

PAPERS

**Basal cell carcinoma—a review of treatment results with special reference to cryotherapy**

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**Summary**

A retrospective study has been undertaken of all head and neck basal cell cancers treated at the Royal Free Hospital between 1976 and 1980 inclusive.

Four methods of treatment were used during the period: simple excision with primary closure ( $n=43$ ), skin grafting or trans-position flap ( $n=19$ ), radiotherapy ( $n=99$ ), and cryosurgical ablation ( $n=34$ ). The methods were compared by observing the immediate results, the subsequent tumour recurrence rate and the length of follow-up.

Statistical comparison of tumour recurrence rate showed no significant difference between treatment groups. Radiotherapy had the lowest recurrence rate (2%), but required an average of 9 out-patient treatment attendances. Excision with primary closure carried the highest recurrence rate (9.3%), whilst excision with defect closure by flap or graft, which needed a mean in-patient stay of 8.2 days, and cryosurgical treatment had similar recurrence rates of 5 to 6%. Comparing the modes of treatment, cryosurgery was quickest to perform, required no hospitalization and less than 2 out-patient treatment sessions per patient and gave the best cosmetic result. It appears to be a safe technique for treating basal cell cancers and may prove to be the most cost effective method.

KEY WORDS: carcinoma, basal cell, cryotherapy, radiotherapy, surgery, operative.

**Introduction**

Basal cell carcinoma is the commonest malignant

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skin tumour in Caucasians (Sanderson and Mackie, 1979), is locally slow growing and in most cases there is no lymphatic spread. It occurs mostly on the face and neck and typically presents as a recognizable ulcerated keratotic lesion which fails to heal. Cystic, superficial and the very rare morpheic forms may also occur.

The current commonly used treatments for this condition include curettage with and without radiotherapy (Sweet, 1963; Crissey, 1971), surgical excision with primary closure or grafting (Bart *et al.*, 1973; Battle and Patterson, 1960; Taylor and Barsini, 1973), radiotherapy (Bart, Kopf and Petratos, 1970; Freeman, Knox and Heaton, 1964; Nevrlka and Newton, 1974) and cryosurgery (Zacarian, 1976; Torre, 1977; McLean *et al.*, 1978). Moh's chemosurgical treatment is also in use, but being time consuming and exacting to employ, other treatments seem to be preferred. Good results are claimed for each mode of treatment but few direct comparisons have been made (Freeman *et al.*, 1964). Therefore, a retrospective study has been undertaken of all head and neck basal cell cancers treated at the Royal Free Hospital over 5 consecutive years. To evaluate the effectiveness of therapy, we have observed the time taken for treatment, immediate results, subsequent recurrence rate and, by inference, patient convenience.

**Patients and methods**

Cryosurgical treatment of basal cell cancers was introduced at this hospital in 1976 and therefore the period 1976-1980 was chosen for the study. Details of all patients undergoing treatment for head and neck basal cell tumours at the Royal Free Hospital during

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TABLE 1. Distribution of lesions in each treatment group, recurrence rates and follow-up times

	Number of lesions	Recurrent tumours		Follow-up (months $\pm$ s.e.m.)
		n	(%)	
(1) Simple excision	43	4	(9.3)	18.9 $\pm$ 2.5
(2) Excision and graft/flap	19	1	(5.3)	21.3 $\pm$ 3.7
(3) Radiotherapy	99	2	(2.0)	26.5 $\pm$ 2.9
(4) Cryosurgery	34	2	(5.9)	14.6 $\pm$ 2.8

the period were obtained using the hospital's diagnostic index.

Treatments used were: (1) Simple excision with primary closure. This was carried out using a local anaesthetic by experienced middle grade registrars or more senior surgeons in the out-patient department. A few cases required in-patient management under general anaesthesia. In all cases, the lesions were excised with a 3–5 mm margin of normal skin.

(2) Excision and skin flap or graft. This was carried out as an in-patient procedure and a general anaesthetic was necessary in 79% of cases; the operations were performed by senior registrars or consultants in plastic surgery.

