



DOI: 10.14744/eer.2021.77486
Eur Eye Res 2021;1(3):167–169

EUROPEAN
EYE
RESEARCH

ORIGINAL ARTICLE

Topical ivermectin in the treatment of blepharoconjunctivitis caused by demodex infestation

 Altan Atakan Ozcan,  Burak Ulas

Department of Ophthalmology, Cukurova University Faculty of Medicine, Adana, Turkey

Abstract

The aim of this study was to present a case of chronic blepharoconjunctivitis due to Demodex infestation. A 46-year-old man patient presented with itching, burning, tearing, and redness in the right eye for 4 months. Biomicroscopic examination revealed chemosis, hyperemia, and papillary reaction in the right eye. Demodex in the hair follicles of eyelashes and their potential influence were suspected. For diagnosis, lash sampling with direct microscopic counting method was used. When Demodex infestation was diagnosed tea tree oil (TTO) treatment was started. However, TTO increased ocular allergy. After TTO was stopped, topical ivermectin treatment was started. Dramatic improvement was observed in 1 week. No recurrence was seen at 6 months follow-up. Rare causes should be considered in the selection of diagnosis and treatment in long-term unilateral conjunctivitis. Demodex infestation is often overlooked in the differential diagnosis of ocular surface diseases. Topical ivermectin was effective in the treatment of demodex.

Keywords: Blepharoconjunctivitis; Demodex; ivermectin; tea tree oil.

Demodex mites may be a potential etiological factor in the development of various eye and skin disorders.^[1] Demodex mites are the most common ectoparasite found in human skin.^[2] The follicle mite lives in the hair follicles and sebaceous glands, especially of the face, nose, and eyelids.^[1,3] Demodex is an eyelid infestation that may also be the cause of blepharoconjunctivitis.^[1,3] Demodex is a common but overlooked cause of ocular surface inflammation.^[1,2] Two distinct Demodex species have been confirmed as a cause of blepharitis: Demodex folliculorum, Demodex Brevis.^[1,2] The main symptoms are itching, burning, foreign body sensation, crusting and redness of the lid margin, and

blurry vision.^[3] The mechanical blockage of meibomian glands can result in the severe lid margin inflammation.^[2,3] The misdiagnosed Demodex-related conjunctivitis is usually refractory to conventional medications.^[1–3] Tea tree oil (TTO) treatments are effective in eradicating mites and reducing ocular surface inflammation.^[2,3] However, TTO has caused irritation in some patients.^[2] Topical ivermectin is a new therapeutic modality that demonstrates antiparasitic and anti-inflammatory properties for Demodex.^[4,5]

This article aims to present topical ivermectin treatment in a case of chronic Demodex blepharoconjunctivitis. Ivermectin was effective, safe and well-tolerated in our case.



Cite this article as: Ozcan AA, Ulas B. Topical ivermectin in the treatment of blepharoconjunctivitis caused by demodex infestation. Eur Eye Res 2021;1:167-169.

Correspondence: Burak Ulas, M.D. Department of Ophthalmology, Cukurova University Faculty of Medicine, Adana, Turkey

Phone: +90 322 338 60 60 **E-mail:** drburakulas@gmail.com

Submitted Date: 14.06.2021 **Accepted Date:** 15.09.2021

Copyright 2021 European Eye Research

OPEN ACCESS This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



Case Report

A 46-year-old man was referred to our clinic with persistent itching, burning, and redness in the right eye for 4 months. His past medical and ocular history was unremarkable. He was using no systemic medication. He had no history of ocular trauma or previous eye surgery. Periodic improvements were noted when the patient received topical steroids (loteprednol), artificial tears (polyvinyl alcohol-povidone), and anti-allergic agents (olopatadine and sodium cromoglycate). His visual acuity was 10/10 in both eyes. Intraocular pressure was measured 12 mmHg in the right eye and 13 mmHg in the left eye. On the external examination of the periorbital region, exfoliative lesions and color changes around the eyelids and excretions over eyelashes were noted in the right eye. Slit-lamp examination revealed chemosis, hyperemia, papillary reaction. Blepharitis was the evident with cylindrical dandruff on the eyelashes of the right eye (Fig. 1) while the left eye's biomicroscopic examination was normal. Upon suspicion of Demodex, two eyelashes from the upper eyelid and two eyelashes from the lower eyelid removed from the right eye under biomicroscopy. The removed eyelashes were examined under light microscopy. Lash sampling with direct microscopic counting method was used (glycerol carbonate drop with fluorescein). Positive results were confirmed with standard parasitological methods with presenting Demodex folliculorum. On the fundus examination, the retina and the optic discs were normal in both eyes.

