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Original Article

Cutaneous Squamous Cell Carcinoma in Very Elderly Patients: An Observational Analysis From 90 Years of Age Onward

Carcinoma escamoso cutáneo en pacientes de edad muy avanzada: análisis observacional a partir de los 90 años

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ABSTRACT

Background: Although the incidence rate of cutaneous squamous cell carcinoma (cSCC) increases with age, there is limited information on the comprehensive evaluation of very elderly patients. This study aimed to describe the clinicopathological characteristics of patients aged ≥ 90 years with cSCC and to review the available literature.
Materials and methods: We conducted a retrospective study of patients aged ≥ 90 years with histologically confirmed cSCC, evaluated from 2020 to 2024 by a multidisciplinary committee in a tertiary referral center. Frailty was determined through comprehensive geriatric assessment.
Results: A total of 29 patients were included (mean age, 94.4 years). The median diagnostic delay was 4 months (IQR, 3–12), and follow-up was 12.5 months (IQR, 6–15). During follow-up, 51.7% of patients died. A total of 69% were categorized as Frailty Group 3. A total of 95.7% met high-risk cSCC criteria. Initial surgical treatment was performed in 86.2%; radiotherapy was the adjuvant therapy in 10.3% and palliative care in 13.7%. The recurrence rate was 13.8%. A total of 39.4% were taking medications associated with cSCC development, particularly antihypertensives. The 12-month survival probability was 63.6%.
Conclusions: Patients aged ≥ 90 years with cSCC showed relatively favorable survival. Despite the conservative approach often adopted in this age group, based on presumed therapeutic inadequacy due to age and comorbidities, our findings and the available literature support a proactive therapeutic approach. This should be based on multidisciplinary and individualized assessment.

Introduction

Skin cancer has experienced a significant increase in incidence rate, mainly as a result of prolonged sun exposure throughout life in an increasingly aging global population. In the geriatric population, the prevalence of skin cancer has been estimated between 2.1% and 12%, depending on the cohort analyzed due to the different study designs published.[1] In Spain, a meta-analysis[2] estimated an incidence rate of 38.16 cases of cutaneous squamous cell carcinoma (cSCC) per 100,000 person-years. The incidence rate of cSCC increases dramatically with age, as cumulative sun exposure is the main risk factor.[3,4]

However, data on the influence of dependency, malnutrition, cognitive impairment, and other aspects of frailty syndrome have not been systematically reported in epidemiological and clinical studies on skin cancer in the elderly population. There is also insufficient literature available on oncogeriatric evaluation, representing an important gap, especially in frail elderly patients. Therefore, addressing these aspects is essential to improve care and therapeutic outcomes in this population.

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Endpoints

The primary endpoint of the study was to describe the clinicopathological characteristics of patients aged ≥ 90 years diagnosed with cSCC in a tertiary referral center and review the available literature in this age group.

Materials and methods

We retrospectively and systematically reviewed the health records of patients evaluated by a multidisciplinary advanced skin cancer committee at *Hospital Universitario Germans Trias i Pujol* (Barcelona, Spain). All patients aged ≥ 90 years with histologically confirmed cSCC whose cases were presented to the committee due to complexity between January 2020 and April 2024 were included. This committee consists of specialists in Dermatology, Plastic Surgery, Medical Oncology, Radiation Oncology, and Geriatrics.

Tumors were staged using the TNM system according to the 8th edition of the American Joint Committee on Cancer. In patients with synchronous cSCC lesions, the main lesion was defined as the one with the most advanced stage according to TNM classification, and only this lesion was described. High-risk cutaneous squamous cell carcinoma (HR-cSCC) was defined as cases with any of the following characteristics: maximum tumor diameter > 2 cm, depth of invasion > 6 mm, lymphovascular invasion, perineural invasion (≥1 mm), invasion of subcutaneous fat, desmoplastic or adenosquamous histological type, poorly differentiated histological grade, immunosuppression status, high-risk location (auricle or lip), or recurrent tumor (current recurrence).[5]

The degree of frailty was determined through comprehensive geriatric assessment, performed in all cases by the same oncogeriatric team. Patients were categorized into 4 frailty groups according to criteria established by the International Society of Geriatric Oncology, described in the Appendix. No initial frailty screening was performed, as advanced age (≥85 years) is considered a sufficient criterion for potential frailty. In this context, all patients were considered candidates for comprehensive oncogeriatric assessment.

