Abstract. A 49-year-old female, who had undergone irradiation at six years of age as a treatment for a cutaneous nasal hemangioma, developed later a devastating basal cell carcinoma requiring sub-amputation of the nose and subsequent reconstruction with a pre-expanded forehead flap. Basal cell carcinomas are now frequently reported as late sequelae of previous low-dose irradiations after 10-20 years, and patients should be aware of this possible evolution.

Basal cell carcinoma is infrequently seen in patients under 40 years of age and when the tumor appears it can be sporadic or associated with genetic syndromes, such as basal cell nevus syndrome, and xeroderma pigmentosum. In addition, exposure to irradiation has been recently noted to be a predisposing factor in the early development of such neoplasm. The case of a patient who, after receiving radiotherapy for a nasal hemangioma, developed later a devastating basal cell carcinoma of the nose requiring sub-amputation, is described here.

Case Report

A 49-years-old white female was referred to our Department for the treatment of an ulcerated lesion, which arose five years ago, on the tip and dorsum of the nose. The history was negative for basal cell nevus syndrome and xeroderma pigmentosum. The patient had been treated for a hemangioma at the age of six with radiotherapy, and developed later signs of radiodermatitis.

Surgery included sub-amputation of the nose, and reconstruction was achieved with a pre-expanded forehead flap (Figures 1-9). Pathology revealed a cystic and sclerotic basal cell carcinoma, which was completely excised. The post-operative course was uneventful.

Discussion

Skin carcinoma is the most common type of cancer, and the incidence of skin cancer has increased during the last 30 years. The etiology of skin cancer is multifactorial. Although the role of ultraviolet radiation in human skin carcinogenesis has been supported by a wealth of epidemiological data, the mechanisms by which it leads to skin cancer, are still poorly understood. Numerous experimental data obtained in animal models clearly indicate the existence of a relationship between radiation-induced immune suppression and skin cancers (1). Skin cancers were the first malignancies described in association with ionizing radiation (2).

Squamous cell carcinoma (SCC) was previously believed to be the most common type of skin cancer arising on radiodermitic areas (3), but recent studies demonstrated that this type of neoplasm depends on various factors, including anatomic location, dose of radiation therapy, type of radiation therapy and size of fractionation (4).

Several reports of basal cell carcinoma (BCC), arising on previously irradiated areas, suggest that this type of cancer might be more frequent than SCC. BCCs were rarely reported and thought to be coincidental, until 1963, when Lazar and Cullen reported a series of 18 patients developing 108 BCCs, but no SCC, after receiving ionizing radiation for different reasons, stating that the development of BCC on radiodermitic areas was more than a coincidence (5). All the main epidemiological studies of ionizing radiation and skin cancer have shown that radiation causes basal cell carcinoma, but have not found dose-related excesses of squamous cell carcinoma or malignant melanoma (6).

Radiation exposures to the scalp during childhood for tinea capitis were associated with a 4-fold increase in cancer, especially basal cell carcinomas, and a 3-fold increase in benign skin tumors (7).
There was no relationship between the total dose of radiation and the frequency of tumors. Conversely, radiogenic ulcers increased with a higher total dose. The patients who received radiation for ankylosing spondylitis, tinea capitis, malignancy, hypertrophic tonsils and psoriasis, developed later basal cell carcinomas in the irradiated areas (8, 9). The relative risk of radiogenic skin cancer did not
differ as between men and women, or with regard to time, since exposure. However, the risk was greater in those who were irradiated during early childhood.

Shore et al. (1976) reviewed 2,215 patients irradiated for tinea capitis who were followed for an average of 20 years (10). They identified, as well as others (11, 12), an excess of skin tumors in the exposed area compared with matched control subjects, from which we can deduce an induction rate skin cancer of approximately $5 \times 10^{-6}$ tumors per cGy for 20 years, for this area of exposed skin. Other reports of BCCs, arising after radiotherapy for several reasons (13, 21), were also reported.

Basal cell carcinomas have also been described arising in irradiated port-wine stains (22, 23), although they are extremely rare. In these cases BCCs are generally multifocal and with clinically indistinct margins, and can arise even if no sign of radiodermatitis is present. Although rare, this possibility should be considered by physicians, and patients who were irradiated for hemangiomas should be monitored even if no pathological sign is present.

References


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