












ORIGINAL ARTICLE

Histological deep margins in cutaneous squamous cell carcinoma of the scalp and risk of recurrence

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Abstract

Background: Consensus is lacking on adequate deep histological margins in cutaneous squamous cell carcinoma (cSCC). Deep clearance for tumours located on the scalp is limited by anatomic constraints.

Objective: To determine whether clear but close deep histological margins (<1 mm) confer a higher risk of recurrence in cSCCs of the scalp treated by wide local excision, compared to deep histological margins ≥ 1 mm.

Methods: Multicentre retrospective observational cohort study and multivariate competing risk analysis to evaluate risk factors for recurrence.

Results: In total, 295 patients with 338 cSCCs were included. Close deep histological margins were not associated with an increased cumulative incidence of recurrence (subhazard ratio [SHR] 1.96 [95% CI 0.87–4.41]). However, an increased risk of recurrence was observed for those tumours that presented concurrent invasion of the galea aponeurotica and close deep margins, as opposed to patients without these factors (SHR 3.52 [1.24–10.01]). Tumours with clear but close peripheral margins (<1 mm) also had higher risk of recurrence (SHR 5.01 [1.68–14.97]).

Limitations: Retrospective observational study based on pathology reports.

Conclusions: Deep histological margins <1 mm do not confer a greater risk of recurrence as long as the tumour is completely excised and the galea aponeurotica is not involved. Surgical excision of cSCC on the scalp should include the galea to ensure proper assessment of deep margins.

Júlia Verdaguer-Faja and Álvaro Guerra-Amor contributed equally and should be considered as first authors.

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INTRODUCTION

Cutaneous squamous cell carcinoma (cSCC) is the second most common type of skin cancer.¹ Standard treatment consists of wide local excision (WLE) with post-operative histological assessment of surgical margins.^{2,3} This modality is associated with a 5-year disease-free survival rate $\geq 91\%$,⁴⁻⁶ and an overall recurrence rate of 0%–14%, with most tumours recurring within 2 years of intervention.³⁻¹⁰ The mortality rate in cSCC is relatively low (2%–3%).^{8,11} Estimated recurrence rates in the literature are usually $\leq 6\%$ for local recurrence^{3,4,7,9,12} and of 1%–4%^{3,7,9,11} for regional metastases, although higher rates have been described for tumours in the head and neck region^{4,8,13,14} and those presenting with risk factors for poor outcomes.^{2-4,8,9,14,15} Some factors, such as the extension beyond the dermis and immunosuppression, have also been linked to an increased risk of incomplete excision in cSCC.^{16,17}

Current guidelines recommend clinical peripheral margins of 4–10 mm during primary excision of cSCC to achieve complete excision in $>95\%$ of cases.^{2-4,15,18-22} None of the guidelines, however, provide recommendations on histological deep or peripheral safety margins.^{2,15,18,20-25} Consultation between the Royal College of Pathologists (RCPATH) and the British Association of Dermatologists (BAD) in 2001 revealed strong support for clinical purposes in establishing the term ‘clear but close margin’ to define those histological clear margins measuring 0.1–0.9 mm.²⁶ Just one set of guidelines, those of BAD, recommend including sufficient peripheral and deep tissues to ensure histological clearance of ≥ 1 mm during primary excision. They also recommend that cSCCs with histological margins < 1 mm should be reviewed by a multidisciplinary committee to determine the need for further treatments.^{2,21} While recommendations on incomplete excision in cSCC are clear,^{2,3,18} there is no guidance on the management of completely excised tumours with close histological margins. Few studies have analysed the risk of recurrence in cSCCs according to histological margins, and findings have often been limited by small sample sizes, a lack of distinction between involved and close margins and uncontrolled confounding factors.^{7,27,28}

The lack of clear guidance on the management of cSCC with close histological deep margins is particularly important in tumours located on the scalp, whose particular anatomic structure influence both the behaviour and treatment of primary tumours (Figure 1).²⁹ On one hand, the galea aponeurotica and the periosteum might be innately more resistant to invasion by tumour cells.³⁰⁻³² In addition, while clinically recommended safety peripheral margins are generally easy to achieve during primary excision of tumours, deep clearance is limited by scalp thickness.³³⁻³⁵ Despite the distinctive features of this anatomical location, current guidelines do not offer specific recommendations on the management of deep margins in the scalp. Only the BAD,² European¹⁸ and Scottish guidelines²³ recommend including

Why was the study undertaken?

