

SEMICIRCLE FLAP RECONSTRUCTION AND IMMUNOHISTOCHEMICAL STUDY IN SQUAMOUS CELL CARCINOMA OF THE UPPER EYELID

Tatsuo KODAMA, Katsue KAWAMOTO, Tatsuro KONO, Yuzo SHIBUYA and Tomoichi SETOGAWA

Department of Ophthalmology, Shimane Medical University, Izumo 693, Japan

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A 52-year-old woman complained of recurrent upper eyelid mass in her left eye. The lesion was excised under the histopathological diagnosis of squamous cell carcinoma. Although it involved 67% of the length of the upper eyelid margin, we could encompass the defect using a Tenzel semicircle rotation flap. The functional result was excellent. This technique may be useful in the repair of defects involving up to two-thirds of the upper eyelid margin. Strong immunostaining for proliferating cell nuclear antigen, Ki-67, epidermal growth factor receptor and *c-erb B-2* was demonstrated in this tumor.

Key words: Squamous cell carcinoma / Tenzel semicircle rotation flap / Immunohistochemical study

In 1975, eyelid reconstruction with a semicircle flap was described by Tenzel (1). He reported that defects up to three-fourths of the lower eyelid and one-half of the upper eyelid could be repaired satisfactorily by this method (2). The Cutler-Beard bridge flap technique using cartilage graft has been commonly performed in defects from 60% to the entire upper eyelid (3,4). We describe one patient with squamous cell carcinoma of the eyelid in which the Tenzel semicircle flap was used to reconstruct a 67% defect of the upper eyelid.

As squamous cell carcinoma is relatively rare in eyelids, we examined the immunohistological features of this tumor and evaluated its malignant potential.

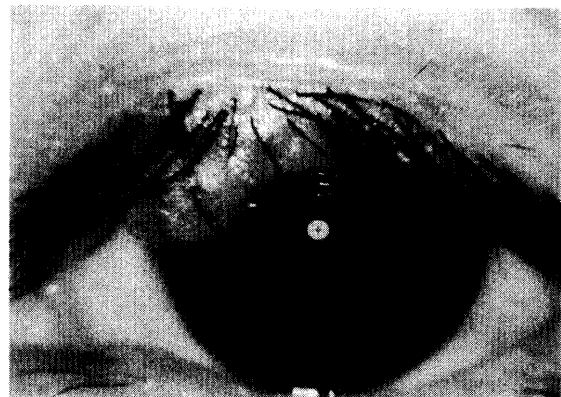
CASE REPORT

In 1989, a 46-year-old woman complained of a painless mass in her left upper eyelid and consulted a nearby hospital. The mass was diagnosed clinically as a chalazion, and it was partially excised. No histopathological examination was done. Thereafter, the mass recurred repeatedly, and several excisions were done by other ophthalmologists. In 1994, the eyelid mass increased gradually. On May 24, 1995, the patient was referred to Shimane Medical University Hospital. A nodular mass measuring 5 × 10 mm was found growing from the medial half of the tarsus (Fig.1). Her visual acuity was 1.0 OU. Both eyes otherwise appeared normal. Preauricular and submandibular lymph nodes were not palpable. Results of laboratory tests were negative or within normal range, including blood cell counts, blood chemistry and urinalysis. Chest X-ray demonstrated no evidence of

metastasis. Serum levels of tumor markers including carcinoembryonic antigen, alpha-fetoprotein and squamous cell carcinoma antigen were within normal range. Computed tomography of the orbit showed no invasion to the orbit.

On May 30, 1995, an incisional biopsy of the extruded portion was performed. Histopathological diagnosis was squamous cell carcinoma. On June 6, 1995, full-thickness excision of the upper eyelid, including the remainder of the tumor, was excised. A pentagonal incision, approximately 14mm (base) × 10mm (apex) in diameter, was performed. As the tumor cells were detected in the lateral margin of the excised specimen, two additional excisions were made (1.5mm+1.0mm). The final eyelid defect was 16.5 mm (67.3% of the length of her preoperative upper eyelid margin: 24.5mm). The defect was corrected by the semicircular flap technique described by Tenzel and Stewart (2).

Histopathologic study of the excised specimen



a



b

Fig. 1. a: A nodular mass arises at the lid margin of the upper eyelid. b: Ulceration is seen with the upper eyelid everted.

