

Clinical Paper
Head and Neck Oncology

Anatomical restrictions in the surgical excision of scalp squamous cell carcinomas: does this affect local recurrence and regional nodal metastases?

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G. Jenkins, A.B. Smith, A.N. Kanatas, D.R. Houghton, M.R. Telfer: *Anatomical restrictions in the surgical excision of scalp squamous cell carcinomas: does this affect local recurrence and regional nodal metastases?*. Int. J. Oral Maxillofac. Surg. 2014; 43: 142–146. © 2013 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Abstract. Squamous cell carcinomas (SCCs) of the skin of the scalp have the potential for regional metastases. Microscopically, clearance may be less than the optimal dimensions. We report 101 SCCs of the scalp treated surgically under the care of a single oral and maxillofacial surgeon. Forty-two of the study patients had deep margins that were clear by less than 2 mm, of whom five had margins that involved pericranium ± skull. Our study demonstrated a local recurrence rate of 6% and a regional recurrence rate of 7%. All patients presented with relapse of the disease within 18 months of primary surgery. The evidence presented in this study suggests that in SCCs of the scalp, less than ideal surgical margin clearance, entirely due to anatomical restrictions, does not appear to substantially affect regional recurrence, but increases the risk of local recurrence.

Keywords: cutaneous squamous cell carcinoma; scalp; recurrence rates.

Accepted for publication 29 August 2013
Available online 13 October 2013

Non-melanoma skin cancer is the most common cancer worldwide and its incidence has continued to rise over the decades.¹ Ninety percent of cutaneous malignancies occur in the head and neck region,² secondary to the lifetime accumulation of ultraviolet radiation damage³ in conjunction with skin type. It is approximated that between 10% and 20% of these malignancies are squamous cell carcinomas (SCCs).⁴

SCC has the potential for regional metastases, although early surgical management reduces this risk to around 5%.⁵ It has been recognized in the literature that particular sites of the head and neck represent a so-called ‘danger-area’ for increased risk of recurrence and metastases.^{2,4,6} In a recent multicentre study in Australia documenting the patterns of nodal metastases in head and neck patients diagnosed with cutaneous SCC, the scalp

represented the primary in the order of 10%.⁷

Anatomically the scalp is the cutaneous covering of the cranial vault, extending from the external occipital protuberance and superior nuchal lines to the supraorbital margins.⁸ The scalp has five anatomical layers that are of finite thickness, which show individual variation. However there can be some confusion with the term forehead, which encompasses the area

marked by the hairline superiorly to the supraorbital ridges inferiorly and bound laterally by the temporal ridge.⁹

The recommended clinical margins for the excision of a cutaneous SCC are 4 mm for a 'low-risk' SCC and 6 mm for a 'high-risk' SCC in order to achieve a 95% histological clearance rate (there are no guidelines in millimetres for histological clearance).^{10,11} These distances, and greater, are usually easily achieved clinically at the peripheral margins of scalp lesions, but deep clearance is restricted by the anatomical thickness of the scalp.

The purpose of this study was to address whether narrow (0.1–1.9 mm) clearance at the deep surgical margin, as measured histologically, results in a rate of local or regional recurrence above that stated in the literature, and when compared to groups with greater (2–6 mm and >6 mm) clearance at the deep surgical margin.

Patients and methods

Patients recruited into the study were those treated in the maxillofacial department of the hospital. The estimated population covered by this hospital is 700,000. Data were recorded retrospectively. Ethical approval for this study was received from the hospital clinical audit department, set in the context of service evaluation.

The inclusion criteria were set as follows: (1) treatment under the care of a single oral and maxillofacial surgeon in the department (MRT). (2) Patients treated between the years 2005 and 2009. This enabled appropriate follow-up in accordance with National Institute for Health and Clinical Excellence (NICE) guidelines,¹² namely 6 months or less formal follow-up for 'low-risk' SCCs and locally agreed follow-up for 'high-risk' SCCs. (3) SCCs of the scalp, not including the forehead, as indicated by the anatomical description above. (4) SCCs treated primarily by surgical excision.

