BURN SCAR NEOPLASM

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SUMMARY. Marjolin’s ulcer is a rare and aggressive cutaneous malignancy that occurs in previously traumatized and chronically inflamed skin, especially after burns. The majority of burn scar carcinomas are seen after a lag period in burns that were not grafted following injury. Between 2000 and 2006, 48 patients with Marjolin’s ulcer were treated in our centre (Sulaimani Teaching Hospital and Emergency Hospital). All the lesions were secondary to burns from various causes. The medical records of these 48 patients were reviewed prospectively. The mean age at tumour diagnosis was 40 yr and the ratio of male to female was 2:1 (67% males and 33% female). Upon histological examination, all the cases were diagnosed as well-differentiated squamous cell carcinoma. The scalp was most frequently affected (16 patients = 33.3%), followed by the lower limb (14 patients = 29.1%). Treatment of the neoplasm consisted of excision and grafting in 36 patients (75.0%), excision and reconstruction with flaps in eight patients (16.6%), and amputation in three patients (6.2%). A chemotherapy combination of the above treatments was used in two patients (4.1%). Local recurrence was noted in 16 patients (33.3%) out of the 48, and all died from these recurrences.

Introduction

Marjolin’s ulcer is a malignant skin tumour that occurs in various forms of scars, chronic ulcerations, inflammations, and fistulas but mainly on burn scars after a long latent period.1 The relation between malignant degeneration and thermal burn scars is known to have been first defined by Celsus in the first century A.D. The condition is named after the French surgeon Jean-Nicholas Marjolin, who demonstrated the cellular changes of ulcerated lesions in scar tissue in 1828, although Dupuytren also reported on malignant degeneration in 1839.2

The majority of burn scar carcinomas occur after a lag period in burns that were not grafted following injury.3 The incidence of malignant skin tumours in scar tissue is 0.1-2.5%, with squamous cell carcinoma constituting the majority of cases.4

In our region of Iraq, because of the poor facilities for burn patient management in the past, most burn patients did not receive skin grafts following their burn injury, and either ointments or powders were applied prescribed by a physician or used as a home remedy.

Patients and method

Between 2000-2006, 48 patients with Marjolin’s ulcer were treated in our Centre (Sulaimani Teaching Hospital and Emergency Hospital). All the lesions were secondary to burns from various causes. The medical records of these 48 patients were reviewed.

Prospectively, the patients were evaluated according to age, sex, body part affected, tumour diagnosis, patient age at the time of burn injury, the latency period between the burn injury and tumour diagnosis, treatment of burn injury, the period of time between tumour appearance and presentation for treatment, and the size of the tumour.

Our treatment regime consisted of a combined approach with aggressive surgery for treatment of Marjolin’s ulcer, excision with safe margins, lymphatic dissection, chemotherapy (radiotherapy is not available in our region), and amputation if needed. During chemotherapy treatment we worked together with the oncology clinic.

Results

The patients’ mean age at tumour diagnosis was 40 yr, and the male-female ratio was 2:1 (67% male and 33% female) (Fig. 1).

Fig. 1 - Age and sex distribution among the burn scar neoplasm patients.
The patients’ mean age at the time of burn was 10 yr (Fig. 2). The latency period was 30 yr.

On histological examination, all of the cases were diagnosed as well-differentiated squamous cell carcinoma.

The causes of the burns were flame in 38 patients (79.1%) (Fig. 3).

The scalp was the most frequently affected body part (16 patients = 33.3%), followed by the lower limb (14 patients = 29.1%) (Fig. 4).

Treatment of the neoplasm consisted of excision and grafting in 36 patients (75.0%), excision and reconstruction with in eight patients (16.6%), and amputation in three patients (6.2%).

A chemotherapy combination of the above treatments was given in two patients (4.1%) (Fig. 5).

Local recurrence was noted in 16 out of the 48 patients (33.3%), all of whom died from these recurrences.

Marjolin’s ulcer is a rare and aggressive cutaneous malignancy, which arises in previously traumatized and chronically inflamed skin, especially after burns.

All burn scar carcinomas in our study were of the squamous cell type; however, basal cell carcinoma, adenocarcinoma, melanoma, malignant fibrous histiocytoma, adenoacanthoma, liposarcoma, and osteogenic sarcoma have also been reported. The majority of burn scar carcinomas occur after a lag period in ungrafted full-thickness burns. Large full-thickness burns should therefore be managed surgically and not allowed to heal by second intention. None of the patients in this series had any history of grafting.

