

2015 OMIG Abstract 24

Pure 0.01% Hypochlorous Acid Cleanser without Sodium Hypochlorite Impurities for Treating *Demodex* Blepharitis

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PURPOSE *Demodex* is a common microscopic parasite associated with blepharitis which appears to arise from *Staphylococci* that are carried on the surface of the parasites and *Bacillus oleronius* found inside the mites. A case of an ocular surface disease patient with a *Demodex* infestation treated with AVENOVA (0.01% pure hypochlorous acid in saline pH 4 without sodium hypochlorite impurities) is described. We also present *in vitro* bactericidal activity of AVENOVA against bacteria associated with *Demodex*.

METHODS Time-kill kinetics was tested against *Staphylococcus aureus* (ATCC 25923), methicillin-resistant *S. aureus* (MRSA) (ATCC 33591), *Staphylococcus epidermidis* (ATCC12228), *Staphylococcus haemolyticus* (ATCC 29970), *Bacillus oleronius* (ATCC 700005), and *Propionibacterium acnes* (ATCC 6919). Assessments were made after 1 min, 5 min, 15 min and 30 min of exposure. At each time point, bacteria were serially diluted, plated, incubated at 37°C overnight, and enumerated.

RESULTS On examination the patient had a visually significant degree of corneal pannus extending centrally in her right eye; conjunctival hyperemia, 3+ papillary reaction, telangiectatic vessels along tarsal margins, sleeves surrounding the lash follicles and debris on the lids and lashes of both eyes. Following a regimen with AVENOVA, there was a dramatic improvement in degree of conjunctival hyperemia as well as the amount of debris and cylindrical sleeves seen around the patient's lashes. This was achieved without the need for topical or oral antibiotics or anti-parasitic agents. Treatment with AVENOVATM resulted in complete kill (> 99.9%) of *S. aureus*, *S. epidermidis*, *S. haemolyticus*, *B. oleronius*, and *P. acnes* in < 1 min.

CONCLUSION A pure 0.01% hypochlorous acid cleanser, without sodium hypochlorite impurities, hygiene regimen may be of benefit in managing patients with blepharitis. Further prospective clinical studies are warranted.