At the study institution, cutaneous malignancies are subject to standard light microscopy histopathological preparation, namely fixation, preparation, embedding, sectioning, and finally appropriate staining. All cutaneous SCCs are discussed at a skin multi-disciplinary team (MDT) meeting.

During this time-frame, 101 consecutive SCCs of the scalp were surgically removed under the care of the one oral and maxillofacial surgeon. Histopathology reports were reviewed looking specifically at the size of the lesion, differentiation of the neoplasm, and distance to the closest deep margin. Clinical

notes were appraised, verifying subsequent management, paying particular attention to local and regional recurrence. Histopathological data sets were compliant with the cancer data standard.

Descriptive data were analysed using SPSS version 20 (IBM Corp., Armonk, NY, USA) and Microsoft Excel (Microsoft, Seattle, WA, USA).

Results

Patient demographics

Patient demographics are shown in Table 1; these fall roughly in line with the expected distribution. The mean age of the study participants was 81.7 years.

Characteristics of the primary lesion

The majority of scalp SCCs treated measured between 10 mm and 50 mm in both width (56%) and length (52%). In terms of the depth of the tumour, the majority of lesions measured were less than 10 mm (59%). There was a broad range of differentiations reported on histology (Table 2).

Surgical treatment – deep margin clearance

Figure 1 demonstrates the deep marginal clearance from the invasive edge of the carcinoma, broken down into groups. The standard surgical practice in this unit is resection at the deepest aspect of the lax areolar layer, i.e. on the pericranium, leaving only a very thin layer of the latter. A small number of patients for whom flap repair was planned had the pericranium removed, but as this is histologically only equivalent to 0.1 mm thick its impact is minimal.

Five patients had full thickness SCCs involving the pericranium ± bone treated by excision including the outer table of the skull and appropriate flap repair. We expected these patients to be at higher risk and hence their cases were discussed at the MDT for consideration of adjuvant

Table 1. Patient demographics.

Sex	Number
Male	79
Female	22
Patient age ranges, years	
61–65	2
66–70	4
71–75	19
76–80	22
81–85	29
86–90	15
91–95	10

Table 2. Histological differential of tumours.

Histological differentiation	N
Poorly differentiated	25
Moderately differentiated	53
Well differentiated	23

therapy; this group was not relevant to this study. We were therefore left with the main groups: 37 patients with histological marginal clearance of less than 2 mm and 39 patients with a marginal clearance of 2–6 mm, which when combined gave a group of 76 patients with marginal clearance of less than 6 mm. The last group of 20 patients had deep margin clearance greater than 6 mm; no patients in this group developed either local or regional recurrence.

Disease relapse – local recurrence

Figure 2 demonstrates local recurrence in the cohort. In the deep marginal clearance group of ≤2 mm, three patients developed local recurrence. No patients in the 2–6 mm group developed local recurrence.

The overall local recurrence rate in this study was 6%, including those involving the skull. None of the cohort had positive radial margins. However, removal of the cohort with involved pericranium or skull resulted in an overall local recurrence rate of 3% for those patients with clear histological soft tissue margins. The absolute risk of developing local recurrence with a deep margin of ≤2 mm with non-involved margins was 8%. Both these figures coincide with the current literature.

Disease relapse – regional recurrence

When reviewing regional recurrence (Fig. 3), some difference was noted. Seven patients developed regional recurrence, two patients in the ≤2 mm group and five patients in the 2–6 mm group.

This gave an overall regional recurrence rate of 7%, coinciding with the current literature. The relative risk values of the two groups, ≤2 mm and >2 mm, demonstrated deep marginal clearance not to be a key factor in regional recurrence (Table 3).

Discussion

A cutaneous SCC has the potential for invasive growth, metastasis, and mortality. The risk factors for the development of a cutaneous SCC are well documented in the literature and include, but are not limited to, ultraviolet radiation, fair skin, phototherapy, ionizing radiation, chemical

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