The patient was treated with TTO for eradicating mites and reducing ocular surface inflammation. When the patient was reexamined in the next week, increased hyperemia, chemosis, and papillary reaction were noted. Monothera-

py with TTO was discontinued. On the 8th day, topical ivermectin treatment (Sklice® 0.5% topical ivermectin, Arbor Pharmaceuticals, Atlanta, USA) was started twice a day. Dramatic improvement was seen in the 1-week control. Topical ivermectin was stopped at the 1st week control, just eyelid hygiene was continued. By the 1st month, no infestation and allergic reaction were present (Fig. 2). At the 6th month follow-up, no recurrence was present in the control examination. Written informed consent was obtained for identifiable health information included in this case report.

Discussion

Demodex is a common ectoparasite of human skin.^[6] Demodex can be found in hair follicles and sebaceous glands of the skin, especially on the face.^[6,7] Contiguous to the skin, the eye can also be infested by Demodex mites.^[6,7] The association with blepharitis is demonstrated in various studies.^[1,3,6-10]

The detection of Demodex in this blepharitis case showed the pathogenic potential of this ectoparasite which can be also found in normal skin flora.^[3,6,7] Demodex blepharitis is common but frequently overlooked.^[1-3,7] Demodex infestation should be considered in cases of blepharitis which do not respond to therapy.^[1,2,6,7] This case has also been treated with various diagnoses for 4 months before referred to our clinic. Methods for investigating Demodex should be added to the blepharitis diagnosis algorithm for accurate diagnosis and appropriate treatment.^[2,3,6,7] Cylindrical dandruff on eyelashes is a common specific finding in some blepharitis patients.^[1-3]

Demodex mites may be found in healthy, asymptomatic individuals.^[2,3] Prevalence is higher in the age group of 20-



Fig. 1. Right eye's biomicroscopic examination revealed chemosis, hyperemia, blepharitis with cylindrical dandruff.



Fig. 2. After topical ivermectin treatment, dramatic improvement was seen in 1 month.

30 years because of the increased sebum production.^[2,3,8] The prevalence peaks again with age, population above 60 years of age testing positive for Demodex.^[2,3,8] However in our case, the patient was 46-year-old.

TTO, a natural essential oil, has long been used in blepharitis with demodex infestation.^[3,8-10] Weekly lid scrub with TTO is effective in eradicating ocular Demodex infestation.^[3,5,9,10] However, TTO is strongly irritating and burning which limits its wider use in blepharitis patients.^[2,8] The other treatment options for Demodex blepharitis are topical or systemic metranidazole, topical povidine iodine, topical or systemic ivermectin.^[2-6,8,10]

The possibility of systemic side effects is a consequence of an oral treatment for a local disease. Therefore the popularity of topical treatment is increasing.^[2-6,8-10] Topical povidone-iodine was found effective at Demodex blepharitis, however, there is no controlled clinical trial in the literature.^[2] Systemic ivermectin is also a treatment option of Demodex mites, but a new modality of topical ivermectin is available recently.^[4-6,10] In refractory blepharitis, oral ivermectin reduced the Demodex mites in the lashes.^[6] Ivermectin has antiparasitic and anti-inflammatory effect.^[6] The side effects of oral ivermectin are diarrhea, dizziness, nausea, allergic reactions, skin swelling, fainting, fast heartbeat, fever, joint pain, vision changes, and yellowing of the eyes or skin.^[6] Ivermectin's anti-parasitic effect is known, though it has selective activity against glutamate-gated chloride ion channels from the invertebrates' peripheral nervous system.^[6,10] Avila et al.^[5] showed the acaricidal effect of topical metranidazole (1%)-ivermectin (0.1%) combination with 96% Demodex spp. eradication in their study. Topical ivermectin has associated anti-inflammatory, antiparasitic, and antibacterial effects with minimal side effects.^[4,5] Topical ivermectin's side effects are irritation, allergic dermatitis, and redness.^[4,5] Our patient applied a small amount of 0.5% ivermectin cream to affected eyelids. We did not see any side effects of topical ivermectin in our patient. Topical ivermectin treatment for Demodex blepharitis was effective, safe, and well-tolerated in our case.

