Case Report

Multiple basal cell carcinomas following irradiations for Hodgkin’s disease

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Abstract. We present the case of a 63 year-old Caucasian man with 24 basal cell carcinomas (BCCs) overlying his back and upper chest, which was irradiated three times between 1972-1975 for Hodgkin’s disease. These lesions had developed between 2000 and 2005. All the tumors were located within radiation fields. He had skin type II. He had no other known risk factor for cutaneous malignancy, in particular any history of excessive or intense burning with sun exposure. Other possible causes of basal cell carcinoma, such as arsenic intoxication, nevoid basal cell carcinoma syndrome (NBCCS), were excluded. There is no family history of skin cancer. We therefore postulate that his multiple basal cell carcinomas have arisen as a late adverse effect of irradiation.

Key words: Multiple basal cell carcinomas, radiotherapy.

Basal cell carcinoma is the most common cancer in humans. It affects men slightly more than women and occurs primarily on sun-exposed areas such as face and neck [1]. It is currently becoming more common in younger individuals, probably due to increases of exposure to sunlight as a lifestyle and fashion change. Depletion of ozone layer is another possibility for the development of BCC. Mutations in tumor suppressor genes (p53, p63) have been detected in 50 % of BCC cases. Ionizing radiation, after a long latency period, is also a proven cause for BCC [2].

Light-skinned people who tend to easily burn or having a history of childhood sunburn are in greater risks for BCC development.

Case

Our patient, a 63 year-old retired veteran was diagnosed with Hodgkin’s disease in 1972. He underwent three sessions of whole-body irradiation (face and anterior torso) between 1972 and 1975. In 1986, he suffered right arm pain and numbing of which they were attributed to ischemia of the brachial nerve root, strongly possible due to radiotherapy. Except for the previous radiotherapies, the patient had no other risk factors such as excessive sun exposure, burn, fair skin, inability to tan or arsenic intoxication. He reported that he had always avoided sunbathing and never smoked. There were no evidence of palmoplantar pits, bone anomalies, abnormal facial configuration and family history of BCC, nevoid basal cell carcinoma syndrome (NBCCS) or other skin tumors.

Figure 1. Some of the BCCs on the chest of the patient before (a) and after (b) the criotherapy. The BCC number 19 was further treated with imiquimod and thereafter with intralesional interferon.
He presented to a plastic surgeon in 2001 with four cutaneous lesions on his right shoulder, parasternal area and face, which had developed in the preceding year. These lesions were identified as BCC after excisional biopsies. The patient was referred to our department four years later, with multiple pigmented lesions on his back, upper chest, right postauricular area of which they had been present for approximately two years (Figure 1 and 2a).

Clinical examination revealed 24 nodular, brownish-pigmented lesions ranging from 3 to 25 mm in diameter, which were confined within the irradiation area. One of these lesions had arisen on the post surgical scar zone of pre-existing BCC on his shoulder. Dermoscopic evaluation of all the BCCs showed the presence of leaf-like areas and blue-gray ovoid nests, suggesting the diagnosis of pigmented basal cell carcinomas. Histological examination performed after punch biopsy of all the lesions confirmed the clinical diagnosis. We treated all the BCCs with criotherapy although some of the small lesions almost disappeared with the biopsy. 21 out of 24 lesions were cured completely (Figure 1b and 2b), 2 out of 3 criotherapy resistant lesions were further excised surgically and the last one which was on the chest within a radiodermatitis scar, was treated with imiquimod topically five times per week for six weeks. We had to treat the last BCC with intralesional interferon alpha-2a successfully because it did not respond to imiquimod treatment, although there are studies reporting successful treatment results with imiquimod [3].

**Discussion**

BCC is the most common malignancy of the skin and the most common cancer in some countries, such as USA and Australia. Although the prevalence of this tumor increases within a population as exposure to sunlight increases, the distribution of the lesions does not always correlate well with the area of maximum exposure to ultraviolet radiation[1]. Besides, arsenic salts are also a proven causative agent [4].

Some case reports supported that BCC may arise in skin damaged by ionizing radiation as in our case [5-12]. Treatment with prolonged administration of low-dose ionizing radiation is associated with subsequent multiple BCCs [8,13]. The tumors confined to irradiated areas did not appear to be more aggressive than sporadic BCCs [14], as it was in our patient; there were no recurrences in two years after the treatment.

Lichter et al. showed that skin type did not modify the risk associated with radiotherapy [15]. In a recent study by Karagas et al. the risk of BCC in patients treated with radiation at a younger age were the highest compared to other causalities [16].

One might wonder why there are few case reports of skin cancers following radiotherapy in the past, but this may be due to not surviving long enough to develop BCC in those patients. Therefore it can be expected that BCCs could be seen more often in the future because of having a longer life expectancy for those patients who will be irradiated for a malignancy [8].

Many data available in literature showed that the latency period between the first exposure to ionizing radiation for therapy and the appearance of skin cancer is predicted to range from 11 to 60 years [9,10]. Our 63 year-old male patient developed the first four BCCs confined to the irradiated areas 29 years after treatment with radiotherapy at the age of 59 years (he did not know the radiation type and total dose because he did not retain his medical records), but the new BCCs continued to appear during the next four years and he admitted to our outpatient clinic with 24 new BCCs con-
fined in the irradiated area. Furthermore, new BCC lesions continued to appear even after treating all those 24 BCCs, he had two more new lesions prior to the submission of this manuscript.

We consider our patient’s multiple BCCs as a late adverse effect of radiotherapy, because the latent period for radiation-induced skin cancer is generally very long. Given that the observation of newly developing BCCs during the past 6 years in our patient, individuals previously treated with radiation therapy should be followed-up carefully for also dermatologically for the rest of their life but not for a limited period of time.

References