- Little is known about histological deep margins and recurrence risk in cutaneous squamous cell carcinoma, especially on the scalp, where anatomical constraints limit deep excision.

What does this study add?

- Deep margins < 1 mm do not confer a greater recurrence risk if the tumour is completely excised and the galea is not involved. However, peripheral margins < 1 mm associate a higher risk of recurrence.

What are the implications of this study for disease understanding and/or clinical care?

- Surgical excision of cSCCs of the scalp should include the galea, which might act as an anatomical barrier, to enable complete assessment of the excised tumour and avoid complications.

the galea when excising a scalp cSCC, although the latter recognize that there is insufficient evidence to support this recommendation.

The aim of this study was to determine whether tumours with clear but close deep histological margins (< 1 mm) have a higher risk of recurrence following surgical excision than those with wider deep margins (≥ 1 mm). Secondary aims were to compare the risk of recurrence between tumours with clear but close histological peripheral margins (< 1 mm) and those with wider peripheral margins (≥ 1 mm), and to determine whether the risk of recurrence was increased when in addition to a close deep margin there was concurrent invasion of the galea aponeurotica.

PATIENTS AND METHODS

Study design and population

Multicentre retrospective cohort study was conducted at 10 Spanish hospitals. Information was collected from medical records and pathology reports at each hospital, after revision and approval by the local clinical research ethics committee. Patients with a primary cSCC of the scalp that had been diagnosed and treated by conventional surgical excision between 2016 and 2021 were included. The standard surgical practice for cSCC of the scalp in our setting is WLE including galea aponeurotica and a minimum peripheral margin of 4 mm, with post-operative margin assessment. Pathology reports follow the British recommendations,²⁶ using the ‘1 mm’ cut-off point to differentiate between clear but close and wider

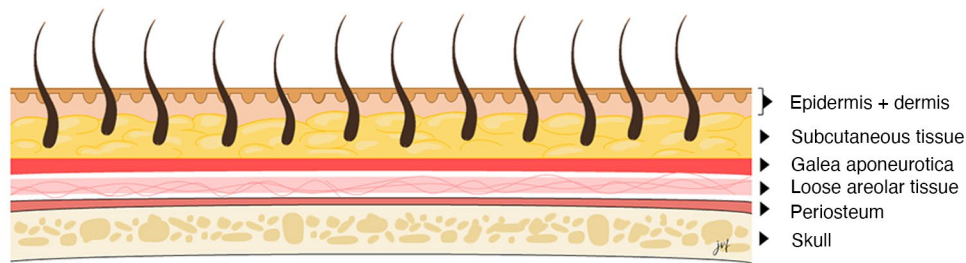


FIGURE 1 Graphical representation of the anatomical structure of the scalp. The scalp has a stratified structure composed of five layers—skin (integrated by epidermis and dermis), subcutaneous tissue, galea aponeurotica, loose areolar tissue and periosteum—overlying the skull. Illustration created by JVF and adapted from Verdaguer-Faja et al.²⁹

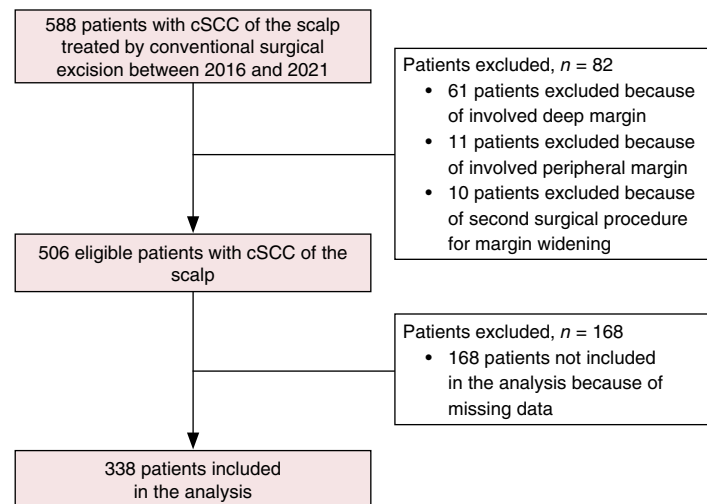


FIGURE 2 Flow chart of patients included.

histological margins. Tumours located in areas with distinct anatomic characteristics (the forehead and temple) were excluded, as were tumours with non-evaluable histological margins, tumours treated with other surgical techniques, tumours excised with involved margins, tumours with bone involvement and tumours requiring a second surgical procedure for margin widening (Figure 2).

