

Contact Lens Update

CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Midday fogging

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The challenge

A unique challenge of scleral lenses is fogging in the post-lens fluid reservoir, which is a frustrating problem for practitioners and patients alike. As explained in the editorial, when debris accumulates between the scleral lens and cornea, fogging may occur after minutes to hours of scleral lens wear.¹ Post-lens tear reservoir debris (midday fogging) occurs when debris accumulates between the scleral lens and cornea, which may occur minutes to hours post lens insertion.²⁻⁹ Midday fogging requires frequent lens removal and reapplication, which is an inconvenience for many scleral lens wearers.

Recent work

A recent study investigated if midday fogging could be mitigated by a novel scleral lens filling solution, which closely approximates the ionic concentration and pH of human tears:¹⁰

Fogt JS, Karres M, Barr JT. Changes in Symptoms of Midday Fogging with a Novel Scleral Contact Lens Filling Solution [published online ahead of print, 2020 Sep 15]. Optom Vis Sci. 2020;10.1097/OPX.0000000000001559. doi:10.1097/OPX.0000000000001559

This novel filling solution consisted of a formulation containing calcium, magnesium, potassium, and phosphate ions was compared to habitual sodium chloride solution. Current scleral lens wearers with prior complaints of midday fogging (N = 22) were evaluated and completed symptom surveys. The novel solution was assessed immediately and after 4 hours of lens wear via a slit lamp examination and anterior segment optical coherence tomography (OCT). After 5 to 9 days of using the novel solution, subjects were reexamined and the surveys repeated.

The median Ocular Surface Disease Index score decreased from 27.1 when using habitual filling solution to 9.1 when using the test solution (P = .006). The novel test solution (compared with the habitual solution) resulted in statistically significant decreases in burning/stinging (P = .04), grittiness/foreign body sensation (P = .01), dryness (P = .002), blurry/fluctuating vision (P = .002), and overall pain/discomfort (P = .006).

This study determined that the new solution was safe to use and was well tolerated. However, decreases in corneal staining and fogging were not statistically significant. Corneal staining is difficult to assess in a population with ocular surface diseases that are associated with inflammation, such as severe dry eye and keratoconus. A decrease in the mean staining score was found that was not statistically significant. This decrease suggests that products are at least equal to currently available substitutes. This improvement in staining may be due to

the addition of calcium, magnesium, potassium, and phosphate ions to the typical sodium and chloride ions, mimicking the composition of human tears more than sodium chloride alone.

There were no statistically significant changes in fogging between the products for particulates viewed behind the lens with either slit-lamp biomicroscopy or OCT. However, there was a small average numerical decrease found with all methods of measuring fogging. It is possible that there are multiple origins of midday fogging, which may contribute to the particulates under the lens. In this study, lens fit was not altered and tear exchange was not evaluated.

Further studies of the effectiveness of this solution to reduce midday fogging with a larger sample size are indicated.

Take away points

The type of fogging must be established between front surface, post-lens fluid reservoir or corneal edema. Current management of reservoir fogging is lens removal and reapplication, fitting modifications (improving landing zone alignment or reducing reservoir thickness,^{4,11} using a more viscous fluid for lens application, and treating underlying ocular surface disease, including allergies and dry eye disease.¹² Thus, multiple management strategies may need to be used to address fogging, as appropriate management of this problem will reduce the inconvenience of lens removal and reapplication and improve the scleral lens wearing experience.

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