This study fully complied with the ethical principles outlined in the Declaration of Helsinki (Fortaleza, 2013) and was approved by the Research Ethics Committee of *Hospital Universitario Germans Trias i Pujol*.

Data were expressed as absolute numbers and percentages for discrete variables, and as medians and interquartile ranges (IQR) for continuous variables with asymmetric distribution. Results were presented with one decimal when necessary. Follow-up time distribution was illustrated using a box plot, and survival probability was estimated graphically using the Kaplan–Meier method. All analyses were performed using STATA version 17.0 (StataCorp. 2021. Stata Statistical Software: Release 17).

Results

The study included a total of 29 patients (Table 1) with a corrected mean age of 94.4 years (SD, 3). Of these, 16 were men (55.2%) and 13 women (44.8%). A total of 8 patients (27.6%) had a prior history of cSCC.

The median diagnostic delay was 4 months, with an IQR, of 3 to 12 months. The median follow-up time for all patients was 12 months, with an IQR, ranging from 6 to 19 months (Fig. 1). When analyzed by censoring status (death), patients who did not experience the event of interest (censored) had a median follow-up of 12.5 months, with an IQR, between 6 and 15 months. Regarding mortality, 15 patients (51.7%) died during the study follow-up period, with only two cases probably related to cSCC.

Patient distribution across frailty groups was as follows: 3.5% belonged to Group #1, 24.1% to Group #2, 69% to Group #3, and 3.5% to Group #4.

Table 1
General baseline characteristics of the cohort.

Baseline characteristics	
Mean age (SD), years	94.4 (3)
Male sex, *n* (%)	16 (55.2%)
Female sex, *n* (%)	13 (44.8%)
Past medical history of cSCC, *n* (%)	8 (27.6%)
Diagnostic delay, median (IQR), months	4 (3–12)
Total patient follow-up, median (IQR), months	12 (6–19)
Follow-up of censored patients, median (IQR), months	12.5 (6–15)
Mortality during follow-up, *n* (%)	15 (51.7%)
SIOG frailty group 1–4, *n* (%)	1 (3.5%), 7 (24.1%), 20 (69%), 1 (3.5%)

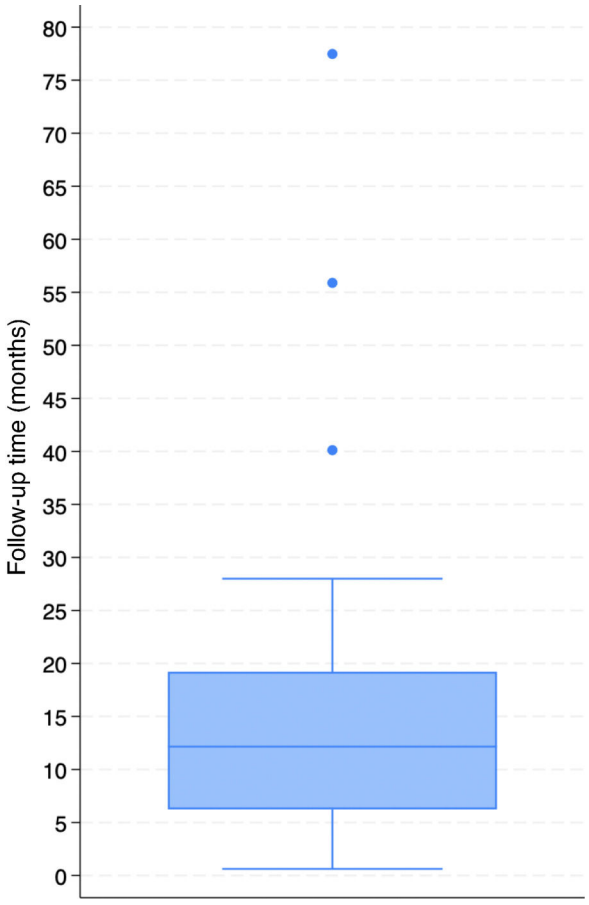

Fig. 1. Box plot of follow-up time.

