

# A case of pseudo-ocular cicatricial pemphigoid caused by aerosolized hypochlorite water

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## Abstract

**Pseudo-ocular cicatricial pemphigoid (OCP) is an intractable keratoconjunctival disease which mimics ocular surface findings of OCP. The disease is usually caused by long-term administration of eye drops. We present a case of suspected pseudo-OCP in a 56-year-old woman on the basis of clinical findings, such as swelling of the eyelids, shortening of the conjunctival sacs, and symblepharon in both eyes. She was constantly using hypochlorite water at work, and exposure to aerosolized hypochlorite water was suspected as the cause of her pseudo-OCP. We instructed her to avoid aerosolized hypochlorite water environment and prescribed fluorometholone eye drops, which resulted in an improvement in the clinical findings. This is the first case report of pseudo-OCP caused by exposure to a chemical aerosol, not by direct application of eye drops. In cases of pseudo-OCP suspected, physicians should consider not only the history of eye drop use, but also exposure to aerosolized chemicals**

**Keywords:** Pseudo-ocular cicatricial pemphigoid, Sodium hypochlorite, Weak acid hypochlorous solution, hypochlorite water aerosol, Humidifier.

## Introduction

Ocular cicatricial pemphigoid (OCP) is an autoimmune disease that causes scarring lesions on the ocular surface. In dermatology, this condition is considered as a specific pathology of pemphigoid limited in the ocular surface and is called “ocular mucous membrane pemphigoid”. In ophthalmology, however, the term of OCP is common and we use “OCP” in this paper. Although the standard treatment is to instill artificial tears and anti-inflammatory medications or immunosuppressant including steroid, OCP is often difficult to treat. On the other hand, similar process limited only to the conjunctiva observed in some patients using eye drops, usually glaucoma medications, is called pseudo-OCP1. Here, we report a case of pseudo-OCP which is strongly suspected to be caused by humidifier use with hypochlorous acid water.

## Case Report

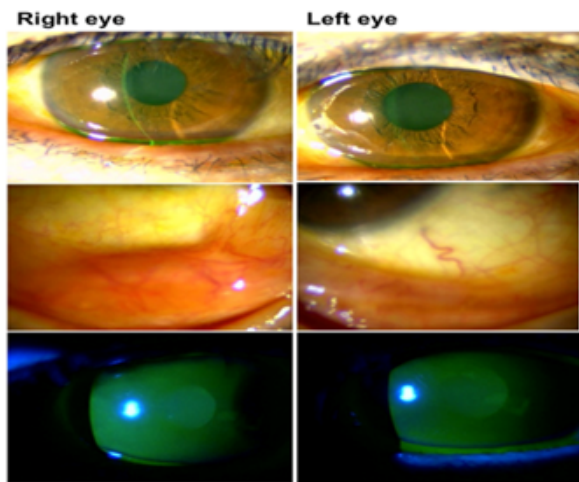
A 56-year-old woman was referred to our clinic with a diagnosis of intractable allergic conjunctivitis. She had been treated by a local ophthalmologist with antiallergic eye drops (epinastatin hydrochloride) and steroid eye drops (0.1%

betamethasone) 4 times a day for 4 weeks, but the symptom did not improve. At the first visit, best corrected visual acuity was 20/20 in both eyes and the intraocular pressure was 16.0 mmHg in OD and 18.0 mmHg in OS. Slit lamp microscopy revealed not only hyperemia and papillary edema in the conjunctival membrane but also shortening of the conjunctival sacs and symblepharon in both eyes (Figure 1). No remarkable findings were found in the eye, in blood tests or in orbital computed tomography. Although her medical history and family history were unremarkable, and she was not a constant user of any eye drops, binocular symblepharon suggested the pseudo-OCP due to external factors other than eye drops. She worked at a public bath that used a humidifier with hypochlorous acid water under well-ventilated, as a measure against coronavirus (COVID-19), and had been exposed to aerosolized hypochlorite water for more than 3 months before the symptom occurred, which suggested that hypochlorite water is a causative external factor of pseudo-OCP. Thus, we instructed her to avoid aerosolized hypochlorite water environment and prescribed fluorometholone eye drops, which resulted in an improvement in the clinical findings. At 3 months after the first visit, conjunctival sac shortening, symblepharon, and conjunctive edema were improved (Figure

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2), and 0.1% fluorometholone eye drops were reduced to 2 times a day. At 4 months, those findings disappeared (Figure 2), and the treatment was stopped. No recurrence of symptoms has been observed.



**Figure 1.** Anterior findings of the eye at the time of initial diagnosis. Swollen eyelids, mild hyperemia, papillary, and edema were observed in the conjunctival membrane of both eyes, and findings of shortening of the conjunctival sacs and symblepharon adhesions were recognized. The image of staining with fluorescein showed no SPK and other scar was found on the corneal surface.



**Figure 2.** The time course of the anterior of the eye. Conjunctival sac shortening (▲) and adhesions of the eyelid (→) were still recognized 2 weeks later and 1 month later. After 2 months, the symblepharon adhesions had improved, and after 4 months, disappearance of conjunctival sac shortening, the symblepharon adhesions, and eyelid edema was confirmed.

## Discussion

Pseudo-OCP was first reported by Patten et. al. in 1976 [1]. Topical glaucoma medications, rosacea

blepharoconjunctivitis, atopic keratoconjunctiviti, and lichen planus have been reported as possible causes. Although glaucoma medicines such as  $\beta$ -blockers [2], epinephrine  $\alpha$  agonists, miotics including pilocarpine hydrochloride are well-known causes of pseudo-OCP, homemade or folk remedies such as plant extracts, lemon juice, and some dried insect bodies may also cause this condition [3-5]. In this case, other than the hypochlorite water, there were no agents including eye drops or cosmetics that were exposed to the eyes on a daily basis. Also, there were no symptoms in other parts of the body such as the oral cavity, lungs, and skin. Although we did not have direct pathological evidence for this case, we concluded that it was pseudo-OCP based on conjunctival findings, course, and circumstantial evidence.

Sodium hypochlorite, a chemical component of bleach and is different from hypochlorous acid water, is a well-known hazardous agent to the eye. It causes inflammation when exposed directly to the eye [6], and the symptoms of severe pain, burning, glitter, and fogging, and findings such as conjunctivitis, corneal ulcers, and visual impairment have been reported [7,8]. On the other hand, hypochlorous acid water also inactivates pathogens while is relatively safe for humans [9]. Although humidifiers using hypochlorous acid water have been sold, routine use of disinfectants on environmental surfaces by spraying or fumigation is not recommended by the World Health Organization [10]. So far, damages to the eye caused by hypochlorous acid water have not been reported. In the present case, hypochlorous acid water was considered the main cause because avoidance of exposure to hypochlorous acid water aerosol improved the symptom.

## Conclusion

All previously reported cases of pseudo-OCP have involved direct exposure to some liquid agents, and as far as we know, this is the first case in which an aerosolized irritant was considered to be a cause of pseudo-OCP. In cases of pseudo-OCP suspected, physicians should consider not only the history of eye drop use, but also exposure to aerosolized chemicals.

## Acknowledgements

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## Conflict of Interest

No conflict of interest.

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