Correspondence to : Tatsuo Kodama, MD, Department of Ophthalmology, Shimane Medical University, Izumo, Shimane, 693, Japan. Tel 81-853-23-2111 (Ext. 2751) Fax 81-853-25-0464

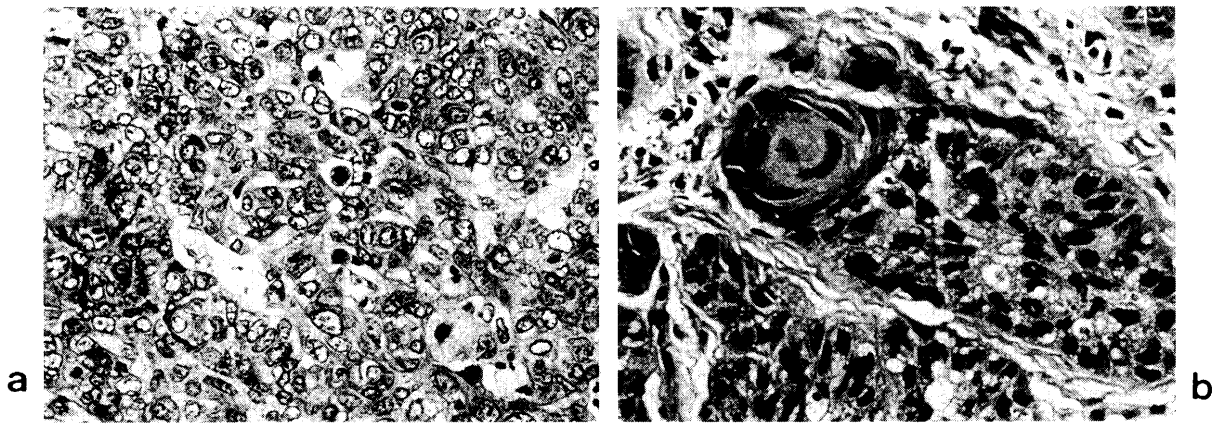


Fig. 2. a: Photomicrograph of the excised tumor showing atypical cells, loss of polarity, individual cell keratinization and abnormal mitosis. Hematoxylin and eosin (magnification $\times 100$). b: High power photomicrograph showing keratin pearl within the epithelial island. Hematoxylin and eosin (magnification $\times 200$).

