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Frozen section control of excision of eyelid basal cell carcinomas: 8½ years' experience

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SUMMARY For a period of 8½ years all basal cell carcinomas were excised under frozen section control. One hundred and fifty-six patients with 165 tumours were treated, and 137 were followed up for at least three months (3–94 months, mean 29·1 months). There were three possible recurrences, giving a recurrence rate of up to 2·19%. The practical implications, advantages, and difficulties encountered are described, and the place of frozen section control of excision of basal cell carcinoma in a busy NHS general ophthalmic practice is discussed.

Recurrence of basal cell carcinoma after surgical excision is generally believed to be due to inadequate excision of the tumour. This has been shown to occur in an unexpectedly high percentage of cases—23% reported by Aurora and Blodi[1] and 50% by Rakofsky.[2] Mercifully, recurrence occurs in only one-third or less of inadequately excised cases, for example, 23·4% in Rakofsky's series,[2] for reasons which are not well understood.

Surgery under histological control, ensuring complete excision of tumour, should theoretically eliminate the risk of recurrence in basal cell carcinoma. Older *et al*[3] reported a 100% cure rate from a series of 157 basal cell carcinomas, 72% of which had frozen section control, and complete resection was achieved in 97·5% of cases overall. Chalfin and Putterman[4] reported no recurrences from 37 primary and 16 recurrent basal cell carcinomas during follow-up of 3–48 months (mean 14·3 months), and 3–52 months (mean 22·6 months) respectively.

Doxanas *et al*[5] reported a study of 165 basal cell carcinomas. In 39 cases excised under frozen section control there were no recurrences, while among the remaining 126 cases excised without frozen section control 34 (26·9%) were incompletely excised and 7 (5·5%) recurred.

I decided to use frozen section control for all cases of basal cell carcinoma excised under my care until there were enough cases and sufficiently long follow-up to allow me to decide if the advantages of the technique justified the extra time and cost involved. The purpose of this paper is to report my experience in the hope that others will profit thereby.

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Material and methods

Excision of the tumour was witnessed by the pathology technician, marker sutures being used to facilitate orientation of the specimen in the laboratory. Frozen sections of the specimen were examined by the pathologist, who communicated his findings to the surgeon by telephone. Paraffin sections were prepared and reported on later. If excision was incomplete, further tissue was excised from the appropriate margin. This was examined by frozen section in the early years of the project, but, as tumour was not found in most of the secondary specimens, latterly the tissue was placed in formalin for paraffin section examination, unless there was serious concern that the second excision might still be inadequate.

The frozen sections were prepared as described by Doxanas *et al*.[5] The specimen was bisected through the centre of the tumour and sections were taken in a plane parallel to that cut. Subsidiary planes were examined in large lesions or where the initial sections were inconclusive. The plane in which tissue was examined was varied in some cases at the request of the surgeon to include any particularly difficult margin. The method of Chalfin and Putterman[4] and Older,[6] in which marginal blocks are cut from every raw surface of the specimen and then sectioned, was not available.

Surgical reconstruction was delayed until the frozen section report was received, or started in such

a way that further excision and more major repair could be done if necessary.

The patients were followed up for at least five years, longer if they were willing to continue to attend annually.

PATIENTS

The study was done in the context of a busy NHS general ophthalmic practice. All patients under my care undergoing surgery for basal cell carcinoma from April 1979 to 18 December 1987 were entered in the study.

During the period of the study 156 patients, all Caucasian, with 165 basal cell carcinomas were treated. Of these tumours eight were recurrent, the patient having been previously treated with radiotherapy, cryotherapy, curettage, or surgery. Seven patients had a past history of basal cell carcinoma, and 14 had more than one focus of tumour during the period of the study. Concurrent basal cell carcinomas not on the lids or adjacent face were treated by traditional methods, usually surgery without frozen section control.

Four additional patients were excluded. In two cases the frozen section showed doubtful clearance, but further excision was not done for the following reasons. One patient was too nervous and agitated under local anaesthetic (paraffin sections later confirmed complete excision). The other patient was aged 85 and had an upper lid basal cell carcinoma. Excision was macroscopically complete, and the pathologist was unsure of clearance because the tumour came very close to one margin of the sections. Further excision would have required a major plastic surgical repair and was not done because of the doubt and the patient's advanced age. Paraffin sections later showed that the original excision was just complete. The other two cases of incomplete excision were excluded because, although further tissue was removed, it was not sent for histology by the junior medical staff concerned, and the conditions of the study were not fulfilled. In none of the four cases has tumour recurred (follow-up 1–19 months, mean 10·8 months).

The patients were aged between 33 and 90 years old at the time of operation (Table 1). (Age at first operation is entered for those who developed further tumours at other sites.) The peak incidence was during the sixth and seventh decades, 31·4% and 33·3% respectively.