Variables and outcomes

Study variables included patient characteristics (age, sex and immune status), clinical and histopathological features of primary tumours (location, diameter ≥ 2 cm, grade of differentiation, deep invasion, invasion of galea aponeurotica, perineural invasion >0.1 mm, distance to peripheral margins and distance to deep margin) and treatments received (surgery, radiotherapy and others). In all cases, the date of surgical excision was defined as the start of follow-up; follow-up data for up to 3 years were collected. Recurrence was defined as any recurrence after surgery (local recurrence or satellite, in-transit, lymph node or visceral metastases).³⁶ Local, regional and lymph node recurrences were defined as

lesions with similar histological characteristics to those of the primary tumour that reappeared in previously treated areas or in the lymphatic drainage basin. Visceral metastases were considered to be lesions with compatible imaging findings in a fitting clinical context. Those few patients that presented with more than one scalp cSCC and a recurrence were discussed. The recurrence was attributed to the tumour with the most plausible clinical, histological and temporal context.

Statistical analysis

Missing data were categorized as ‘missing completely at random’ and were not included in the analysis. Descriptive statistics were used to summarize patient and primary tumour characteristics. The Mann–Whitney *U*-test was used to compare quantitative variables between the deep margin groups (≥ 1 mm vs. <1 mm) and the Fisher's exact test to assess differences between proportions.

Multivariable Fine–Gray competing risk models were used for the survival analysis, with recurrence as the event of interest and death by another cause as the competing

TABLE 1 Demographic, clinical and histological characteristics.

	Distance to deep margin			p Value
	≥1 mm	<1 mm	Total	
	n = 267	n = 71	n = 338	
Age, years	81.85 (74.92,87.80)	84.75 (75.99,89.67)	82.22 (75.01,88.10)	0.157
Sex				
Male	242 (90.6%)	62 (87.3%)	304 (89.9%)	0.383
Female	25 (9.4%)	9 (12.7%)	34 (10.1%)	
T location				
Frontoparietal	58 (21.7%)	9 (12.7%)	67 (19.8%)	0.439
Parietal	135 (50.6%)	38 (53.5%)	173 (51.2%)	
Temporal	19 (7.1%)	5 (7.0%)	24 (7.1%)	
Vertex	42 (15.7%)	14 (19.7%)	56 (16.6%)	
Occipital	13 (4.9%)	5 (7.0%)	18 (5.3%)	
Immune status				
Immunocompetent	196 (73.4%)	53 (74.6%)	249 (73.7%)	0.881
Immunosuppressed	71 (26.6%)	18 (25.4%)	89 (26.3%)	
T diameter ≥2 cm				
No	170 (63.7%)	32 (45.1%)	202 (59.8%)	0.003
Yes	97 (36.3%)	39 (54.9%)	136 (40.2%)	
Deep invasion ^a				
No	197 (73.8%)	36 (50.7%)	233 (68.9%)	<0.001
Yes	70 (26.2%)	35 (49.3%)	105 (31.1%)	
T differentiation				
Good	93 (34.8%)	19 (26.8%)	112 (33.1%)	0.357
Moderate	144 (53.9%)	45 (63.4%)	189 (55.9%)	
Poor	30 (11.2%)	7 (9.9%)	37 (10.9%)	
Invasion of galea aponeurotica				
Absent	250 (93.6%)	53 (74.6%)	303 (89.6%)	<0.001
Present	17 (6.4%)	18 (25.4%)	35 (10.4%)	
T perineural invasion >0.1 mm				
Absent	252 (94.4%)	64 (90.1%)	316 (93.5%)	0.275
Present	15 (5.6%)	7 (9.9%)	22 (6.5%)	
T T-score AJCC8				
T1 AJCC8	152 (56.9%)	23 (32.4%)	175 (51.8%)	<0.001
T2 AJCC8	53 (19.9%)	9 (12.7%)	62 (18.3%)	
T3 AJCC8	62 (23.2%)	39 (54.9%)	101 (29.9%)	
T T-score BWH				
T1	146 (54.7%)	23 (32.4%)	169 (50.0%)	<0.001
T2a	88 (33.0%)	28 (39.4%)	116 (34.3%)	
T2b	32 (12.0%)	19 (26.8%)	51 (15.1%)	
T3	1 (0.4%)	1 (1.4%)	2 (0.6%)	
Distance to peripheral margins, mm				
Peripheral margins ≥1 mm	262 (98.1%)	66 (93.0%)	328 (97.0%)	0.038
Peripheral margins <1 mm	5 (1.9%)	5 (7.0%)	10 (3.0%)	
Adjuvant radiotherapy				
No	249 (93.3%)	58 (81.7%)	307 (90.8%)	0.005
Yes	18 (6.7%)	13 (18.3%)	31 (9.2%)	
Follow-up time, months ^b	32.00 (27.20,33.00)	29.00 (21.00,33.00)	31.31 (27.20,33.00)	