Tumor location and histological data are summarized in Tables 2 and 3.

Of 23 evaluable cases, 22 patients (95.7%) met criteria for HR-cSCC. Regarding tumor staging, among the 21 evaluable cases, 33.3% were stage T1, 28.6% stage T2, 33.3% stage T3, and 4.8% stage T4.

Regarding treatments, 86.2% of patients initially underwent surgery by conventional excision with margins; only 3 patients had surgery with hygienic/palliative intent. A second surgery was performed in 3 cases for margin extension due to close (≤1 mm) or involved margins, while reintervention was ruled out in 2 cases. Radiotherapy was administered as adjuvant treatment in 10.3% of cases and as palliative treatment in 13.7%; in 31% of cases, radiotherapy was indicated but not performed

Table 2
Tumor location.

Tumor location	*N* (%)
Scalp	10/29 (34.4%)
Malar region	4/29 (13.8%)
Frontal region	4/29 (13.8%)
Temple	2/29 (6.9%)
Lip	2/29 (6.9%)
Periocular	2/29 (6.9%)
Preauricular	1/29 (3.4%)
Auricle	1/29 (3.4%)
Retroauricular	1/29 (3.4%)
Nail unit	1/29 (3.4%)

Table 3
Summary of histological characteristics.

Histological characteristics	
Mean maximum tumor diameter, centimeters (SD)	1.97 (1.12)
Mean depth of invasion, millimeters (SD)	4.15 (2.12)
Mean maximum tumor thickness, millimeters (SD)	6.27 (3.53)
Histological type	
Conventional (%)	21/27 (77.8)
Acantholytic (%)	3/27 (11.1)
Basaloid (%)	1/27 (3.7)
Clear cell (%)	1/27 (3.7)
Spindle cell (%)	1/27 (3.7)
Histological differentiation	
Well or moderately differentiated (%)	23/27 (85.2)
Poorly differentiated (%)	4/27 (14.8)
Lymphatic invasion	
No (%)	23/24 (95.8)
Yes (%)	1/24 (4.2)
Vascular invasion	
No (%)	22/24 (91.7)
Yes (%)	2/24 (8.3)
Perineural invasion	
No (%)	18/24 (75)
Yes (%)	6/24 (25)
Subcutaneous tissue invasion	
No (%)	4/11 (36.4)
Yes (%)	7/11 (63.6)

(due to patient and/or family decision, prior irradiation, or comorbidity). Lymphadenectomy was performed in only 1 case (3.4%) and ruled out in another due to comorbidity. No cases were candidates for systemic treatment.

A total of 20.7% of cases had a synchronous diagnosis of another cSCC at a different location. Only 2 cases in the series were recurrences of previous cSCC. Subsequent recurrence was observed in 13.8% of patients. During follow-up, no new cSCC occurred at other locations.

Regarding the use of drugs associated with cSCC development,[6–8] 39.4% of patients were taking at least 1 associated drug. The most frequent drugs were hydrochlorothiazide (14.3%), enalapril (14.3%), and ramipril (7.1%).

In our series, no patients with defined immunosuppression were identified. However, 3 patients had neoplastic/hematological conditions without active oncologic treatment, potentially associated with some degree of immune dysfunction.

Survival analysis (Fig. 2) showed a >12-month probability of survival of 63.66%.

