

# Hormone Administration Promotes the Epithelium Healing in Patients with Recurrent Corneal Epithelial Exfoliation

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## Abstract

**Purpose:** To investigate the effects of hormone administration upon epithelium healing in patients with recurrent corneal epithelial exfoliation.

**Methods:** The recurrence rate of 56 patients with recurrent corneal epithelial exfoliation was compared after 3-month follow up, 30 patients of whom received the basic treatment of bFGF and pressure bandage plus prednisone administration (combination treatment group, ie. A) and the other 26 patients received the basic treatment alone (single treatment group, ie. B).

**Results:** No patients showed recurrence in the combination treatment group. But there were 20 patients (76.92%) in the basic treatment group recurred.  $\chi^2$  test showed that  $\chi^2=35.9$ . The two groups had significant difference regarding the recurrence of corneal epithelial exfoliation ( $P<0.01$ ).

**Conclusion:** For the patients with recurrent corneal epithelial exfoliation, hormone administration should be considered to reduce the recurrence and protect the function of cornea as a supplement to the basic treatment. (*Eye Science* 2011;26:97-99)

**Keywords:** Corneal epithelial exfoliation; Recurrence; Hormone administration

Corneal epithelium is the first barrier between intra-ocular environment and external environment, and can recover rapidly after being injured. However, delayed recovery may lead to a series of complications, such infection, corneal neovascularization, leukoma, and even blindness, and can cause many sufferings to the patients. Therefore, rapid and effective healing after corneal epithelial injury is of great importance in maintaining the function of corneal epithelium as a barrier, as well as in

the formation of normal vision acuity. Patients with initial injury often recover within a very short period of time after pressure bandage, but those patients who have undergone conventional treatment obviously have 1-2 days longer course as compared to those with initial onset. We compared the differences in disease course and recurrence after combining with hormone administration, so as to determine whether hormone promotes the healing of corneal epithelium, and to provide guidance for the clinical treatment for patients with recurrent corneal epithelial exfoliation.

## Data and methods

### Clinical data

A total of 56 patients, who received medical treatment in our hospital during January 2005 and July 2010, all of whom had over 3 recurrences at a time interval of 2-3 months with a 6 months to 1 year course of disease, were included into the study and were randomly assigned to two groups: single treatment group and combination treatment group.

### Examinations

Diagnosis was confirmed by performing slit-lamp assisted microscopic examination after staining with 2% fluorescein and compared with the location and size of corneal lesions in the initial injury. Epithelial cells were obtained from corneal limbus before and after treatment in 3 and 2 patients in group A and group B, respectively, for pathological observations, so as to determine the presence of infiltrating cells around corneal limbus.

### Treatment approaches

For group A, patients were given corneal nourishing agent basic fibroblast growth factor (bFGF) in eye drops (1-2 drops/time, 8-10 times/day) and pressure bandage (for 2-14 days) in combination with

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15–20 mg daily draught of prednisone in the morning for 2–3 days. As for group B, patients were administered only bFGF eye drops and pressure bandage (at the same dosage and schedule in group A). All the patients in two groups underwent at least 6-month follow-up.

### Statistical analysis

$\chi^2$  test was performed by using SPSS 13.0 statistical software.

## Results

### General information

A total of 30 patients were allocated in group A, including 24 males and 6 females at the mean age of  $27.8 \pm 2.3$  years. In group B, totally 26 patients were enrolled, including 19 males and 7 females at the mean age of  $29.5 \pm 3.5$  years. No significant differences were noted in age and gender between two groups.

### Clinical manifestations

All the patients mainly presented with pricking, photophobia, lacrimation, and foreign-body sensation. The location, size and shape of these recurrent lesions were generally consistent with the initial ones in the patients, with 2–3 months interval between consecutive episodes. Mostly, recurrence suddenly occurred at 3:00 a.m. without any origin.

### Pathological findings

Neo-vascular infiltration was observed in corneal limbus before treatment, with a large number of lymphocytes and neutrophils and a small amount of eosinophils. After the treatment, neo-vasculature was found closed during healing phase; vessels were surrounded by aggregated lymphocytes in early phase and were then replaced by fiber, while surface layer was covered by proliferative epithelial cells.

### Disease course and recurrence

During the follow-up, the patients in group A showed significantly shorter course of disease, averagely by 1–2 days, without any recurrence. While for group B, 20 patients (76.92%) had at least one further episode of recurrence (Table 1), and each course of disease was more than 2 days.

### Statistical results

The recurrence of corneal epithelial exfoliation in group A was significantly better than that in group B

**Table 1** Comparison on further recurrence in the patients between two groups

	Patients without further recurrence	Patients with further recurrence	Total
Combination treatment group	30	0	30
Single treatment group	6	20	26
Total	36	20	56

Note:  $\chi^2=35.9, P<0.01$

with extremely significant difference ( $P<0.01, \chi^2=35.9$ ).