Abbreviations: AJCC8, American Joint Committee on Cancer Staging Manual eighth edition; BWH, Brigham and Women's Hospital; DOI, depth of invasion; T, primary tumour.

^aT DOI ≥6 mm or beyond subcutaneous fat.

^bKaplan–Meier estimate of potential follow-up (reverse Kaplan–Meier estimate). Median and 95% confidence interval.

TABLE 2 Recurrences and all-cause and cSCC-specific deaths.

	Distance to deep margin		Total
	≥1 mm	<1 mm	
	n = 267	n = 71	n = 338
Any type of recurrence			
No	249 (93.3%)	59 (83.1%)	308 (91.1%)
Yes	18 (6.7%)	12 (16.9%)	30 (8.9%)
Local recurrence			
No	256 (95.9%)	64 (90.1%)	320 (94.7%)
Yes	11 (4.1%)	7 (9.9%)	18 (5.3%)
Regional metastasis			
No	263 (98.5%)	66 (93.0%)	329 (97.3%)
Yes	4 (1.5%)	5 (7.0%)	9 (2.7%)
Lymph node metastasis			
No	262 (98.1%)	67 (94.4%)	329 (97.3%)
Yes	5 (1.9%)	4 (5.6%)	9 (2.7%)
Visceral metastasis			
No	267 (100.0%)	69 (97.2%)	336 (99.4%)
Yes	0 (0.0%)	2 (2.8%)	2 (0.6%)
Death of any cause			
No	188 (70.7%)	41 (58.6%)	229 (68.2%)
Yes	78 (29.3%)	29 (41.4%)	107 (31.8%)
Specific cSCC death			
No	263 (98.5%)	66 (93.0%)	329 (97.3%)
Yes	4 (1.5%)	5 (7.0%)	9 (2.7%)

Abbreviation: cSCC, cutaneous squamous cell carcinoma.

event. Deep margin was coded both independently and in conjunction with status of galea aponeurotica. In the latter case, patients with neither of these two factors were taken as reference category. Distinct models were constructed for each of these variables incorporating validated prognostic factors from prior studies. The sampling units in all analyses were the primary tumours; cluster-robust standard errors were used to allow for correlation between primary tumours in patients with more than one tumour. The cumulative incidence function of recurrence was plotted for all variables of interest. Two-tailed tests with significance set at $p < 0.05$ were employed in all statistical tests. The analyses were conducted in Stata/BE, version 18.0 (Stata-Corp LLC).

RESULTS

In total, 338 cSCCs from 295 patients (263 men and 32 women) with a median age at diagnosis of 82 years (interquartile range, 75–88 years) were included. The most common locations were the parietal (51%) and frontoparietal (22%) regions and the vertex (16%). In total, 27% of patients were immunosuppressed. The distribution of immunosuppressed patients was similar in both deep margin