(3) Radiotherapy. Patients were treated as out-patients following established procedures with a mean dose of radiation of 3894 cGy (applied dose), given at a range of 120–150 kV with protection of nearby structures. Treatment included a margin of normal skin (Barnes and Rees, 1972) and fractionation of the total dose.

(4) Cryosurgery. Patients were treated as out-patients by senior registrars conversant with cryosurgical techniques, using a liquid nitrogen cryoprobe (Spemby DFS 30). Lesions were frozen to  $-196^{\circ}\text{C}$ , allowed to thaw and then frozen a second time. This double freeze-thaw cycle was repeated at a second attendance. A rim of surrounding skin was frozen to achieve adequate tumour destruction (Cahan, 1965). A biopsy was taken when the lesion was frozen without any additional anaesthetic being required.

## Results

One-hundred and eighty-six patients with 195 lesions were studied. The number of lesions in each treatment group is shown (Table 1). The anatomical distributions of basal cell cancers in each group was similar and is shown (Table 2). All the lesions treated were judged clinically to be superficial with no deep structures involved.

(1) *Simple excision* ( $n=43$ ). Nine patients in this group were treated as in-patients with a mean in-patient stay of  $4.5 \pm 1.6$  days (s.e.m.). Of these 9 patients, 4 required a general anaesthetic. The mean area of the tumours in this group was  $0.92 \text{ cm}^2$ . The

mean post excision follow-up was  $18.9 \pm 2.5$  months (s.e.m.), and there were 4 recurrent tumours (9.3%) at a mean of 23.5 months. The original tumour in these 4 patients had been excised under a local anaesthetic.

(2) *Excision and graft or flap* ( $n=19$ ). All these patients required in-patient surgery, 15 had a general anaesthetic and 4 had the excision carried out under a local anaesthetic. The lesions treated were larger than those dealt with by simple excision, their mean area being  $1.71 \text{ cm}^2$ . The mean in-patient stay was  $8.2 \pm 1.1$  and days and the post-grafting follow-up was  $21.3 \pm 3.7$  months (s.e.m.). One tumour recurred at 16 months and required further excision and grafting.

(3) *Radiotherapy* ( $n=99$ ). This group contained the largest number of patients because the radiotherapy department is a referral centre from other district general hospitals. All but 3 patients received their treatment as out-patients and the mean number of treatment sessions was  $9.6 \pm 0.9$  (s.e.m.). Tumour size mean area was  $2.62 \text{ cm}^2$ . The mean follow-up for this group was  $26.5 \pm 2.9$  months and there were 2 recurrent tumours (2.0%) at 8 and 14 months.

(4) *Cryosurgery* ( $n=34$ ). All the patients were treated as out-patients except one man who received his first treatment whilst in hospital for unrelated problems. Lesions so treated had a mean area of  $2.80 \text{ cm}^2$ . The mean number of treatment sessions was  $2.0 \pm 0.4$  and the mean of the total number of cryoprobe applications was  $4.2 \pm 0.8$ . The follow-up mean was  $14.2 \pm 2.9$  months (s.e.m.) during which there were 2 recurrent tumours, (5.9%), at 6 and 33 months. Both were successfully treated by refreezing.

Statistical comparison of the tumour recurrence rates between groups using the Chi-square test with correction for small numbers shows no significance at the  $P=0.05$  level. In addition, when both excisional groups are combined and compared with the other groups, there is no statistical significance. The tumour recurrence rates and the follow-up times are shown (Table 1).

## Discussion

In this retrospective study, the selection of treatment for the majority of these patients was undertaken in the dermatology department where they

TABLE 2. Anatomical distribution of the numbers of basal cell carcinoma in each treatment group (number in parentheses = % in each treatment group)