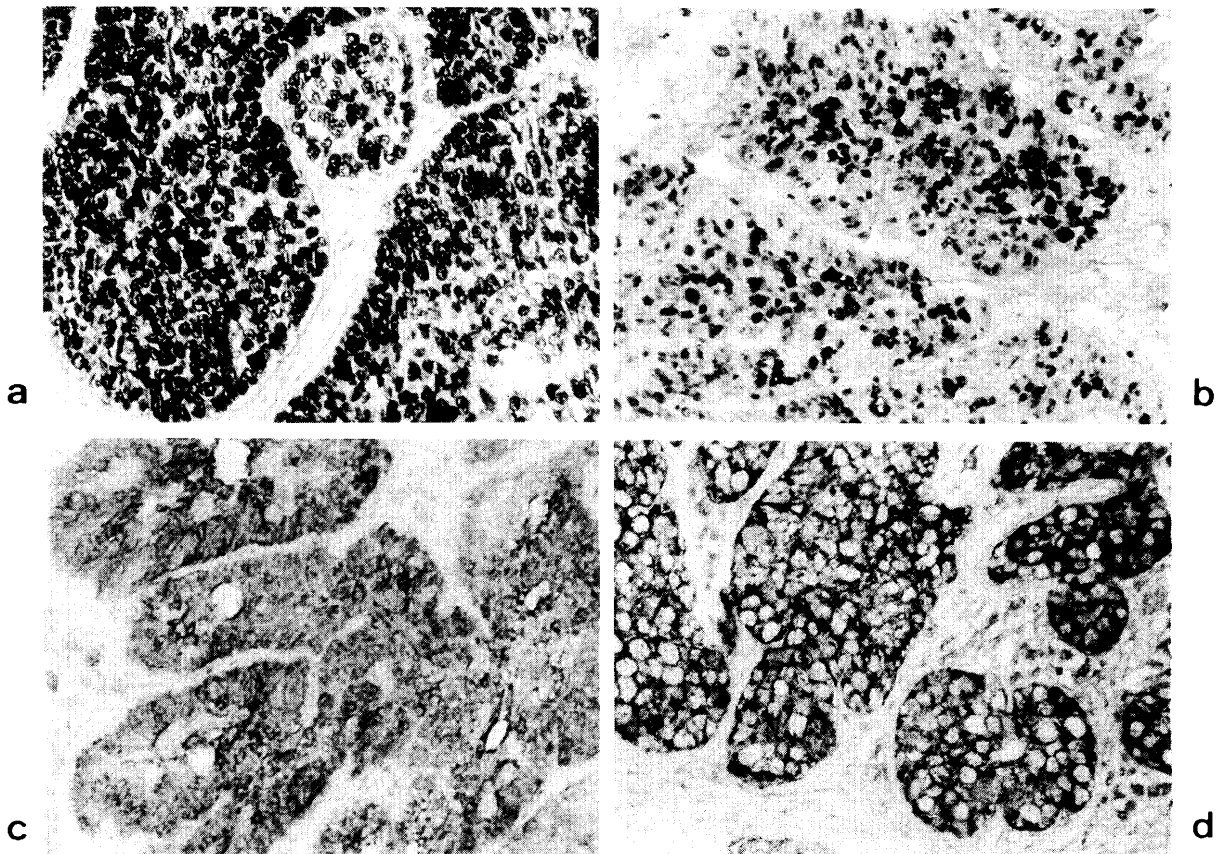


Fig. 3. Immunocytochemical staining in squamous cell carcinoma (magnification $\times 100$). a: Staining of the tumor cell using PC10 is very strongly positive. Paraffin-embedded tissue section was used. b: The rate of Ki-67-positive cell is 74% at the extruded portion of the eyelid tumor. Microwave-processed paraffin section was used. c: The tumor cell membrane using EGF-R1 shows strongly-positive staining. Frozen section was used. d: The tumor cell membrane using *c-neu* (Ab-3) shows strongly-positive staining. Microwave-processed paraffin section was used.

showed atypical epithelial cells with hyperchromatic nuclei and dyskeratosis of some tumor cells, indicating moderately differentiated squamous cell carcinoma (Fig.2-a,-b). Immunohistochemical staining for proliferating cell nuclear antigen (PCNA9, Ki-67, epidermal growth factor (EGF) receptor, and *c-erb* B-2 protein were assessed with the tumor sections

using monoclonal antibodies PC10 (DAKO, Copenhagen, Denmark), MIB-1 (IMMUNOTECH, Marseille, France), EGF-R1 (DAKO), and *c-neu* (Ab-3) (Oncogene Science, New York, USA), respectively. Results were determined with avidin-biotin complex immunostaining. Strong immunostaining for PCNA, EGF-R, and *c-erb* B-2 protein was demonstrated in the



Fig. 4. Three months postoperatively, the eyelid shows no recurrence and a good functional result.

tumor cells (Fig.3-a,-c,-d). Higher Ki-67 counts were also observed (Fig.3-b).

The postoperative course was uneventful. No recurrence or metastasis was noted during the postoperative follow-up period of 20 months. The functional result of the reconstructed eyelid was excellent (Fig.4).

DISCUSSION

Squamous cell carcinoma is relatively rare in the eyelids, accounting for about 2.4% to 30.2% of all malignant eyelid lesions (5). It has been reported that squamous cell carcinoma of the eyelid occurs about 40 times less frequently than does basal cell carcinoma of the eyelid (6). In most cases, squamous cell carcinoma of the eyelids is well differentiated and typically affects elderly individuals and males, and commonly arises in the lower eyelid (5). Thus, we believe that the squamous cell carcinoma arising in our patient is uncommon.

It is recommended that upper eyelid defects of 40%–60% can be corrected by the Tenzel semicircle rotation flap, and that reconstruction of defects from 60% to the entire eyelid should be performed using cartilage graft (3,4). The semicircle flap has the advantage of not using tissue from the eyelids, nose, ear or mouth. However, reforming the lateral portions of the eyelid may be difficult if the flap is used for defects larger than those it can cover (3). In this case, the eyelid defect excised was larger than we expected preoperatively. Although the extent of the eyelid excised involved 67% of the upper eyelid margin, we could encompass the defect with the flap. The technique may be effective in the repair of defects involving up to two-thirds of upper eyelid margin, particularly in patients with loose tissue.

It is now widely accepted that tumor cell kinetics directly influence the clinical course of patients suffering from cancer. Immunostaining for cell cycle-associated molecules PCNA and Ki-67 has been used in the assessment of proliferative status of several tumors (7,8). We previously reported that immunohistochemical study for EGF receptor may be the hallmark of epidermoid malignancy and that

strong immunostaining was observed in squamous cell carcinomas of the conjunctiva (9). *c-erb* B-2 oncogene encodes a 185-kDa EGF receptor-like membrane glycoprotein and several investigators have reported an association between *c-erb* B-2 over-expression and early disease recurrence or short survival in patients with breast cancer (10,11). To our knowledge, a report on immunostaining in squamous cell carcinomas of the eyelid may be rare. We therefore examined the immunohistological features in this case and evaluated its malignant potential. In this case, PCNA and Ki-67 were strongly immunostained. Strong immunostaining for EGF-R and *c-erb* B-2 protein was also detected in squamous cell carcinomas of the eyelid. These results indicate high proliferative activity of tumor cells and may relate to their infiltrative activity found in the surgical margin, by which two additional resections were required. This suggests the necessity of close postoperative follow-up of the patient.

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