Basal cell carcinoma secondary to trauma: A 3-year experience of the single center

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Abstract

Background. Basal cell carcinoma (BCC) is the most frequent cancer worldwide in humans. The risk factors reported in the literature encompass excessive sun exposure, genetic predisposition, irradiation, exposure to arsenic, and trauma. The exact role of trauma in the etiology of BCC remains unexplained.

Objectives. To analyze patients with BCC treated surgically in the Dermatosurgery Unit, looking for possible cases of BCC secondary to trauma.

Material and methods. We performed a retrospective review all of treated BCCs in the Dermatosurgery Unit between January 2017 and June 2020.

Results. Among 1,832 patients with BCC, 5 (0.27%) tumors had a positive history of previous trauma. Many different types of injuries have been associated with oncogenesis in the area of the scar. The clinical presentations of lesions varied between the patients.

Conclusions. It is worth to underline that BCC may be located in the area of post-traumatic scar; however, the incidence seems to be lower comparing to reported previously (7.3–13%). This article illustrates the importance of exclusion malignancy in every non-healing lesion. A neoplasm may be difficult to differentiate from infection or local ischemia in the area of the scar. Prudent management of all clinically unclear lesions should include a biopsy.

Key words: trauma, basal cell carcinoma, SCAR

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Introduction

Basal cell carcinoma (BCC) is the most commonly occurring cancer in humans.[1] It is characterized by a slow growth rate and local malignancy. The etiology of BCC evolution is multifactorial. Both genetic and environmental factors, as well as immunological factors, influence the development of BCC. Excessive ultraviolet (UV) light exposure is the most significant carcinogen.[2]

It has been suggested that intense sun exposure during childhood and adolescence may be especially important for establishing adult risk for BCC. Additional risk factors for BCC include ionizing radiation, polycyclic aromatic hydrocarbons, arsenic exposure, and chronic immunosuppression.[2] Previous skin trauma has been also suggested as a predisposing factor.[2,3] However, the exact underlying mechanism leading to BCC formation within scars still remains unclear.[1,3] The aim of this study was to analyze patients with BCC treated surgically in the Dermatosurgery Unit looking for possible cases of BCC secondary to trauma.

Material and methods

We performed a retrospective review of all excised and histologically confirmed BCCs in the Dermatosurgery Unit between January 2017 and June 2020. Medical records of these patients were evaluated for the presence of patients with BCC secondary to injury. The analysis revealed 5 cases of post-traumatic tumor. For each patient, the following data were extracted through manual search of medical charts: age of patients at the time of treatment, location of each lesion, tumor size, clinical presentation of the lesion, lesion growth, time interval between the trauma and the development of BCC, type of the previous injury, and postsurgical defect reconstruction method.

Results

Among 1,832 treated patients with BCC, 5 (0.27%) tumors had a positive history of previous trauma. Four out of our 5 patients were males and 1 patient was a female (Table 1). Their average age was 61.2 ±16.8 years. The scars were located on the face, upper limb and foot. Various types of previous injuries in our patients have been observed: physical tearing of the tissue due to a traffic accident, burn, ulceration secondary to venous insufficiency, and even repeated trauma due to blood donation. None of these 5 wounds were originally closed surgically. The period of time from injury to tumor formation ranged between 5 and over 50 years. Different clinical manifestations of BCCs were found in our study group (Fig. 1,2). Two lesions had typical pearl-like borders. The remaining ones presented with sharply demarcated, irregular borders. The time from the onset of the first symptoms noticed by patients until the establishment of proper diagnosis varied from 1 to 4 years (with the median value of 3 years). Concerning the lifestyle habits, all patients were non-smokers, with average sun-exposure during the lifetime. One of the patients had concomitant diseases:

Table 1. Demographic and clinical details of patients with BCC secondary to trauma

Case No.	Age [years]	Sex	Site of BCC	Dimensions of BCC [mm]	Clinical presentation of the lesion	Lesion (BCC) growth [years]	Type of previous injury	Interval between trauma and development of BCC	Type of surgical procedure
1.	59	male	right antecubital fossa	20 × 20	red solid nodule with teleangiectasia	4	microinjuries caused by repeated blood donation	15 years of blood donation	cut-and-taple
2.	64	male	forehead	30 × 40	pearly pink lesion with rolled borders, multiple small ulcerations and telangiectasia	3	traffic accident	childhood (50 years)	full thickness graft from the right supraclavicular area
3.	86	male	dorsal surface of left foot	10 × 15	ulcerated lesion with crust on the top	1	previous ulceration due to trauma, diabetes and venous insufficiency	5 years	full thickness graft from the right tight
4.	58	female	right temple	20 × 20	depressed scariform plaque with sharply demarcated, irregular borders	2	traffic accident	20 years	cut-and-staple
5.	39	male	left arm	94 × 87	brightly erythematous lesion with slightly elevated rolled border, multiple small surface erosions and gentle scaling	3	boiling water burn	childhood (32 years)	cut-and-staple