	Excision	Excision and graft	Radiotherapy	Cryosurgery
Ear and periauricular	3 (7)	1 (5)	2 (2)	2 (6)
Cheek	9 (21)	2 (11)	11 (11)	7 (20)
Forehead	7 (16)	2 (11)	11 (11)	9 (26)
Eyelids and canthi	4 (9)	3 (15)	13 (13)	2 (6)
Nose and perinasal	7 (16)	7 (37)	31 (32)	10 (30)
Lip	1 (3)	0 —	4 (4)	0 —
Chin and neck	2 (5)	0 —	5 (5)	2 (6)
Scalp	10 (23)	4 (21)	22 (22)	2 (6)
Total	43	19	99	34

were first referred. A few cases were referred directly for simple excision, cryosurgery and radiotherapy, but none directly for treatment by excision and grafting. The treatment selection was not randomly carried out. The criteria of this selection were based on the patient's age and the site, extent and type of the lesion. Radiotherapy and cryosurgery were applied to the elderly and those particularly anxious about surgery. Excision on the other hand was preferred for lesions on the ear and for the radioresistant morphoeic form. All 4 methods of treatment were effective, with low recurrence rates. Although the recurrence rate after simple excision with primary closure appears high, this was not statistically significant when compared with the other therapies and is similar to other reported series where the recurrence rate can be 19% (Bart *et al.*, 1978). The recurrence rate after cryosurgery is similar to that reported in other series (McLean *et al.*, 1978; Kuflik, 1981; Zacarian, 1980a).

Cryosurgery has achieved in this small number of patients a very favourable position, with results comparable to the more conventional therapies, all of which took longer to perform. It was convenient for the patients since only 2 out-patient attendances were required, and any discomfort produced was mild because of the paralysis of sensory nerves producing anaesthesia. Minor analgesics were required by a few patients, and then only for a few hours after treatment (Elton, 1977). As shown in Table 2, all sites have been treated by cryosurgery except the lip. This is an unsuitable site because of the scarring produced. Tumours overlying cartilage can be treated without fear of chondronecrosis and the canaliculus and punctum at the eye have been shown to be resistant to freezing to between  $-30^{\circ}\text{C}$  and  $-50^{\circ}\text{C}$  (Zacarian, 1980b). The two cases of recurrent tumour were on the cheek and forehead, both sites where other lesions were treated without complication. Both recurrences were successfully refrozen, indicating probable inadequate initial treatment.

Simple excision was an out-patient procedure in

72% of cases so treated and the remaining 28% were treated as in-patients because of their unsuitability for out-patient management for reasons of infirmity or social considerations. The surgical procedure, in this group was quickly carried out.

Excision with skin grafting or closure by flap required a mean in-patient stay of 8 days because of the nature of the treatment involved.

Radiotherapy was followed by the lowest tumour recurrence rate in the largest treatment group which had the longest mean follow-up. To achieve this combination of low recurrence rate and acceptable cosmetic result, the total dose of radiation had to be divided into several smaller doses (mean 9.6), each of which needed a separate weekday out-patient attendance. Although each treatment session was short, this attendance, was by inference, inconvenient. However only one patient of all those treated by radiotherapy (1.1%) failed to complete the course of radiation.

Consideration of the cosmetic results of treatment is important because the majority of basal cell cancers are distributed in the face. Surgical excision gives good scars, although those grafted are large. The results achieved with both radiotherapy and cryosurgery are generally thought to be superior (Bart *et al.*, 1978; Zacarian, 1980a). This is explained in part by the lack of contraction of these wounds associated with slow removal and replacement of the residual matrix (Li *et al.*, 1980), and in the case of radiotherapy by the lower dose of radiotherapy now used. Indeed, because of the poor cosmetic results after radiation doses of between 5000 and 6000 cGy (applied dose), very few basal cell cancers were treated by radiotherapy at this hospital until 1966 when the lower dose was introduced.

In this study of the treatment of superficial head and neck basal cell cancers, acceptable results have been achieved with each mode of therapy and direct comparison must be viewed guardedly because of the non-randomized selection of patients to treatment groups. Cryotherapy as a primary treatment for

malignant lesions is controversial, but in this study it has achieved comparable results with the more conventional therapies, despite the tumours so treated having a larger mean size than any other group. It is the least complicated of all the treatments studied, takes the shortest time and results in very acceptable cosmetic appearances. The lesions in this study were all superficial. However cryotherapy may be of use for more deeply invading tumours if the excellent experimental results of freezing bone (Kuylenstierna, 1980), are confirmed in clinical practice. A randomized controlled clinical trial of these treatments may well be justified.

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