## Discussion

In this study, we observed 56 patients with recurrent post-traumatic corneal epithelial exfoliation, and found that recurrence mostly occurred at night. Possible reasons included: first of all, poor healing of corneal epithelium after trauma caused recurrent exfoliation. Secondly, lacrimal secretion plummeted to the lowest level during the night while the tear was hypo-osmotic, in addition to malnutrition in corneal epithelium and swelling of corneal epithelium in the region of palpebral fissure; once the eye lips rubbed against the cornea, corneal epithelium was prone to rupture. Thirdly, patients suffered from extensive epithelial exfoliation with basal membrane injury; therefore new epithelial cells could not firmly adhere to it.

Pressure bandage facilitated tight connection between corneal epithelium and stromal layer and thus accelerated the healing of epithelium. For the patients suffering from corneal trauma for the first time, the injured corneal epithelium treated by pressure bandage could be healed soon. However, for those with recurrent corneal trauma, the course of disease might be prolonged and the trauma was difficult to recover shortly. The main active ingredient of bFGF is basic fibroblast growth factor, which is a multi-functional cell growth factor that promotes the repair and renewal of the tissue originating from mesoderm and neuro-ectoderm. It effectively triggers the growth and migration of human corneal epithelial cells, matrix fibroblast and endothelial cells. It can specifically act on the injury site in cornea, and thereby accelerate healing of cornea and improve the quality of corneal healing by activating and regulating the repair mechanisms in corneal tissue and

cells, which plays an important role in the repairing process of cornea<sup>1</sup>. However, it is also a potent vascular endothelial growth factor and fibroblast growth factor that accelerates the growth of CNV and exacerbates corneal scarring, leading to occurrence of significant complications<sup>2,3</sup>. The role of hormone administration in the proliferation of collagen fiber under corneal epithelium was studied after LASIK; it was found that glucocorticosteroid reduced the occurrence of corneal opacity mainly by inhibiting the synthesis of collagen peptide and proline hydroxylase, reducing synthesis of DNA and proteins, inhibiting proliferation of fibroblasts, inducing collagenase in fibroblasts and promoting degeneration of collagen<sup>4,5</sup>.

After 6-month follow-up, group A presented with not only shorter course of disease but also no further recurrence in any patient, while 20 patients (76.92%) of group B had a course of disease of more than two days and at least one further recurrence. It was clear that combined hormone therapy could significantly shorten the course of disease and reduce the number of recurrence in patients with recurrent corneal epithelial exfoliation and promote the healing of corneal epithelium. Based upon the pathological findings in this study, it was clear that immune response might have been involved in corneal epithelial exfoliation, while administration of hormone could obviously decrease inflammatory response, reduce infiltration of lymphocytes, promote proliferation of epithelium and reduce formation of scar. Moreover, it was considered that combined hormone administration might offset the side effects of corneal epithelial nourishing agent, and in the meantime enhance its

role in promoting epithelial healing.

To sum up, for patients with multiple episodes of recurrent corneal epithelial exfoliation, hormone therapy can be used to accelerate epithelial growth, promote healing and reduce the side effects caused by corneal nourishing agent. However, due to the small sample size and short follow-up period in this study, subsequently we expect to conduct longer term follow-up for these patients, particularly those treated with combined therapy, and perform pathological examinations in more patients when feasible, in the hope of obtaining more valuable observation as guidance for clinical treatment and observing how hormone administration promotes the healing of corneal epithelium.

## References

- 1 Xu JT, Sun BJ, Fang HZ. Fundamental Theory and Clinical Practice of Ocular Surface Conditions. Tianjin science and technology press, 2002, 20.
- 2 Teicher BA, Alvarez E, Menon K, et al. Antiangiogenic effects of a protein kinase C beta-selective small molecule. *Cancer Chemother Pharmacol* 2002, 49(1): 69.
- 3 Li W, Zhou YD. Clinical Efficacy of Recombined Human Keratinocyte Growth Factor Variant for Alkali Burn in Rabbit. *China Pharmacy*, 2008, 19(7): 513–515.
- 4 Mao PA, Ma YL. The Advancement of Haze under Corneal Epithelium after Eximer Laser Photorefractive Keratectomy. *Medical Recapitulate*, 2006, 12(4): 407–409.
- 5 Zhu LY, He ZL, Chen FL, et al. Different regimens of early high-dose glucocorticoids in reducing corneal Haze after LASEK. *Journal of Youjiang Medical University for Nationalities*, 2008(1): 16–18.