groups (≥ 1 mm vs. < 1 mm). The distance to the deep margin after excision was ≥ 1 mm in 267 tumours and < 1 mm in 71. In the case of peripheral margins, the distance was ≥ 1 mm in 328 tumours and < 1 mm in 10. Most of the tumours were well or moderately differentiated, with no significant differences observed according to deep margin width. cSCCs with a deep histological margin < 1 mm were more likely to have a tumour diameter ≥ 2 cm (55% vs. 36% in the ≥ 1 mm group, $p = 0.006$); a deep invasion, defined as depth of invasion (DOI) ≥ 6 mm or invasion beyond the subcutaneous fat (49% vs. 26% in the ≥ 1 mm group, $p < 0.001$); and close (< 1 mm) peripheral margins (7% vs. 2% in the ≥ 1 mm group, $p = 0.038$). According to the Brigham and Women's Hospital (BWH) tumour staging system, 50% of the tumours were considered T1, 34% T2a, 18% T2b and 1% T3. Based on the eighth edition of the American Joint Committee on Cancer Staging Manual (AJCC8), 52% of the tumours were T1, 18% T2 and 30% T3. Using either of the staging systems (BWH and AJCC8), tumour stages associated with worse outcomes were more common in patients with a deep margin < 1 mm ($p < 0.001$ in both cases). Thirty-one tumours (9%) were treated with local adjuvant radiotherapy due to clinical and/or histological risk factors. While 7% of the patients in the ≥ 1 mm group were treated with adjuvant radiotherapy, 18% of the patients with deep histological margins < 1 mm received this treatment ($p < 0.001$). The demographic, clinical and histological characteristics in relation to deep margins are summarized in Table 1.

Median duration of follow-up within the 3-year window analysed was 31 months (95% CI 27–33 months). During this period, there were 30 recurrences of any type (9%): 18 local recurrences (5%), 9 regional recurrences (3%), 9 lymph node metastases (3%) and 2 lung metastases (0.6%). In total, 107 patients (32%) died during follow-up, 9 (3%) of them due to cSCC (Table 2). Median time to recurrence was 6.5 months, with 87% of tumours recurring in the first 2 years.

The presence of a deep histological margin < 1 mm was not associated with an increased cumulative incidence of recurrence (subhazard ratio [SHR] 1.96 [95% CI 0.87–4.41], $p = 0.103$). In contrast, tumours with peripheral margins < 1 mm exhibited an increased risk of recurrence (SHR 5.01 [95% CI 1.68–14.93], $p = 0.004$) (Figure 3). Immunosuppression (SHR 2.90 [95% CI 1.23–6.82], $p = 0.015$), a tumour diameter > 2 cm (SHR 3.79 [95% CI 1.56–9.21], $p = 0.003$) and perineural invasion (nerves > 0.1 mm in calibre) (SHR 4.70 [95% CI 2.13–10.34], $p < 0.001$) were also associated to worse outcomes (Table 3). As adjuvant radiotherapy treatment of some tumours may have decreased their risk of recurrence, this modality treatment was included in the Fine–Gray model. Besides, a sensitivity analysis excluding those patients treated with local adjuvant radiotherapy was also carried out, showing the same results.

When tumours were classified considering both deep margins and galeal invasion, an increased cumulative