Discussion

Literature on non-melanoma skin cancer in patients > 90 years is scarce, with a predominant focus on the therapeutic management of basal cell carcinoma. One of the main limitations of available studies is the lack of consensus on the definition of the elderly population, which complicates the performance of systematic reviews. Most available studies focus on patients aged 65 or >75 years, leaving a gap in information for more advanced ages.

In 2004, a study conducted at *Hospital General de Alicante*[9] (Alicante, Spain) included 20 cases of cSCC in patients > 90 years, mainly located in the malar region (40%). Patients had a mean of 1.5 medical comorbidities and were taking a mean of 2.3 regular drugs. According to the authors, this finding could be attributed to a selection bias toward relatively healthy patients who had exceeded average life expectancy. Regarding treatments, excision was the most frequent procedure (66.6% of cases). These findings are consistent with a previous study[10] that evaluated the safety of Mohs micrographic surgery in patients in this age group.

More recently, a single-center observational study conducted in Italy[11] between 2012 and 2021 included 70 patients aged > 95 years diagnosed with cSCC. The study focused mainly on treatments administered: radiotherapy in 42.9%, surgery in 18.6%, combined treatments in 8.5%, and 8.5% of patients died before initiating any treatment. The conclusions of this study indicated that advanced age, per se, should not be considered an absolute or relative contraindication to therapeutic intervention in patients with cSCC.

In the literature review by Leus et al.,[12] surgery is highlighted as the gold standard for the treatment of cSCC in elderly patients, as it is generally well tolerated and safe. These patients often present with larger tumors, leading to larger surgical defects. Surgical treatment was the initial strategy in most cases in our series (86.2%).

In a more recent review,[13] surgery is reaffirmed as the treatment of choice, while active monitorization is reserved for very frail patients with low-risk tumors. Radiotherapy, particularly in its hypofractionated modality, is presented as a viable alternative, offering good tolerance and adherence in this group of patients. On the other hand, although techniques such as curettage and cryotherapy are options for patients unfit for surgery, they show variable recurrence rates. In addition, intralesional methotrexate and 5-fluorouracil, along with other agents,[14] may be used as neoadjuvant treatment to reduce tumor size before surgery or as primary therapy in small lesions.

However, it is essential to adopt an individualized approach, balancing the benefits of active treatment with symptom control, and always considering patient preferences, functional independence, and quality of life. In frail patients, high cure rates should not be the sole determining factor in treatment selection, as many may prefer to avoid invasive procedures in the last years of life. Furthermore, cognitive assessment is essential to ensure that the patient has the capacity to understand information and make informed treatment decisions.[15]

Regarding the relationship between age and prognostic factors in cSCC, available data[16] focus only on head and neck cSCC in patients aged > 75 years. These patients present larger tumor diameter, greater depth of invasion, and poorer differentiation vs younger patients. Moreover, these risk factors are considered independent predictors of carcinoma progression.

Aspects of frailty syndrome have also not been extensively addressed in the existing literature, which has predominantly focused on individuals younger than 75 years. Our study provides particular value by focusing on an underrepresented population, as most patients (68.97%) presented a significant degree of frailty (SIOG 3). A study[17] including 77 patients showed that frail patients had a significantly higher proportion of high-risk cSCC. Additionally, this study observed a deviation from guidelines toward less aggressive treatments in frail patients, without affecting short-term outcomes or quality of life. In our study, 95.7%

