treatment in the micrometastases group. The choice of the operation is usually based on the size, depth and grade of tumor and sometimes the preference of surgeon (5-7).

SLNB is an emerging alternative technique for staging the neck. It can identify indeed patients who may theoretically benefit from complete lymph node dissection. Although the validity and reliability of this technique has been confirmed in breast cancer and cutaneous melanoma, it is still in its infancy in SCC of the lip (8). With the aid of SLNB, the surgeon can select the appropriate patient who must undergo immediate neck dissection in the same session (7).

Shoaib and Soutar reviewed the literature on SLNB and its role in head and neck SCC. They stated that early results are encouraging and suggest that the technique should be evaluated in the context of multicenter trials (9). SLNB may be performed using blue dye (4,10), radiocolloid material (11,12) or both (8,13). The aim of this study is to evaluate the role, if any, of SLNB in detection of metastasis in clinically negative node patients with SCC of the lip.

Methods

The study was conducted at the surgery department of the Suez Canal University Hospital, Ismailia, Egypt. Over an 18 month period (between July 2010 and December 2011), and after approval of our research ethics committee, an informed consent was obtained from eighteen patients with SCC of the lip to participate in the study. Patients included in this study were those who had no clinically palpable lymph nodes while patients with obvious palpable regional lymph nodes, patients with recurrent lesions, pregnant women and patients received pre-operative radiotherapy were excluded. All patients underwent pre-operative incisional biopsy to confirm the diagnosis (Fig. 1).

All included patients had undergone wide local excision of the primary tumour with adequate margins followed by bilateral supraomohyoid neck dissection. The SLN technique involves the injection of the radiocolloid material and the Blue dye. The used radiocolloid material is 2 ml of filtered technetium-99m sulfur colloid at an activity of 450 μCi (16.6 MBq). It was prepared in the nuclear medicine department at the morning of the operation and transported to the surgery ward by a medical stuff in a lead shield where it was injected around the tumor two hours before the operation.

In the operating room, 2 ml of vital blue dye was injected around the tumour after induction of the anesthesia and the area was massaged for about 5 to 10 minutes to facilitate the migration of the mapping agent to the lymph nodes. The straight 14-mm diameter hand-held gamma

![Fig. 1: Patient with SCC of the lateral third of the lower lip.](image1)

![Fig. 2: Pre-operative transcutaneous localization of SLN using the gamma probe detector.](image2)
probe detector was used for transcutaneous localization of the hot spot (intense focus of radioactivity) on both sides of the neck and to mark it for orientation purposes at the beginning of the operation (Fig. 2).

The procedure was started by excision of the primary tumour. This was done prior to neck dissection in order to reduce the shine-through effect of the radiotracer material and the scatter from the injection site, which can significantly hinder the detection of the SLN. The resultant defect was closed primary in small lesions and by Abbe-Estlander flap in larger lesions. Then, an incision was made for bilateral supraomohyoid neck dissection. The flap of the skin and subcutaneous tissue was elevated so that it uncovers the mandible above and reaches below to the hyoid bone.

A search was made for the blue stained lymph nodes (Fig. 3). Further confirmation of the site of the SLN was made again intra-operatively by the gamma probe searching through the operation field guided by the external marking of the hot spot and the internal marking of the blue dye (Fig. 4). The deeply stained and hottest radioactive nodes were identified and harvested. They were referred as SLNs. The procedure was completed by formal bilateral supraomohyoid neck dissection in all patients. Histology of the dissected specimen was compared with that of the SLN in each patient.

**Results**

Eighteen patients with stage T1-2N0M0 SCC of the lip were enrolled in the study. The mean age for the patients was 50 years with a range between 42 years and 65 years. There were 12 males and 6 females giving a male to female ratio of 2 to 1. The tumour was located in lower lip in seventeen patients (94.4%) while it was in the upper lip in only one patient (5.6%). Among patients with lower lip tumour; 13 patients had their tumour in the lateral third, 3 patients in the central part and one patient in the oral commissure. Thirteen patients (72.2%) presented with T1 disease while the remaining five patients (27.8%) presented with T2 disease. The clinico-pathological characteristics of the patients are shown in Table 1.

The patent blue dye could localize the SLN in 15/18 patients whilst the radioisotope scanning could successfully identify it in 17/18 patients. Hence, the mapping success rate using this combined technique was 94.4%. Thirty SLNs were harvested from 17 necks (average of 1.8 nodes per patient). Two SLNs were harvested in thirteen patients while one SLN was harvested in four patients. Four SLNs were found in the submental region, twenty four in the ipsilateral submandibular region and two in the contralateral submandibular region.