Several systemic and topical medications have been proposed for the treatment of Demodex blepharoconjunctivitis. The use of topical medications is desirable because systemic medications have side effects and do not achieve high concentrations for eyelids Demodex infestation. There are only a few studies about topical ivermectin therapy and Demodex blepharoconjunctivitis in ophthalmology.

As a result, patients with persistent blepharitis should be investigated for Demodex. Topical ivermectin therapy in Demodex infestation can provide some advantages. More clinical trials are needed to demonstrate the efficient use of topical ivermectin in optimal therapeutic applications in ophthalmology.

Informed Consent: Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: A.A.O.; Design: A.A.O., B.U.; Supervision: A.A.O.; Resource: B.U.; Materials: A.A.O., B.U.; Data Collection and/or Processing: A.A.O., B.U.; Analysis and/or Interpretation: A.A.O., B.U.; Literature Search: A.A.O., B.U.; Writing: A.A.O., B.U.; Critical Reviews: A.A.O.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Schear MJ, Milman T, Steiner T, et al. The association of Demodex with chalazia: A histopathologic study of eyelid. *Ophthalm Plast Reconstr Surg* 2016;32:275-8. [\[CrossRef\]](#)
2. Pelletier JS, Capriotti K, Stewart KS, Capriotti JA. Demodex blepharitis treated with a novel dilute povidone-iodine and DMSO system: A case report. *Ophthalmol Ther* 2017;6:361-6.
3. Liu J, Sheha H, Tseng SC. Pathogenic role of Demodex mites in blepharitis. *Curr Opin Allergy Clin Immunol* 2010;10:505-10.
4. Choi Y, Eom Y, Yoon EG, Song JS, Kim IH, Kim HM. Efficacy of topical ivermectin 1% in the treatment of Demodex blepharitis. *Cornea* 2021;2021:2802. [\[CrossRef\]](#)
5. Avila MY, Martinez-Pulgarin DF, Madrid CR. Topical ivermectin-metranidazol gel therapy in the treatment of blepharitis caused by Demodex spp.: A randomized clinical trial. *Cont Lens Anterior Eye* 2021;44:101326. [\[CrossRef\]](#)
6. Holzchuh FG, Hida RY, Moscovici BK, et al. Clinical treatment of ocular Demodex folliculorum by systemic ivermectin. *Am J Ophthalmol* 2011;151:1030-4. [\[CrossRef\]](#)
7. Zhao YE, Wu LP, Hu L, Xu JR. Association of blepharitis with Demodex: A meta-analysis. *Ophthalmic Epidemiol* 2012;19:95-102. [\[CrossRef\]](#)
8. Hirsch-Hoffmann S, Kaufmann C, Banninger PB, Thiel MA. Treatment options for Demodex blepharitis: Patient choice and efficacy. *Klin Monbl Augenheilkd* 2015;232:384-7. [\[CrossRef\]](#)
9. Gao YY, Pascuale MA, Elizondo A, Tseng SC. Clinical treatment of ocular demodocosis by lid scrub with tea tree oil. *Cornea* 2007;26:136-43. [\[CrossRef\]](#)
10. Navel V, Mulliez A, Benoist d'Azy J, et al. Efficacy of treatments for Demodex blepharitis: A systematic review and meta-analysis. *Ocul Surf* 2019;17:655-69. [\[CrossRef\]](#)