



## Chemical Burn and Limbal Stem Cell Deficiency in Pictures

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### ABSTRACT

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The stem cells located at the limbic level are responsible for the renewal of the corneal epithelium, in a physiological situation, but also for healing.

The can be of very diverse etiologies, including eye burns, whether by acid or by base. Burns by bases are more serious than those by acids, in fact, due to their chemical properties, bases quickly penetrate cells to reach deep tissues. In these cases the destruction of the limbus and its stem cells leads to corneal epithelial regeneration from the epithelium of the bulbar conjunctiva. The cornea will then be invaded by the conjunctival epithelium and will change its phenotype.

To illustrate this syndrome, we report the case of a 19-year-old patient, with no particular medical history, seen in our training following bilateral ocular burns by lime while performing domestic chores (Base, pH= 12.3).

The initial examination found visual acuity with “hand movements” in both eyes, with grade III base burn on the right and grade IV on the left according to the Hughes classification modified by Ropper Hall, with bilateral central corneal ulcer.

The evolution was marked by the occurrence of a Limbal stem cell deficiency, with the appearance of a bilateral 360° vascular call, and a chronic ulcer in the left eye.

Limbal stem cell deficiency are mainly found in grades 3 and 4, which include extensive limbic ischemia, which is the case of our patient. As for the treatment of chemical burns by bases, the ocular wash is the first step which must be carried out quickly and abundantly, followed by medical treatment. But when a Limbal stem cell deficiency occurs, limbal transplantation is the appropriate treatment, even if the time taken to perform this transplantation still seems to be a subject of controversy: the intervention time must be less than 4 months for Gatinel and collaborators, but longer for Rao and collaborators, who believe that this improves the prognosis due to the absence of inflammation and ischemia.

### KEYWORDS:

limbal stem cell deficiency, eye burn

### INTRODUCTION

The stem cells located at the limbic level are responsible for the renewal of the corneal epithelium, in a physiological situation, but also for healing [1].

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In these cases the destruction of the limbus and its stem cells leads to corneal epithelial regeneration from the epithelium of the bulbar conjunctiva. The cornea will then be invaded by the conjunctival epithelium and will change its phenotype.

### OBSERVATION

To illustrate this syndrome, we report the case of a 19-year-old patient, with no particular medical history, seen in our training following bilateral ocular burns by lime while performing domestic chores (Base, pH= 12.3).

The initial examination found visual acuity with “hand movements” in both eyes, with grade III base burn on the right and grade IV on the left according to the Hughes

classification modified by Ropper Hall [2], with bilateral central corneal ulcer.

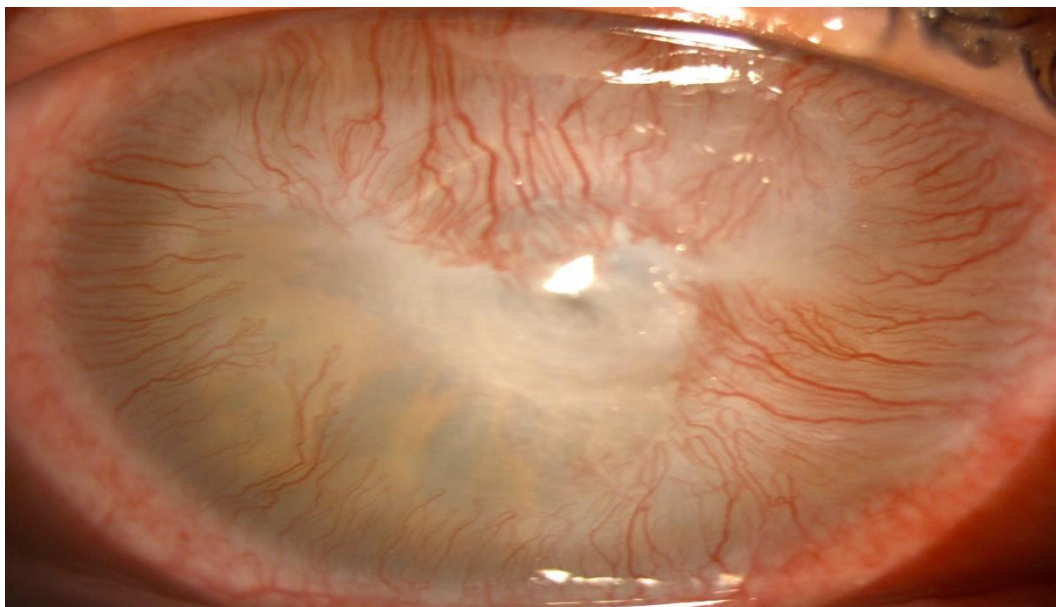
The initial course of action had consisted of his hospitalization, with abundant ocular washing, use of artificial tears, topical steroidal anti-inflammatories, local antibiotics and therapeutic lenses.