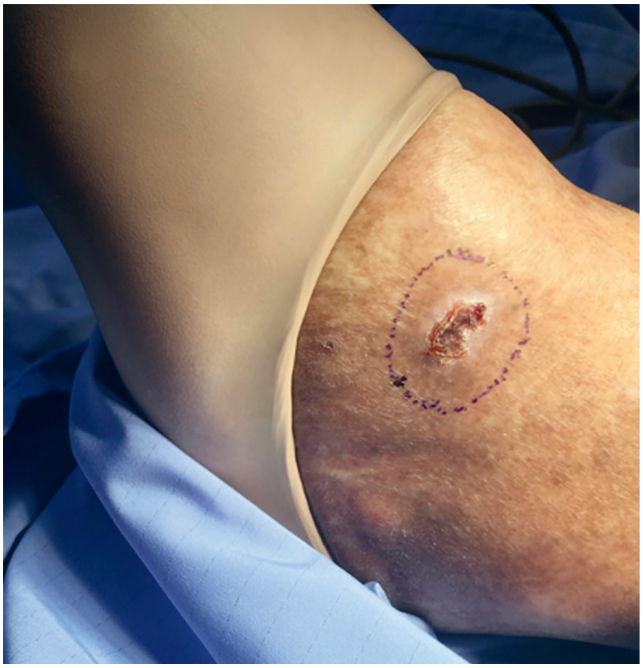

Fig. 1. Patient No. 3

BCC secondary to trauma presenting as ulcerated lesion with crust on the top.

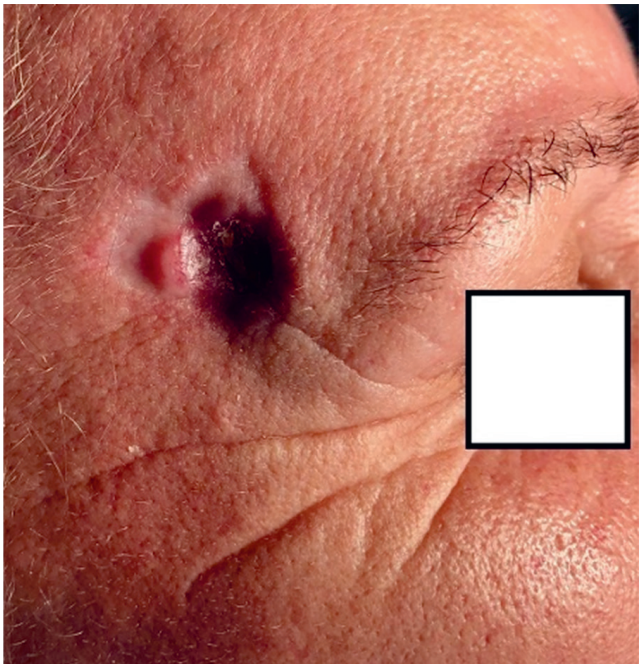

Fig. 2. Patient No. 4

BCC secondary to trauma presenting as depressed plaque with sharply demarcated, irregular borders.

hypertension and type 2 diabetes mellitus. There was no history of long-term usage of the drugs in the analyzed group of patients. The details of all the patients are given in Table 1.

Discussion

Excessive sun exposure is a major factor contributing to the development of BCC. The non-ultraviolet factors reported in the literature include genetic predisposition, irradiation, exposure to arsenic, and trauma.[1,3] A relationship between BCC and various types of trauma has been reported in analyzed published case reports: surgical incisions, sharp or blunt injuries, deep abrasions, puncture injuries, burns, and those caused by chickenpox or vaccination.[4–9]

The underlying pathomechanism of BCC secondary to trauma is still unexplained. Nevertheless, several theories have been proposed. Chronic irritation and misplacement of epithelial cells have been suggested to promote tumor growth.[5,10] Moreover, the imbalance of cytokines and growth factors in initiation of carcinogenesis in scar tissue has been theorized.[11]

To the best of our knowledge, only 2 retrospective studies of previous trauma as possible etiologic factor in BCC were conducted. Noodleman et al. presented the results of the retrospective analysis of 1,774 BCC patients.[3] A history about previous injury was positive in 7.3% of the lesions. Özyazgan et al. analyzed 92 BCC cases and found that 13% of lesions were preceded by an earlier injury.[1] The abovementioned studies suggest that trauma may be a fairly common risk factor of BCC. However, there are only few publications focused on particular cases of post-traumatic BCC. Our study seems to be one of the largest case series of BCC developed in the area of scar.

Trauma-related BCC was more frequently seen in men and younger patients.[3] In our study, the average age was 61.2 ±16.8 years, while the average age of all our patients with BCC, treated at the same time period (last 3 years) was 70.5 ±13.7 years (unpublished data). This may suggest the younger age of trauma-related BCC occurrence. Wound healing by secondary intention has been mentioned as the most important etiological factor. In the series of cases reported by Ünverdi et al. each BCC developed from a wound which had healed with secondary intention.[5] Morpheaform BCC was detected more frequently in patients with a previous injury than in the other patients. It was proven that BCCs arising in scars do not present more aggressive biological behavior.[1]

Conclusions

In conclusion, it is worth underlining that BCC may be located in the area of post-traumatic scar. The clinical manifestation of those tumors varies between the patients. Increased surveillance of chronic wounds is very important. Their impaired healing seems to be a major risk factor for trauma-related BCC. Patients may postpone their visit to a specialist if they relate the appearance of the lesion with primary injury. For that reason, they should be alert to any new changes of the scar.

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