Clinical study

BASAL CELL CARCINOMAS FOLLOWING ROENTGEN THERAPY FOR LUMBOSACRAL RHEUMATIC DISEASES

U. Baldari, A. Monti, F. Alessandrini and A. Ascari Raccagni

ABSTRACT

During a 14-year survey 805 patients with basal cell carcinomas (BCCs) have been observed. 78 (9.7%) patients who presented tumors in the lumbosacral (LS) area had undergone local antiphlogistic x-ray treatment years before. Out of them 67 were men and 11 were women. All our patients received from 2 to 3 series, each of standardized 10 Gy. BCCs occurred earlier in the males than in the females, as they had undergone the x-ray therapy at an earlier age. Fertile women did not undergo treatment in the LS area, because of vicinity of the gonads. The latency period from treatment to the tumor onset was quite long (average 19.2 years). According to the sun reactivity 7 persons (9 %) belonged to the skin type I, 49 to type II (62.8%) and 22 (28.2%) to type III. There were no patients of types IV-VI. 70 patients (89%) had multiple lesions. Superficial pagetoid and pigmented tumors were diagnosed in 72 (92.3%) and fibroepithelial tumors (Pinkus) in 9 cases (11.5%). Our report points out that basal cell carcinomas following the x-ray therapy for lumbosacral rheumatic diseases were not uncommon in a dermatologist's practice.

KEY WORDS

basal cell carcinoma, x-ray treatment, antiphlogistic, lumbosacral area

INTRODUCTION

Basal cell carcinoma (BCC) is the most common malignant skin tumor (1). Two factors mostly contribute to BCC onset on the body: sun exposure and distribution of hair follicles (2); therefore the most exposed areas are face and the neck (3). Lesions on the trunk and limbs have been reported as common in subtropical countries, being connected with a more intensive and prolonged sunlight exposure (4).

Medical ionizing radiation can also provoke BCC, occurring years after the therapy (5), the total cumulative dose being the most important risk factor (6). It was common in the past, to treat chronic painful inflammations of the musculo-skeletal system, post-traumatic arthropathies and neuralgia's with x-ray treatment (roentgen therapy) (6).

The aim of this report is to show the results of a survey done on 78 patients affected with lumbosacral (LS) arthropathies, treated with x-rays, who subsequently developed BCCs in the mentioned area.

SUBJECTS, MATERIALS AND METHODS

During a 14 year survey, 805 patients with biopsy confirmed BCCs were first visited by the dermatologists of our team. Out of them 78 (9.7%) of them presented lesions in the LS area and had undergone antiphlogistic x-ray treatment in the Department of radiology of our hospital years before. 67 were men and 11 women. Information was obtained by interviewing the patients, by reviewing their radiological records and inspecting them. Their age, sex, sun reactive skin type, site and number of lesions, age of the patients at their first radiological treatment, age at BCC onset, type of BCC and radiation doses were taken into consideration.

RESULTS OF A 5 YEAR FOLLOW-UP

The patients' age bracket was between 42 and 87 years (median range 63.5). BCC onset occurred earlier in males (median range 61.3) than in females (median range 77.2). At the time of radiation treatment the patients were old between 31 and 69 years (median range 43.9). The males often underwent the therapy earlier (at 31-64 years, median 34.8) than the females (at 53-69 years, median 60.5).

Our patients received two or three series, each of standardized 10 Gy. The consecutive cycles were applied over a period of 2-12 months. Details such as kilovolts, focus distances and the use of single or fractionated application could not be traced down.

The latency periods from treatment to tumor onset were from 9-45 years, (median 19.2), with no significant differences between the sexes.

The skin type examination showed the following data: 7 patients (9%) were of type I, 49 (62.8%) of type II and 22 (28.2%) of type III; there was no subject of types IV-VI (Table 1).

70/78 subjects had multiple lesions (from 3 to 15 tumors) as observed during the follow up period. Concerning the clinical types, superficial pagetoid and pigmented lesions were prevalent (72/78 subjects, 92.3%), whereas nodulo-ulcerative tumors were present in 12/78 patients (15.3%). Only one patient was affected by a single cystic BCC. In 9/78 cases (11.5%) fibroepithelial tumors of Pinkus were diagnosed, always associated with BCCs.

DISCUSSION

It has long been known that carcinomas occur more easily in areas subjected to radiation treatment (7,8). However, it is basic to remark the difference between grenz-ray therapy, seldom causing skin cancer (9,10) and roentgen therapy, which can cause epitheliomas more often (6,11,12,13). Carcinomas preferred to occur when fractionated doses of x-rays were previously given, the cumulative dose being the decisive factor (14). Recommendations of the International Commission on Radiological Protection (15) mention an absorbed total dose of 20 Gy for occurrence of skin cancer. Rowell (14) has estimated the dose of 15-30 Gy and Basso-Ricci et al of 12-25 Gy (16).

