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Case Report

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## Thimerosal-Induced Limbal Stem Cell Failure: Report of a Case and Review of the Literature

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**Purpose.** To report a case of unilateral total limbal stem cell (LSC) failure and corneal opacification secondary to thimerosal- and contact lens-induced ocular surface toxicity. **Methods.** Interventional case report and review of the literature on thimerosal-induced ocular surface changes. **Results.** A 49-year-old woman with a 2-year history of long-term soft contact lens wear developed unilateral total LSC failure and corneal opacification secondary to presumed thimerosal-induced toxicity and contact lens wear. At presentation, best-corrected visual acuities were 20/120 in the right eye and 20/15 in the left eye. The patient underwent a keratolimbal allograft and amniotic membrane graft followed by a penetrating keratoplasty. At the last follow-up, the right eye showed a clear corneal graft with a best-corrected visual acuity of 20/30. **Conclusions.** Thimerosal toxicity can lead to total LSC failure with secondary corneal vascularization and opacification. Keratolimbal allograft followed by penetrating keratoplasty can be successful in reconstructing the ocular surface in such cases.

**Key Words:** Contact lens—Keratolimbal allograft—Limbal stem cell failure—Preservative—Thimerosal.

Thimerosal is an organic mercurial compound commonly used as an antimicrobial preservative in contact lens disinfecting solutions. Adsorption of thimerosal by a contact lens followed by prolonged contact with the corneal epithelium can potentially cause serious ocular surface damage. Several *in vitro* studies have shown its cytotoxic effects.<sup>1–4</sup> In the late 1980s, thimerosal was increasingly withdrawn from contact lens solutions because of reports of toxic and immunoallergic ocular surface changes, such as a punctate coarse keratopathy, pseudodendritic lesions, superior limbic keratoconjunctivitis, and a more diffuse keratoconjunctivitis.<sup>5–9</sup> This report describes a case of thimerosal-induced total limbal stem cell (LSC) failure in a young woman. The ocular surface was reconstructed with

a keratolimbal allograft (KLAL) and an amniotic membrane graft followed by penetrating keratoplasty. The literature on thimerosal-induced ocular surface changes and management is reviewed.

### CASE REPORT

A 49-year-old myopic woman with a 2-year history of soft contact lens wear was referred with a history of recurrent episodes of ocular discomfort in her right eye with markedly decreased vision. Since beginning contact lens wear, she was repeatedly examined by her optometrist for redness, discomfort, and burning while using her lenses. The contact lenses were changed without benefit until they were eventually discontinued 1 year before her presentation, with some improvement of symptoms in her right eye and resolution of symptoms in her left eye. The patient had been using an Alcon saline solution (Fort Worth, TX) to clean and store her soft contact lenses. This product is a sterile, buffered, isotonic aqueous solution preserved with thimerosal, sorbic acid, and edetate disodium. Even after detailed questioning, the patient could not recollect the name of the soft contact lenses she had been using. The patient had no other preexisting ocular or medical conditions that could have predisposed to LSC failure.

The vision in her right eye gradually deteriorated with worsening of symptoms until she was referred for recurrent episodes of redness, blurred vision, and pain in the right eye. Her best-corrected visual acuity was 20/120 in the right eye and 20/15 in the left eye. The right cornea showed extensive epithelial and subepithelial haze with superficial and anterior stromal vascularization. There was patchy uptake of fluorescein across the whole cornea and loss of all recognizable limbal palisades of Vogt, clinically consistent with total LSC failure (Fig. 1). There was no evidence of tear film dysfunction. The left cornea appeared healthy. The condition in the right eye was thought to be secondary to recurrent or persistent keratoconjunctivitis related to thimerosal preservative and contact lens wear.

After receiving informed consent, a KLAL with an amniotic membrane patch graft was performed to repopulate the LSCs (Fig. 2). A conjunctival limbal autograft was not performed because of suspicion of subclinical LSC damage in the left eye. Postoperatively, the patient was immunosuppressed with oral cyclosporine for a period of 6 months. The postoperative recovery was uneventful. Penetrating keratoplasty was performed 17 months later.

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