The average age onset is in the fifth decade of life, with a range of 8-84 yr. Males have a greater tendency toward burn scar carcinoma. In our patients, the male/female ratio was 2:1 and the patients’ age ranged from 16 to 79 yr.

Burn scar cancer is typically seen on the lower extremities (43.7%), upper extremities (22.4%), trunk (11.5%), and head (22.4%). The lesions of our patients varied according to their anatomic location and a high percentage was seen in the scalp (Fig. 6) owing to treatment of scalp fungal infection in the past by cauterization of the skin. In general, tumours located on the head, neck, and upper extremities have a far better prognosis than those on the trunk and lower extremities.
The signs and symptoms associated with the development of the carcinoma include a change in the scar with formation of a mass or ulcer, possibly with an increase in pain, increasing discharge, foul odour, and bleeding. Aggressive excision and reconstruction are warranted in these highly malignant squamous carcinomas. A wide excision should be performed with 3 to 4 cm of normal skin and the muscle fascia should be included (Figs. 7a, b). Performing the excision with cautery is said to be safer as it can prevent metastasis by preventing tumour cells from seeding into the blood and the lymphatic system.

Amputation is recommended for lesions that have entered joint cavities and metastasized to bone tissue in the extremities (Fig. 8). Lymph node dissection is recommended in cases with only clinically palpable lymphadenopathies.

The regional relapse rate after surgical excision was very high (58% of all patients). The ratio of recurrence in patients on whom we operated was 33%. Survival rates for this kind of tumour are reported as 52%, 34%, and 23% at respectively 5, 10, and 20 yr.

The precise pathogenesis of burn scar carcinoma is not known. Early theories suggested that cellular mutations as a result of toxin release by damaged, ischaemic, and nutritional-deficient tissue were responsible for the neoplastic change. Neuman et al. suggested that traumatic displacement of living epithelial tissue into the dermis might cause a foreign body response and lead to a deranged regenerative process resulting in carcinomatous change.

More recently, a theory of immunological isolation has been suggested, whereby lymphatic channel obliteration at the site of injury decreases the delivery of antigen or specially simulated small lymphocytes to the regional lymph nodes from that site. This allows the development and progression of antigenically foreign tumour cells to go unchecked; such cells may initially arise by spontaneous mutation or develop under the influence of viral or chemical carcinogens. Tumour antigen recognition may then be delayed long enough for the tumours to reach critical size,
when immune mechanisms are no longer sufficient to prevent continued neoplastic progression.\textsuperscript{16}

\textbf{Conclusion}

Although there is no consensus on the protocol for the treatment of Marjolin’s ulcer, there is a common opinion on precautions to prevent its development: burns must be treated by grafting at an early stage and must not left to heal by secondary intention. Patients with burn scars must be monitored closely and invited for control visits (when an old burn scar begins to show ulceration, the area should be excised and the resultant defective skin should be grafted). A biopsy must be carried out in doubtful conditions.

**BIBLIOGRAPHY**


**RÉSUMÉ**. L’ulcère de Marjolin est une maladie cutanée maligne rare et agressive qui se produit dans la peau précédemment traumatique et chroniquement enflammée, particulièrement après les brûlures. La plupart des carcinomes des cicatrices causées par les brûlures se manifestent après un long intervalle dans les brûlures non greffées. Dans la période 2000-2006, 48 patients atteints de l’ulcère de Marjolin ont été traités dans notre centre (Hôpital d’Enseignement Sulaimani et Hôpital des Urgences). Toutes les lésions étaient dues à des brûlures causées par diverses causes. Les fichiers médicaux de ces 48 patients ont été examinés en manière prospective. L’âge moyen au moment du diagnostic de le tumeur était de 40 ans et le rapport male/femelle était de 2 a 1 (67% male, 33% femelle). A l’examen histologique, tous les cas ont été diagnostiqués comme des carcinomes bien différenciés des cellules squameuses. La partie du corps la plus fréquemment intéressée était le cuir chevelu (16 patients = 33,3%), suivie par le membre inférieur (14 patients = 29,1%). Le néoplasme a été traité moyennant l’excision et la greffe chez 36 patients (75,0%), l’excision et la reconstruction avec des lambeaux chez huit patients (16,6%) et l’amputation chez trois patients (6,2%). Une association chémotherapeutique des traitements susdits a été suivie chez deux patients (4,1%). Des récidives locales ont été notées chez 16 patients (33,3%) sur les 48, suivies dans tous ces cas par leur décès.

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