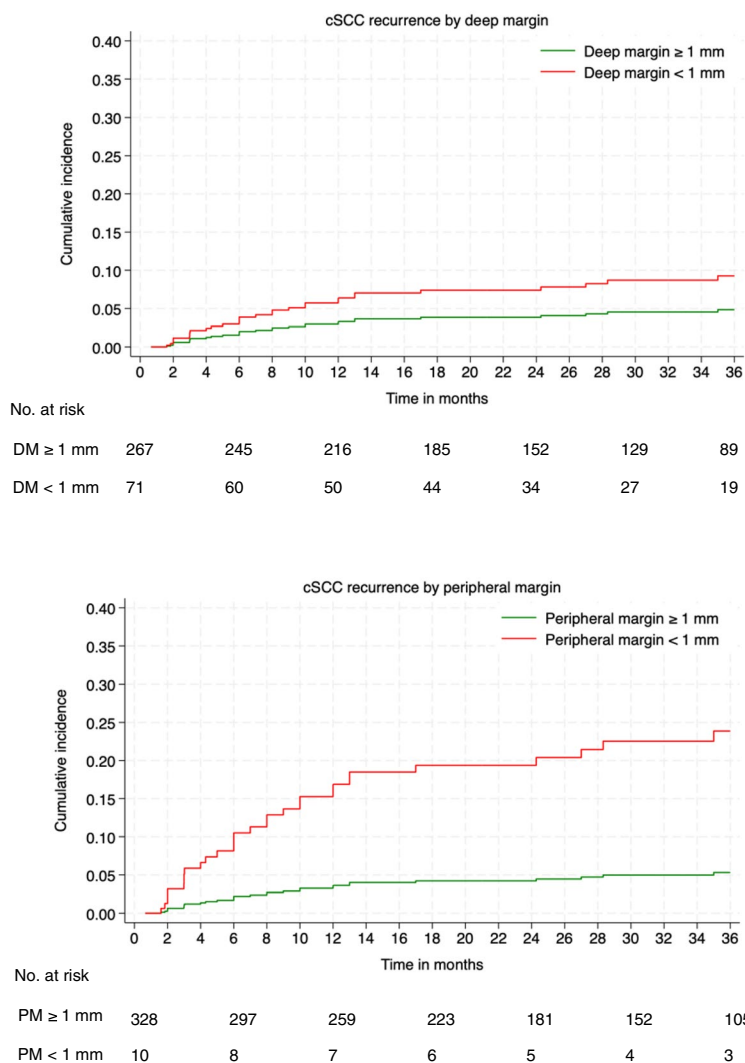


FIGURE 3 Risk of recurrence in cutaneous squamous cell carcinoma according to histological margins. Cumulative incidence functions for any type of recurrence according to histological deep and peripheral margins plotted after fitting Fine–Gray model 1 specified in Table 3.

incidence of recurrence was observed for those tumours presenting with galeal invasion and close deep margins, compared to those without these two factors (SHR 3.52 [95% CI 1.24–10.01], $p < 0.001$). However, tumours with galeal invasion but wider deep margins and tumours with close deep margins but without galeal invasion did not show higher risk of recurrence in comparison with those without either factor. The coefficients of the other variables were comparable to those of the previous model (Figure 4 and Table 3).

DISCUSSION

Just two retrospective studies have analysed the risk of recurrence in cSCCs of the scalp according to deep margin status. The first described a higher local recurrence rate in patients with close but clear deep margins (0.1–1.9 mm), but

no differences in regional recurrences ($N = 101$).³³ However, this study was purely descriptive and did not adjust for potential confounders. The second reported a higher percentage of involved and close deep margins in lesions excised to galea (33.8% vs. 22.5% for lesions excised to periosteum, odds ratio 2.74, $p = 0.004$), therefore recommending the regular inclusion of the galea when excising a scalp cSCC.³⁴

To our knowledge, the current study is the first to assess risk of recurrence in cSCCs excised from the scalp according to histological deep margin width taking into account other prognostic factors and death by other causes in a characteristically older population.

The risk of recurrence observed in our study (Table 2), although slightly lower, is consistent with previous reports of scalp cSCC,^{4,8,12,14,33} considering that patients with involved surgical margins and bone invasion were not included in this study. Immunosuppression, tumour diameter > 2 cm and perineural invasion were independently associated to an

TABLE 3 Competing risk analysis for recurrence: Multivariate analyses using the Fine–Gray model and SHR estimation.

Model 1: Classification according to deep margin ^{a,b}			Model 2: Classification according both to deep margin and status of galea aponeurotica ^{a,b}		
Variable	SHR (95% CI)	p Value	Variable	SHR (95% CI)	p Value
Age (years)	0.98 (0.95–1.01)	0.207	Age (years)	0.98 (0.95–1.01)	0.244
Female sex	2.08 (0.63–6.84)	0.228	Female sex	2.32 (0.69–7.84)	0.175
Immunosuppression	2.90 (1.23–6.82)	0.015	Immunosuppression	3.27 (1.26–8.50)	0.015
T diameter ≥2 cm	3.79 (1.56–9.21)	0.003	T diameter ≥2 cm	3.85 (1.59–9.33)	0.003
T deep invasion	1.53 (0.63–3.71)	0.348	T deep invasion	1.35 (0.49–3.74)	0.567
T perineural invasion	4.70 (2.13–10.34)	<0.001	T perineural invasion	4.59 (2.18–9.66)	<0.001
T poor differentiation	1.73 (0.69–4.36)	0.244	T poor differentiation	1.66 (0.66–4.16)	0.279
Adjuvant radiotherapy	0.40 (0.12–1.30)	0.127	Adjuvant radiotherapy	0.41 (0.14–1.24)	0.114
Peripheral margin <1 mm	5.01 (1.68–14.93)	0.004	Peripheral margin <1 mm	6.11 (1.85–20.11)	0.003
Deep margin <1 mm	1.96 (0.87–4.41)	0.103	Deep margin ≥1 mm with invasion of galea ^c	0.89 (0.15–5.26)	0.899
			Deep margin <1 mm without invasion of galea ^c	1.44 (0.48–4.30)	0.514
			Deep margin <1 mm with invasion of galea ^c	3.52 (1.24–10.01)	0.018

