SURGICAL TECHNIQUES

Confident complete excision of lid-margin BCCs using a marginal strip: an alternative to Mohs' surgery

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Br J Ophthalmol 2007;**91**:794–796. doi: 10.1136/bjo.2006.109892

Aims: To report a new technique of tissue preparation, using a marginal strip, after the excision of eyelid basal cell carcinomas (BCCs) and to report the long-term results of BCCs excised using this technique.

Method: After the excision of eyelid BCC with a safety margin of 4 mm, a 1 mm strip was excised along the whole perimeter from the margin of the freshly excised specimen. This marginal strip had intact conjunctival mucosa along one edge and skin along the other. The marginal strip and the central tumour mass were then fixed immediately in formal saline and subjected to conventional histopathology.

Results: Of the 61 patients who completed a 5 years follow-up, the results of 28 eye-lid BCCs that were within 4 mm of the lid margin are reported. The marginal strip was clear in 22 specimens and had the presence of residual tumour in its margin in 6 specimens. These six cases were further managed by observation (n=2), by further surgical excision using marginal strip (n=2) and by Mohs' surgery (n=2).

Conclusion: Marginal strip examines the entire resection margins analogous to Mohs' technique and we recommend its use in lid margin where tarsus is present throughout the specimen and >4 mm from the lid margin.

Basal cell carcinoma (BCC) is the most common skin malignancy of the eyelid, accounting for 80–90% of cases.¹ It is an indolent and slowly progressive tumour that is locally invasive and rarely metastasizing. Various treatments described in the literature include surgery, radiotherapy, cryotherapy, laser ablation, photodynamic therapy, chemotherapy and immunotherapy.²

Surgical excision is the preferred method for removal of tumour as it is the only technique in which the margins can be examined. Previously published studies have shown that residual tumours are found in the margins of excised specimen in about 50% of surgical BCC excisions.³ The introduction of microscopically controlled tumour excision by Mohs⁴ in 1941 and its further refinement has led to considerable improvements in surgical tumour excision. Mohs micrographic surgery (MMS) provides a combination of high cure rate and tissue conservation, and is therefore widely used for treating morpheaform tumours and the tumours on the head and neck. The literature suggests an overall 5-year cure rate of 99–100% after MMS for primary BCC and 94% for recurrent BCC.^{5,6} However, Mohs' surgery is time consuming, personnel intensive, expensive and is not readily available.

The aims of this study are to report a new technique of tissue preparation prior to histopathology and to report long-term (>5 years) results of BCCs excised using a marginal strip.

MATERIAL AND METHODS

Patients presenting with clinically diagnosed BCC to the oculoplastic services at Cardiff Eye Unit, Cardiff, UK, between

1995 and 2000, were included in the study. After obtaining informed consent, all the lesions were excised under local anaesthesia using lignocaine 2% with adrenalin 1:200 000. The surgical technique and the histological preparation of the excised specimen are described below.

Technique

The tumour margins were determined and marked out by observing the transition in surface contour, alteration in lid vascularisation, change in skin colour, loss of lash and thickening of lid. After delineating the lesion, a safety margin of 4 mm was marked with the skin still under tension. The lesions were excised with this 4 mm margin (fig 1). Primary repair with direct closure was carried out wherever possible, without losing the possibility of further need for closure with a flap, if further excision was required.

Following this, a 1 mm strip was excised along the whole perimeter from the margin of the freshly excised specimen. This marginal strip had intact conjunctival mucosa along one edge and skin along the other (fig 2). In most cases, it also had a slither of lid margin with tarsal plate and lash line at each end. The marginal strip was then marked with a suture at the medial end and was flattened onto a piece of suture pack card. The marginal strip and the central tumour mass were then fixed immediately in formal saline.

The histopathologist carried out routine resin embedding, sectioning and staining. For sectioning, the main tumour mass was sectioned conventionally (bread slicing) to ascertain the nature of the lesion, whereas the marginal strip was sectioned in a plane parallel to the excised margin rather than being perpendicular. This helped in ascertaining the clearance of the tumour from all the margins of the lesion. Depending on the pathology report, further excision along the involved margin was carried out as necessary. The surgical wound was managed by laissez-faire, repair or further excision as indicated by the histopathological study, wound size and other patient factors. Patients were followed for 1 week, 1, 3 and 6 months and then yearly for 5 years.

RESULTS

In this retrospective review, there were 61 patients who presented with BCC of the eyelids at Cardiff Eye Unit (table 1). Patients with lesions involving the medial canthus (n=6) or that were discrete, mobile and >4 mm away from the lid margins (n=27) were excluded from this study.

For this study, 28 BCCs that were within 4 mm of the lid margin that were excised with a 4 mm margin from which a 1–2 mm marginal strip was excised, are reported. There were 17 women and 11 men and the mean (SD) age was 75.3 (10.2) years (range 52–90 years). Clinically, there were 14 (50%) nodular, 8 (29%) ulcerative and 6 (21%) morpheaform

Abbreviations: BCC, basal cell carcinoma; MMS, Mohs micrographic surgery

Figure 1 Preparation of the specimen. (A) Tumour marked on a stretch on lid margin, (B) excised with a 4 mm margin and (C) then the marginal strip excised and (D) laid flat. The skin (green), tarsus (yellow) and the conjunctiva (purple) are colour coded for orientation.

types of BCCs. The mean (range) follow-up time was 5.4 (5–8) years. Histological examination of the marginal strip was clear in 22 specimens. In six specimens, the marginal strip was found to have residual tumour in the margin. The site of the tumour extension was easily determined by its position and orientation on the marginal specimen. These six cases were further managed either by observation, by further surgical excision using marginal strip or by Mohs' surgery (table 2).