Table 1 *Age of patients*

Age (yr)	*Patients*	*%*
30–39	3	1·9
40–49	8	5·1
50–59	25	16·0
60–69	49	31·4
70–79	52	33·3
80–89	18	11·5
90–99	1	0·6

Table 2 *Site of tumour*

Site	*Number*	*%*
Lower lid	79	47·9
Medial canthus	45	27·2
Preseptal lower lid and cheek	15	9·1
Upper lid	13	7·9
Lateral canthus	8	4·8
Brow	4	2·4
Forehead	1	0·6

The tumours were located as shown in Table 2. The forehead tumour was included because it was excised under frozen section control at the same time as an eyelid lesion.

SURGICAL REPAIR

Unfortunately the dimensions of the tumours were not always recorded. However, the nature of the necessary surgical repairs (Table 3) is an indicator of the size of the lesions. Defects closed by simple releasing incisions, small local flaps, or lateral cantholysis are included in the primary closure group, which accounts for 65 lesions (40·1%). Ninety-one more major repairs were done (56·2%); three of these operations repaired the defect left after excision of two foci of tumour. Surgical details are not available in six cases (3·7%).

Results

Of the 165 tumours 137 have a documented follow-up of 3–94 months (mean 29·1 months). The remaining patients have died of other conditions, moved away, or failed to keep their appointments.

Three patients developed a new focus of basal cell carcinoma close enough to the site of the original tumour to be a possible recurrence. However, there

Table 3 *Method of surgical repair*

Method	*Number*	*%*
Primary closure	65	40·1
Full thickness skin graft	35	21·6
Temporal advancement flap	21	13·0
Upper lid pedicle flap	14	8·6
Mustardé cheek rotation flap	9	5·6
Cheek pedicle flap	7	4·3
Forehead or glabellar flap	3	1·9
Island skin graft	2	1·2
Details not available	6	3·7

For remaining three operations see text.

are features in each case suggesting that these may be new tumours. These cases will therefore be described in detail.

CASE 1

A 60-year-old woman presented to me in November 1982 with a basal cell carcinoma below the lid margin at the lateral end of the right lower lid. She said that basal cell carcinomas had been removed from this area 10 and three years previously. She had lived abroad in Egypt and West Africa for many years. The tumour was excised and repaired with an island skin graft brought in from the temple lateral to the eye. In January 1988 she had a nodular recurrence in the scar at the site of the original lesion. I regarded this as a straightforward recurrence until I reviewed her case and saw her dermatology notes from another hospital. In November 1983 I had found three more foci of basal cell carcinoma on the right side of the face, but as these were clear of the eye and site of surgery I referred her to the dermatologist. His notes show that three basal cell carcinomas were treated by curettage and cautery in January 1984—on the right eyebrow, right breast, and left thigh; in addition a large lesion was excised from the left thigh which was reported as being multicentric basal cell carcinoma. The dermatology records show that 11 more foci on the face, neck, and limbs were treated by cryotherapy during 1985–7. One lesion on the shin had arisen in the scar of a previous injury. In view of this and the multiplicity of lesions there is reason to question whether the eyelid recurrence is a straightforward recurrence or perhaps a new focus.

CASE 2

A 57-year-old woman was referred from another regional centre with an extensive basal cell carcinoma of the right lower lid. Clinically the lesion was spreading along the lid margin, except for a central ulcer which extended 5 mm onto the pretarsal skin. Biopsy specimens had been examined twice prior to her referral. The first biopsy two years before had been reported as chalazion, the second, one month before, as basal cell carcinoma. Excision of seven-eighths of the lid with a Mustardé cheek rotation flap repair was performed in January 1985. Tumour was found extending to the temporal margin of the first specimen, but a further section of lid contained no tumour. All was well for one year, and then a granulating spot appeared in the vertical paranasal scar of the cheek rotation flap approximately 9 mm below the lid margin at the approximate level of the lower corners of the original rectangular resection, which were well away from the original tumour. (The skin along the base of the rectangle was excised to allow the cheek rotation flap to be swung in.) The spot failed to heal, so biopsy was done and showed basal cell carcinoma. Formal excision was carried out in April 1987 with full-thickness skin graft repair. Histology showed basal cell carcinoma with some squamous differentiation, and it was the pathologist's opinion that this was a new primary tumour.

CASE 3

A 71-year-old woman had a basal cell carcinoma occupying the medial third of the right lower lid including the punctum. The tumour was excised in the usual way, with the lower canaliculus being sacrificed, and a cheek rotation flap repair made. Another basal cell carcinoma appeared in the advanced lid 47 months later, near to but clear of the resection scar. After diagnostic biopsy the patient was referred for radiotherapy because her general health had deteriorated, and surgery would have involved a further major plastic repair.

