Nosocomial keratitis caused by methicillin-resistant Staphylococcus aureus: case report and preventative measures

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A 47-year-old African-American woman was admitted to the intensive care unit of our community hospital for respiratory failure secondary to severe decompensated heart failure, requiring intubation. In the ensuing days, she developed a methicillin-resistant Staphylococcus aureus (MRSA) infection of the cornea, despite no growth of MRSA in multiple blood, sputum, and urine cultures. This unexpected corneal infection complicated her hospital stay, and increased morbidity and disease-related cost. Risk factors, warning signs, and preventative measures for MRSA keratitis secondary to lagophthalmos (inability to completely close one's eyelids) are outlined in this case report. Implementing simple precautions such as taping eyelids shut or using artificial lubrication may reduce patient morbidity and disease-related costs. These recommendations are directed to non-ophthalmic clinicians who provide care to patients in settings where MRSA colonization is widespread.

Keywords: exposure keratitis; MRSA; nosocomial conjunctivitis; nosocomial keratitis

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fortified gentamycin and vancomycin eye drops. By the third day of treatment, there was clearing of the infiltrate and a decrease in the size of the ulcer.

Visualization of the fundus of the left eye was now possible, the vitreous was quiet, and it was concluded that the bacterial infection was localized to the anterior segment as a keratitis.

Over the course of her 9-day ICU stay, the patient improved and was weaned off intubation. Once she was able to converse, we learned she had a history of congenital ptosis of the left upper eyelid with lagophthalmos and amblyopia. Her vision was poor in the left eye due to her amblyopia but otherwise, she rarely complained of ocular symptoms. Topical antibiotics were tapered and a small course of topical steroids was started. We contacted the patient’s primary care physician who urged us to keep the patient admitted at the hospital to complete the ophthalmic therapy because she has been known to be non-compliant for dozens of prior medical therapies.

Fearing the complications of further ocular infection (5), and consequences from medical non-compliance (6, 7) (e.g., greater morbidity, cost, and resources), we kept the patient admitted until the frequency of dosing could be cut down from every hour to every 4–5 hours (3 days). On a follow-up visit, visual acuity in the left eye recovered to her baseline of 20/200. Her left corneal ulcer healed well, with only a superficial scar remaining.

Discussion
Bacterial keratitis is very uncommon in a healthy eye and usually develops when ocular defenses have been compromised. Keen attention needs to be paid to the following four broad risk factors:

1. Contact lens wear
2. Trauma such as accidental injury and surgical injury (refractive surgery or loose sutures)
3. Ocular surface diseases such as dry eye and exposure
4. Systemic immunosuppression

The mechanism of infection in our patient started from exposure keratopathy due to lagophthalmos. The patient may have acquired this infection at the hospital where MRSA is more common and has a commensal relationship with the conjunctiva and nares (8).

Exposure keratitis may be caused by:

1. Neuroparalytic conditions, especially facial nerve palsy
2. Reduced muscle tone, such as coma, Parkinson’s, or stroke
3. Mechanical conditions, such as scarring and tight skin
4. Globe protrusion

Staining is typically seen in the inferior third of the cornea with subsequent epithelial breakdown. Secondary infection may supervene at any stage as in our patient. There have been several reports of MRSA keratitis occurring in hospitalized patients who were in comas (9), suffered a CVA (10), or had other neurological impairments allowing improper eyelid closure, resulting in exposure keratitis and infection with HA-MRSA.

Simple precautions, which are not yet the standard of care in all ICUs and operating rooms, may help prevent nosocomial ocular infections. Preventative treatment for exposure keratopathy depends on the reversibility of the exposure. Reversible causes may be treated with artificial tears (non-preservative) during waking hours and with an ointment at night. Alternatively, taping the lid closed at night is a viable option. Lid taping works well for patients undergoing non-ocular surgery and those who are in a coma or deeply sedated on intubation.

Permanent corneal exposure may be treated with tarsorrhaphy or insertion of gold weights in the upper eyelid in cases of facial nerve palsy. MRSA infections are becoming more frequent including ocular manifestations, prompting health care workers to vigilantly monitor their patients for signs of MRSA infections involving the eye (10). Hospitals and nursing homes will face rising rates of morbidity and cost if appropriate means of controlling ocular MRSA are not met. Patients with impaired lid closure may benefit from the preventive measures mentioned above.

These simple and cost-effective techniques, which are already implemented by many large institutions, could benefit patients if incorporated into the standard of care.

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