DISCUSSION

The marginal strip provides histological analysis of the tumour extending beyond its clinically visible margins. This technique is ideally suited for excised specimens in which tarsal plate is present at both the ends of the lesion. It also has its limitation in the eyelid margin where the BCCs are removed with a margin on only three sides, the full thickness lid margin on either side with the section connecting the two.

Surgical excision of BCC is the only method to confirm the complete clearance of the lid margin. The various surgical options described include excision with fixed margin and primary repair, excision with micrographic margin control and excision with fixed margin, histological examination and re-excision/delayed repair.

The conventional histological method to examine the clearance of the tumour from all the margins uses the bread-slicing technique. In this technique, only certain slices perpendicular to the plane of the tumour are examined, therefore an extension between the slices can be missed. In a study by Hsuan *et al.*,⁷ 55 patients with well-defined nodular BCCs were excised with a safety of 2 mm margins. Further surgery was needed for 10 (18%) patients to obtain clearance of lid margins. In a study by Hamada *et al.*,⁸ of the 162 patients where all had underwent excision biopsy with a 4 mm excision margins, the pathology revealed the presence of residual tumours in 16% of cases. Of those reported as incompletely excised, 53% contained no tumour at re-excision.

MMS is superior to traditional methods in attaining complete excision while maximising preservation of normal tissue, but it is too expensive and laborious to be used for all periocular BCCs. Modified Mohs' technique using frozen section was described by Tromovitch and Stegman,⁹ and now it is the gold standard for histopathological control in excised periocular tumours. Mohs' technique however does have limitations. "Skip" areas of disease (multifocal disease), effects of

Table 1 All the basal cell carcinomas excised (n = 61)

Site of BCC	Nodular	Ulcerative	Morpheic	Management
Medial canthal lesions (n = 6)	3	2	1	Mohs' microsurgery
<4 mm from lid margin (n = 28)	14	8	6	Marginal strip with 4 mm margin
>4 mm from lid margin (n = 27)	27	0	0	Excision with 2–4 mm margin (conventional histology)

BCC, basal cell carcinoma.

inflammation on interpretation, difficulty with maintaining contiguous anatomical surfaces for examination (particularly in the lateral canthus region) and the presence of scar may all lead to a failure of the technique to give margin clearance.

Mohs' surgery in the eyelid regions is also limited by the fact that the tarsal plate does not lend itself to flattening of specimen on a slide prior to fixation and a tumour that extends to orbital fat is delineated by the fat and, therefore, cannot be accurately mapped out.

With our technique, in only six cases the margins were found to be positive for tumour. In various series, it has been shown that only a minority of patients with histologically documented positive margins will experience a recurrence. De Silva and Dellon¹⁰ followed 38 patients with positive margins and only 37% had recurrence. Gooding *et al.*¹¹ reported a 35% recurrence rate and Shanoff *et al.*¹² reported a 67% recurrence rate. Sarma *et al.*¹³ suggest that tumour cells at the operative site could be devitalised by surgery, thus accounting for the lower than expected recurrence rate. An alternative, more probable explanation is that the margins are so narrow that the specimen distortion through fixing and tissue processing and sampling makes it difficult for the pathologist to confidently confirm clearance. Hauben *et al.*¹⁴ found a recurrence rate of 25.6% with positive margins and 22.8% with negative margins. The question remains whether to do further surgical excision if the completeness of the initial excision is in doubt. Conventional methods used to determine margin adequacy do not allow for gaps in analysis between histological sections. This is where we believe that a marginal strip provides an advantage. We observed two cases that were in central observable position, excised further two with marginal strip and subjected the other two for MMS.

Recurrence rates can be high even in lesions with negative surgical margins. Lang and Maize¹⁵ studied 10 recurrent tumours, 6 of which had negative margins with the initial excision. In our study, there were two patients in whom the marginal strip was involved, but there has been no recurrence in the follow-up reported.

The method we describe, like Mohs', has the advantage of histological confirmation of clear margins. It preserves normal tissue almost as good as Mohs' technique, yet is far less time consuming and can be used by all ophthalmologists without special training. A marginal strip lacks the immediacy of a Mohs' technique but has the advantage of fixed tissue over frozen tissue in terms of best preservation of tissue morphology. It does examine the entire resection margins analogous to Mohs' technique. It is less person intensive and is no more expensive than standard histopathology technique. It is not exactly Mohs' or "slow Mohs" as the histopathologist and the surgeon are different individuals. The marginal strip technique is similar to slow Mohs'¹⁶ and is specific for lid-margin lesions with the advantage of having a continuous margin of tissue in which any spread of tumour can be located.

Table 2 Management of basal cell carcinomas with marginal strip involvement

Age (years)/sex	Type of BCC	Management	Recurrence-free period (years)
77/M	Nodular	Observation	5
79/F	Morpheic	Excision and Mohs'	8
94/F	Nodular	Clear at Mohs'	7
70/F	Ulcerative	Further specimen clear	8
85/F	Nodular	Observation	8
76/F	Nodular	Further specimen clear	7

BCC, basal cell carcinoma; F, female; M, male.

We recommend the use of the technique in lid margin where tarsus is present throughout the specimen and >4 mm from the lid margin.

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Competing interests: None declared.

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Accepted 3 January 2007

Published Online First 17 January 2007

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