The delay for the realization of a possible limbic graft being a subject of controversy (less than 4 months after the burn for some, later after complete disappearance of the inflammation for others) [1], we opted for a close monitoring for 4 months before proposing a transplant. The evolution was marked by the occurrence of a Limbal stem cell deficiency, with the appearance of a bilateral 360° vascular call, and a chronic ulcer in the left eye, illustrated by the following pictures. (Figures 1 to 3) The patient was referred to a specialized center for corneal transplantation, then lost sight of, because the patient no longer showed up for follow-up consultations.

## DISCUSSION

Ocular burns are one of the main emergencies in ophthalmology. They require rapid and adequate management in order to improve the prognosis, which remains reserved in the event of limbic involvement. They are of various etiologies, which can be of chemical, thermal or radiation origins. Ocular involvement complicates about 15 to 20% of facial burns. Often bilateral, burns mainly affect young, male subjects [3; 4], which is the case of our patient. In addition, accidents at work and domestic accidents are the main incriminated causes, as in our young patient. The severity of lesions during chemical eye burns depends on several factors: the nature of the product, its concentration, the duration of exposure of the eye, etc...

## FIGURE :



**Figure 1: right eye aspect in the slit lamp**

When the chemical burn is secondary to bases, the latter quickly and deeply penetrate the ocular environments. The anion saponifies the fatty acids of cell membranes and causes epithelial cell death instantly [2]. In addition, when these burns reach a large part of the limbal epithelium, the seat of limbal stem cells, this can lead to limbal stem cell deficiency. The Hughes classification modified by Roper and Hall is the most widely used to assess base burns.

Limbal stem cell deficiency are mainly found in grades 3 and 4, which include extensive limbic ischemia [1], which is the case of our patient. As for the treatment of chemical burns by bases, the ocular wash is the first step which must be carried out quickly and abundantly, followed by medical treatment. But when a Limbal stem cell deficiency occurs, limbal transplantation is the appropriate treatment, even if the time taken to perform this transplantation still seems to be a subject of controversy: the intervention time must be less than 4 months for Gatinel and collaborators [5], but longer for Rao and collaborators, who believe that this improves the prognosis due to the absence of inflammation and ischemia [6].

## CONCLUSION

Ocular burns constitute an emergency in ophthalmology and the management of which must be carried out as soon as possible, initiated by abundant ocular washing.

In the case of relatively severe ocular burns by lime, the occurrence of Limbal stem cell deficiency is to be feared. The treatment then proposed is a limbic transplant, the prognosis of which is all the better as there is no persistent inflammation of the ocular surface, but the main seriousness of this pathology remains the bilateral involvement of both eyes.