Abbreviations: SHRs, subhazard ratios; T, primary tumour.

^aIn the first model only distance to deep margin is considered for classification of deep margin status while in the second model, both distance to deep margin and galeal invasion are considered.

^bFor all binary variables, the absence of each characteristic was used as the reference category.

^cReference category: Deep margin ≥1 mm without invasion of galea.

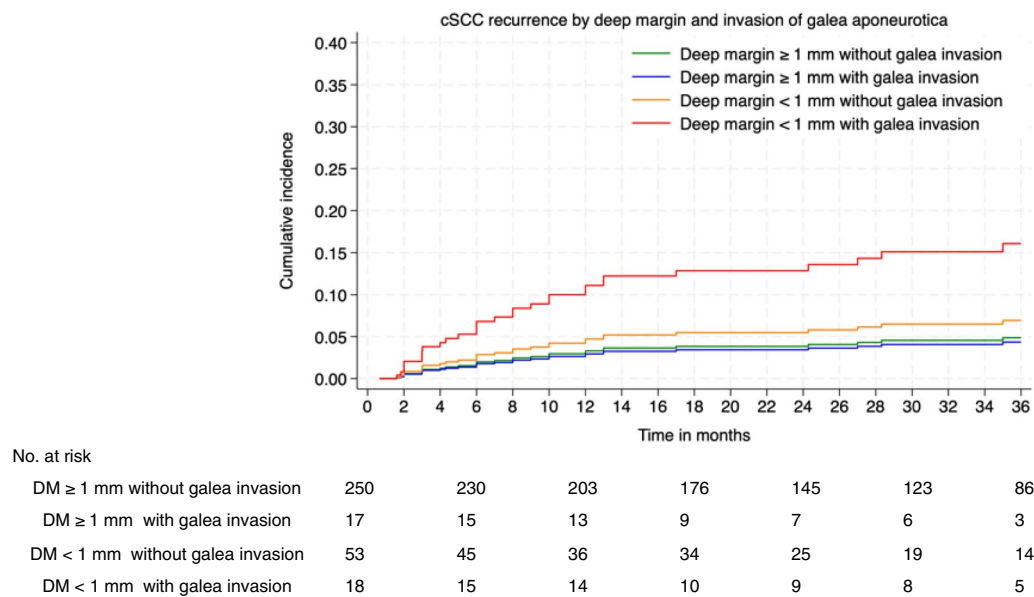


FIGURE 4 Risk of recurrence in cutaneous squamous cell carcinoma according to histological margins and galeal invasion status. Cumulative incidence function for any type of recurrence according to histological deep margin and galeal invasion plotted after fitting Fine–Gray model 2 specified in Table 3.

increased risk of recurrence, as had been described in previous reports.^{2–4,8,9,14,15} Contrary to what we might expect, we did not observe a protective effect of adjuvant radiotherapy against recurrence, which could be explained by the small number of tumours that were treated with this therapeutic modality.

Unlike previous studies,^{27,33,34} we did not find that a close deep margin was an independent risk factor of recurrence in scalp cSCC. Considering that the frequency of poor prognostic factors was higher in tumours with a deep margin <1 mm, we believe that the association between deep margin width and an increased risk of recurrence

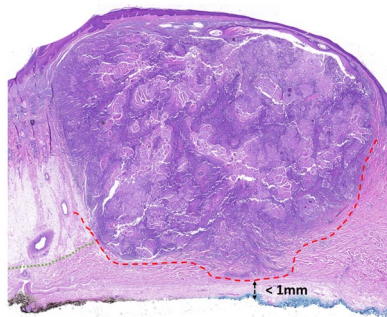


FIGURE 5 Cutaneous squamous cell carcinoma with galeal invasion and a deep margin < 1 mm. Haematoxylin and eosin staining, 15 \times . Histological findings in a cutaneous squamous cell carcinoma of the scalp. Note the invasive nature of the tumour (dotted red line) with galeal invasion (dotted green line) and a histological deep margin < 1 mm.