Of the seventeen patients with identified SLN, only two patients (11.8%) have tumour-
positive nodes. One of them has two SLNs and the other has one SLN. In other words, the pathological analysis of the SLNs revealed 3/30 nodes positive for tumour in 2/17 patients. One of the patients with positive SLNs was clinically staged T1N0M0 whilst the other was T2N0M0. The pathological analysis of the 17 bilateral supraomohyoid neck dissections yielded a total of 307 non-sentinel lymph nodes. Only one of these nodes was positive for metastasis. This node was found in a patient whom his SLNs were also positive for malignancy.

There were no false negative results in the study as the fifteen patients with tumour-negative SLN showed no metastasis in their final histological examination of the dissection specimens. Among the two patients with positive SLNs, one patient has other positive node in the dissection specimen while the second patient has metastasis only in his SLN. No adverse reactions were encountered with the blue dye injection and there was no postoperative morbidity including haematoma or seroma in any of the included patients.

**Discussion**

Lip SCC is a common oral malignancy. Its incidence varies considerably in the literature ranging from 10.8% to 59.4% of all oral SCC. This variation depends mainly on ethnicity, sex and sun exposure (14,15). Lip is easily accessed clinically compared to other sites of oral cavity. This usually stimulates the early seek of medical consultation which render lip carcinoma has the lowest incidence of cervical metastasis among all cancers of the oral cavity, especially when referring to small lesions (T1, T2) (4, 16, 17).

The strategy of managing the neck in patients with node-negative SCC of the lip is still controversial. Some authors strongly advocate the routine neck dissection to decrease the rate of regional recurrence (18, 19) while others prefer the wait and see policy (20). The need for a better diagnostic tool to identify subclinical cervical metastases in this form of the disease has lead to application of SLN technique in its management plan (21).

In the present study, we used the combined method of SLN technique (blue dye and radiocolloid material) in eighteen patients with N0 lip SCC. The technique was followed by bilateral supraomohyoid dissection in all patients. This type of dissection was chosen because of the possibility of crossed drainage of the central lesions of the lower lip beside that the incidence of contra-lateral metastasis in patients having lateral one-third lip lesions is 10% (16, 22).

Although the close proximity of the primary tumor and the area surveyed for the SLN (increased shine-through effect), the study could identify the SLN in 94.4% of the patients. This matches with many other studies that apply the radio-labelled tracer with additional blue dye (6, 8, 23). However, studies that use blue dye alone reported a lower rate of identification (4). Beside the used tracer, the success rate of identification is certainly influenced by the experience of the researcher as many authors have emphasized the significant learning curve that exists for SLN technique and found a statistically significant difference in the negative predictive value of SLN biopsy between experienced surgeons and beginning surgeons (21). The success rate of identification could be further improved by the use of the “triple diagnostic approach” which include blue dye, radio-colloid and the preoperative lymphocintigraphy. By this way a 100% success rate could be achieved (13).

The study found that the risk of regional lymph node metastases is 7.7% for T1 lesions whereas

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Table 1: Clinico-pathological characteristics of the Patients
this rises to 20% for T2 lesions. This relatively high percentage especially in T2 lesions supported the SLNB as a reasonable approach to clinically negative node patients. In two patients (one has central lesion and the other has lateral third lesion); 2 SLN was harvested from the contra-lateral side. This finding emphasizes the necessity of applying the SLNB on both sides of the neck even in well lateralized lesions. This was suggested by other many studies (4, 24).

In this study, one patient has metastasis in his SLN only. The same was noticed by Altinyollar et al (4) who did not found metastases in the non-sentinel lymph nodes of two patients with positive SLNs. One of the potential pitfalls of the SLN technique is the phenomenon of skip metastases i.e., metastases that skip over the first draining lymph node to lodge in nodes further downstream. The current study showed no evidence for skip metastases and the SLNB has been shown to accurately predict lymph node status in all patients. Similarly, in a recent study by Burcia et al (25), the SLNs from fifty cases correctly reflected the status of lymph node basin without false negative cases.

In conclusion, the SLNB remains an exciting area of development for SCC of the lip. The procedure is technically feasible and could avoid the over-treatment by prophylactic neck dissection in the majority of node-negative patients. It should be established as a principal tool in staging these patients. However, the procedure should be performed by surgeons with significant experience.

References