The overall recurrence rate for the study would therefore be 2·19%, 1·46%, 0·72%, or 0% depending on how many of the three cases are counted as true recurrences.

HISTOLOGY

The usual time interval between excision of the tumour and telephoned histology report was approximately 25 minutes. This was in spite of the pathology laboratory being 4 miles (6 km) away. Sometimes, however, the delay was longer—up to 45 minutes on one occasion—if the specimen was large or awkward to section, so that many sections had to be cut and examined before the pathologist was able to report. All the sections were reported by experienced consultant pathologists.

Twenty-one specimens were reported as inadequately excised and further tissue was taken. Only three of the secondary specimens contained tumour, suggesting that in the other 18 cases the line of excision had passed just outside the tumour.

In one of the three cases showing tumour in the second specimen subsequent paraffin sections revealed that there were two tumours present. The first specimen contained all the clinically visible tumour and included part of a separate, macroscopically invisible tumour, the remainder of which was in the second specimen.

Another case, reported as completely excised on frozen section, was found to have a small, completely excised basal cell carcinoma with heavy lymphocytic reaction at the edge of the specimen on paraffin sections. This had been thought to be folliculitis or a cellular naevus on the frozen sections. There has been no recurrence (follow-up 10 months).

Table 4 *The author's incomplete excision rate for each year of the study*

	Total cases	*Incomplete excisions*	*% Incomplete excisions*
1979	7	2	28·6
1980	14	5	35·7
1981	14	1	7·1
1982	24	3	12·5
1983	13	2	15·4
1984	8	1	12·5
1985	20	2	10·0
1986	18	5	27·8
1987	26	4	15·4

EFFECT ON SURGEON

My ability to judge the extent of the tumour, as measured by complete excision on frozen section, improved as the study progressed (Table 4, in which my two incomplete excisions on frozen section described under 'Patients' are included). The immediate report and ability to localise the incompletely excised margin was invaluable in learning to assess the extent of lesions, but after 8 years and 144 cases my incomplete excision rate is still significant (Table 4).

The first recurrence was not until April 1986, when the study had been running for seven years. By this time my faith in frozen section control to confirm complete excision and eliminate recurrence had become very real, and there was a great temptation to skimp the 3 mm margin of macroscopic clearance when excising the lesions. This may account for my relatively high incomplete excision rate for 1986.

Discussion

This study was undertaken because I was impressed with the 100% cure rates for basal cell carcinoma reported when the tumours are excised under frozen section control.[3-5] A frozen section service was available, so I determined to run this study to evaluate the cost effectiveness and place of the method in an NHS general ophthalmic practice.

Sadly, it was not possible to achieve a 100% cure rate; the recurrence rate was up to 2·2%. A definite recurrence rate is not quoted because of uncertainty in three cases (one of which was a recurrent tumour) whether there was recurrence or new tumour. Recurrence rates of 2·3%,[7] 1·4%,[8] and 0·5%[9] have been reported in past series of primary tumours excised without frozen section control, but most series report higher rates. Rates for series of recurrent tumours are greater; Payne *et al*[10] reported 10% for primary tumours and 16% for recurrent tumours.

The way in which the histology is done is important. The method described by Chalfin and Putterman[4] is not generally available but is considered more accurate by some.[6,11] The presence in two cases of clinically invisible additional tumour in the edge of the excised specimen emphasises the multifocal nature of basal cell carcinoma. Even if resection lines can be guaranteed tumour free, adjacent foci may grow and simulate recurrence.

Collin[7] questioned the value of frozen section control for primary basal cell carcinomas because the generally reported recurrence rates for excision of these lesions are low. He also reported five cases which developed recurrent tumour even though histological examination showed complete clearance.

This study was conducted in the midst of a busy general ophthalmic practice. Frozen section control meant longer operating time for each basal cell carcinoma patient, longer lists for the surgeon and theatre staff, and slower clearance of other cases from the waiting list. This last disadvantage was minimised when our twin theatre suite came into operation and two patients could be dealt with simultaneously. Other less major basal cell carcinoma cases were done in the minor operations theatre at a different time. The pathology technician had to travel to the Eye Unit to collect the specimens, and the frozen section meant extra work for the laboratory.

CONCLUSION

In the light of this 8½ years' experience it is now my opinion that frozen section control is valuable and cost effective for tumours requiring a major plastic surgical repair, and for those with a worse prognosis such as recurrent tumours[7] and morphoea type lesions, the extent of which are extremely difficult to judge clinically, and which are aggressive if they recur.[5] I do not consider frozen section control cost effective or essential for every case.

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