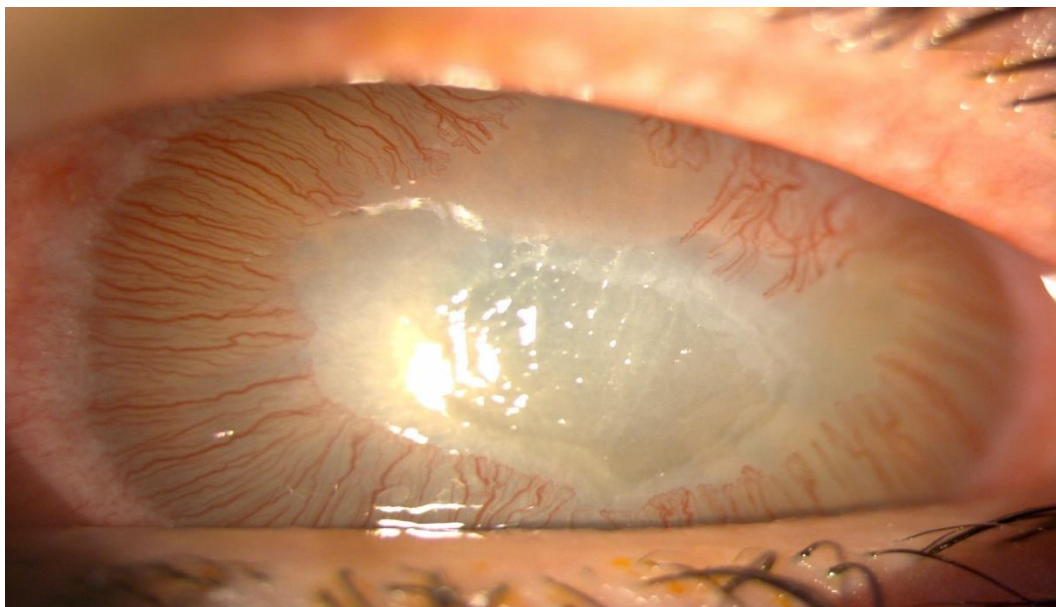


Figure 2: left eye aspect in the slit lamp.

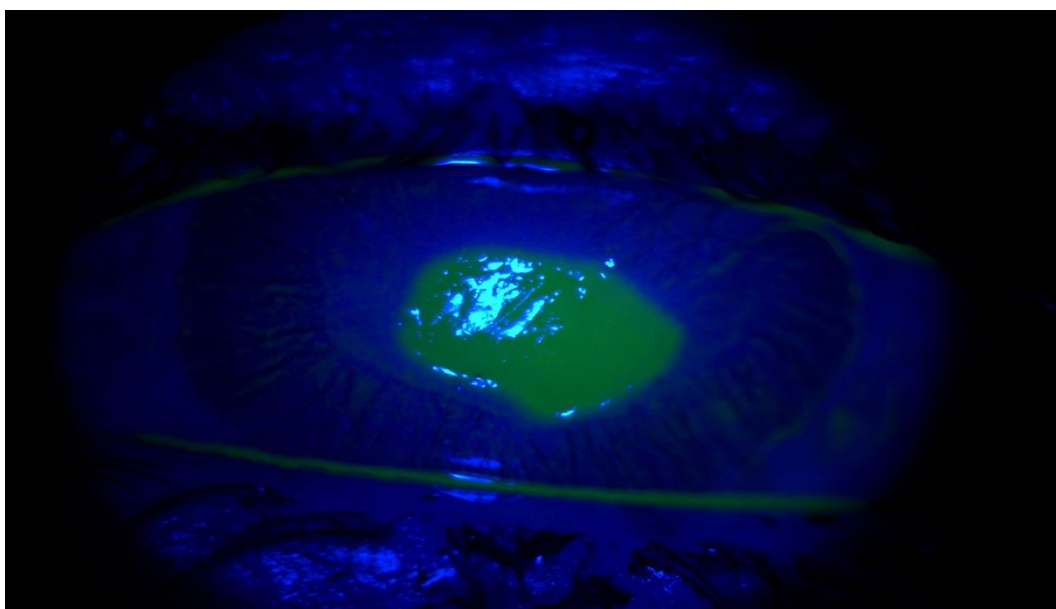


Figure 3: aspect of left eye ulcer after fluorescein staining.

#### REFERENCE

1. Majo, F., Barrandon, Y., Othenin-Girard, P., Toubanc, M., & Hoang-Xuan, T. (2006). Fr. *Ophthalmol.*, 2006; 29, 9, 1060-1069
2. Merle, H., & Mesnard, C. (2020). Brûlures oculaires Ocular burns. [https://doi.org/10.1016/S0246-0343\(20\)78682-X](https://doi.org/10.1016/S0246-0343(20)78682-X)
3. Ghosh S, Salvador-Culla B, Kotagiri A. Acute chemical eye injury and limbal stem cell deficiency. A prospective study in the United Kingdom. *Cornea* 2019;**38**:8–12.
4. Le Q, Chen Y, Wang X, Li Y, Hong J, Xu J. Vision-related quality of life in patients with ocular chemical burns. *Invest Ophthalmol Vis Sci* 2011;**52**:8951–6.
5. Gatinel D, Nghiem MH, Chaine G. Auto- greffe de limbe précoce après brûlure alcaline de la surface oculaire. *J Fr Oph-talmol*, 1999;22:76-8.
6. Rao SK, Rajagopal R, Sitalakshmi G, Pad-manabhan P. Limbal autografting: comparison of results in the acute and chronic phases of ocular surface burns. *Cornea*, 1999;18:164-71.