Skin malignancies occur more often after x-ray therapy of benign diseases than after superficial radiotherapy of skin cancers with high doses (up to 60 Gy); this fact may be due to the relatively small field-size used for cancer therapy and to the better cell killing effect of high single dose (11).

Among the benign diseases treated in the past by x-rays chronic painful inflammations of the musculoskeletal system, post-traumatic arthropathies and neuralgia's have to be mentioned (6,7,12,13,16,17,20).

The latency period from x-ray therapy to BCC occurrence is generally long (6). Colomb et al (13) reported an average latency period of about 20 years and affirmed that skin cancer risk is life-long. Radiation treatment might cause local metabolic disturbances which, after long latency, can end in skin tumors (13). During our 5 year follow up, we often found new BCCs occurring in the same patients.

In the literature there are reports stating that the relative risk of radiogenic skin cancer does not differ significantly between men and women (6,19), whereas it can depend on the skin type (5,19). We have noticed an over-representation of males (85.9%), who had been treated earlier in their life than the females (see Table 1). The latency periods did not significantly differ according to gender. These differences might be due to the localization of the radiation: in fact fertile women never underwent x-ray therapy on the LS area, due to vicinity of the gonads. In our series the youngest female was 53 years old at the moment of her first radiation cycle,

Table 1. Basal cell Carcinomas (BCCs) observed from 1978 to 1991; total no=805. 78/805 (9.7%) were localized on the lumbosacral area(LS)
67/78 (85.9%) were males and 11/78 (14.1%) females; 70/78 patients (89.7%) with monomorphic or pleomorphic multiple lesions and 8/78 (10.3%) with a single lesion

age of the patients first visited for LS BCCs		
sex	aver age	range
M+F	63.5	42-87
M	61.3	42-87
F	77.2	64-86
age of the patients when they underwent radiation treatment		
sex	aver age	range
M+F	43.9	31-69
M	34.8	31-64
F	60.5	53-69
latency (years)		
sex	aver age	range
M+F	19.2	9-45
M	19.5	9-45
F	16.2	10-26

single/multiple lesions			
	M+F	M	F
multiple	70	60	10
single	8	7	1

sun reactive skin type		
type I	7 subjects	(9%)
type II	49 "	(62.8%)
type III	22 "	(28.2%)
type IV	0 "	(0%)
type V	0 "	(0%)
type VI	0 "	(0%)

type of BCC			
	M+F	M	F
pagetoid	35	33	2
pigmented	22	19	2
nodulo-ulcerative	5	3	2
fibroepithelial+pagetoid	4	4	0
fibroepithelial+pigmented	5	3	2
nodulo-ulcerative+pigmented	6	4	2
cystic	1	1	0

Radiation Doses (cumulative doses from 2 or 3 series, each of 1000 rads, over 2-12 months)	
45/78 patients (57.7%)	2000 rads
33/78 patients (42.3%)	3000 rads

the average was 60.5 years, whereas the youngest man was 31 years old and the average was 34.8 (the comparison of the sex age-variances was significant: $P < 0.05$).

Concerning the skin type, we found few patients (9%) of type I, whereas most cases were of type II (62.8%). Type III was also well represented (28.2%), but we did not find any cases of IV-VI types. These data are slightly different from those of Ron (5) and Davis (19), who pointed out that type I was much more frequently involved. We explain this by mentioning that the majority of our patients belong to the "Latin" type, in whom fair skin is rare. Moreover in our series increased melanin pigmentation seemed to be protective against the development of skin cancers in patients who received low-dose superficial ionizing radiation for benign diseases (see Table 1).

Our data concerning clinical types of BCC did not differ from the reports in the literature. Many authors (6,7,13,20,21) found that superficial pagetoid or pigmented BCCs were prevalent in comparison to the other clinical aspects. One can assume that this is probably due to the LS localization where this type of lesions is relatively frequent (4,22). The same is true for Pinkus' fibroepithelial tumor (13,18). We found 9/78 patients with these neoplasm's.

As pointed out in previous reports (7,13,21), our patients very often had multiple lesions (70/78). This fact is probably caused by the relatively large field-size used in the past. It is possible also that physicians were not trained adequately (11).

In conclusion, this report seems us worth of attention, both because of the high number of enrolled subjects and the completeness of the information.

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AUTHORS' ADDRESSES

Urbano Baldari MD, Dpt of Dermatology, Morgagni Hospital,
Piaza Solieri 1, 47100 Forli, Italy
Alberto Monti MD, same address
Franco Alessandrini MD, same address
Antonio Ascari Raccagni MD, same address