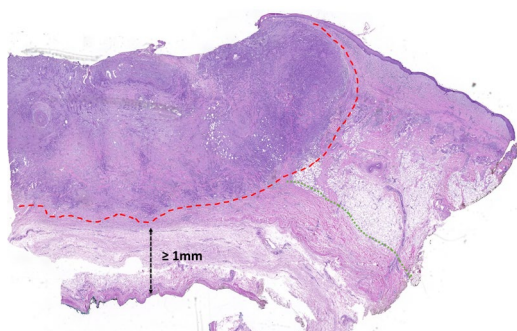


FIGURE 6 Cutaneous squamous cell carcinoma with galeal invasion and a deep margin ≥ 1 mm. Haematoxylin and eosin staining, 20 \times . Histological findings in a cutaneous squamous cell carcinoma of the scalp. Note the invasive nature of the tumour (dotted red line) with galeal invasion (dotted green line) and a histological deep margin ≥ 1 mm.

described in previous reports may be explained by the presence of confounding factors. Thus, we believe that tumours with involved and close deep margins should not be grouped together as far as their recurrence risk is different.

Another notable finding in our study is the increased risk of recurrence associated with close histological peripheral margins. We hypothesize that tumours with close peripheral margins may be more likely to recur than those with close deep margins because they do not benefit from the protective effects of the galea, which, with its tougher consistency, might act as an anatomic barrier, preventing from the vertical growth.^{30–32}

It is noteworthy that invasion of galea aponeurotica was associated with a higher risk of recurrence in tumours with deep margin < 1 mm (Figure 5) but not in those with a deep margin ≥ 1 mm (Figure 6). No differences in recurrence risk, however, were observed in tumours without evident galeal invasion, regardless of deep margin width. These findings are in favour of our hypothesis that the galea could act as a protective barrier, as tumours with a close deep margin that had breached this layer were more likely to recur.

Based on these findings and in agreement with Brewer et al.,³⁴ we consider that surgical excision of cSCC of the scalp should include the galea to increase the likelihood of complete clearance. Such an approach would also enable assessment of the entire tumour, help in detecting galeal invasion and in the event of detection, adjust a proper management.

Limitations and external validity

This study has some limitations that result from its retrospective design, based on the review of medical records and pathology reports. Thus, a complete galea aponeurotica excision cannot be guaranteed in all cases, as these data are not collected in all medical records. Because the cases were selected from the pathology registry of the participating hospitals, some tumours may have been missed because of coding errors. In addition, our results are derived from the inclusion of tumours removed with WLE instead of Mohs micrographic surgery (MMS), in which complete peripheral and deep margins are assessed. Therefore, they might differ from those obtained in areas where MMS is the standard of care. Moreover, the distance of the tumour to the peripheral and deep histological margins cannot be evaluated in MMS due to its technical idiosyncrasy. Finally, it should be noted the small number of recurrences observed in our study, what might be explained in part by the fact that patients with involved surgical margins and bone invasion were not included in this study. The median duration of follow-up was 31 months. However, it should be noted that most cSCC recurrences appear during the first 2 years after diagnosis, and that scalp cSCC affects a characteristically old population with a non-negligible rate of deaths of other causes.

CONCLUSIONS

A deep margin < 1 mm is not associated with an increased risk of recurrence in cSCCs excised from the scalp as long as it is clear and the excision includes the galea, which might act as an anatomic barrier. Surgical excision of cSCCs of the scalp should include the galea to enable complete assessment of the excised tumour and avoid complications. These results may not be extrapolated to cSCCs from other locations, which do not share the particular anatomical characteristics of the scalp.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on reasonable request to the corresponding author. The data are not publicly available due to privacy or ethical restrictions.


ETHICS STATEMENT

Not applicable.

ETHICS APPROVAL

The present study was conducted in accordance with the Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects. The present study was reviewed and approved by the Hospital Universitari Germans Trias i Pujol Clinical Research Ethics Committee (REF. CEI: PI-23-034).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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