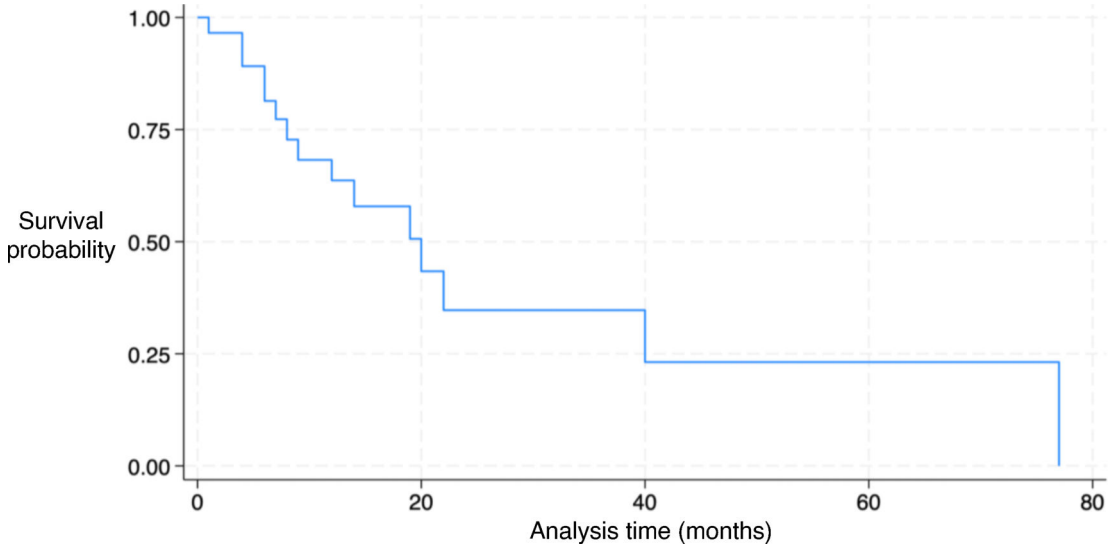

Fig. 2. Kaplan–Meier survival analysis.

of evaluable cases met criteria for HR-cSCC, highlighting the potential aggressiveness of the disease in this population.

Regarding potential pharmacological influence, 39.4% of patients were on drugs previously associated with the development of cSCC, mainly antihypertensives. This finding underscores the importance of reviewing polypharmacy, one of the key interventions implemented by the oncogeriatric team. First, all patients underwent comprehensive oncogeriatric assessment, as previously described. Subsequently, personalized geriatric interventions were carried out, including strategies such as nutritional optimization and home-based rehabilitation, among others, with the aim of significantly improving clinical outcomes.

Survival analysis in our study showed a >12-month probability of survival of 63.66%. However, these results may be influenced by outliers, such as one patient who survived 77 months, significantly longer than the rest of the cohort. This observation suggests a potential survival bias, as such extreme longevity may distort the estimation of median survival.

Nevertheless, the median follow-up in our study was 12.5 months, providing a robust measure of central tendency even in the presence of outliers. These data therefore indicate relatively favorable survival in this cohort, a significant finding that underscores the need to reconsider traditional assumptions regarding prognosis in this age group.

This study has several limitations inherent to its retrospective observational design, which should be considered when interpreting the results, as it does not allow causal inference but only the identification of associations. As a single-center study with a relatively small sample size, focused on patients evaluated in specialized dermatologic care and presented to a multidisciplinary complex skin cancer committee, there is a potential selection bias and limited representativeness of the general population of nonagenarian patients with cSCC, which may affect the robustness and precision of the conclusions.

Conclusions

This study provides a detailed overview of clinicopathological variables in patients aged ≥ 90 years with cSCC, a population underreported in the medical literature. The data obtained suggest that these patients have relatively favorable survival, which is a notable finding and highlights the need to reassess traditional assumptions regarding prognosis in this age group.

Historically, the treatment of skin tumors in elderly individuals has often relied on a watchful waiting approach, based on the premise that these patients would not be suitable for surgery due to their general condition, comorbidities, and limited life expectancy. However, our findings, supported by the literature review, suggest the need to adopt a more tailored and proactive approach. Available treatments have proven to be safe and effective, reinforcing the need to reevaluate traditional strategies to provide more appropriate care in this population. Advanced age alone should not be an exclusion criterion for treating cSCC. In this context, the integration of oncogeriatrics is key to optimizing evaluation and therapeutic management, adapting them to the functional status of each patient.

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Conflicts of interest

None declared.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.ad.2026.104662.

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