

Whether immune status affects the development of *Actinomyces* dacryocystitis is unknown. Earlier studies of the microbial profile in chronic dacryocystitis did not address the patients' immune state,<sup>3,4</sup> whereas in Kubo's series only 1 patient had diabetes.<sup>5</sup> In the present case the patient had several factors that contributed to a weakened immune system, including recent chemotherapy and possibly unknown active metastasis. His blood work from the previous month reflected a moderate degree of bone marrow suppression as evidenced by neutropenia and normocytic anemia with polychromasia, elliptocytes, and teardrop cells. This is the first reported case of *Actinomyces* abscess of the lacrimal sac wall in an immunocompromised patient. Given the increased risk for atypical infections in this case, consultation with an infectious disease specialist and initiation of empiric antibiotics, preferably after sampling for culture, would be appropriate.

*Actinomyces* is a gram-positive, branching, non-spore-forming, anaerobic bacillus. It is part of the normal flora inhabiting the human oropharynx, respiratory tract, gastrointestinal tract, and urinary tract. Infections usually occur in a healthy host with antecedent tissue trauma, most commonly in the cervical, facial, abdominal, thoracic, and intracranial areas.<sup>7</sup> *Actinomyces israelii*, also known as *Streptothrix*, has been found in 91% of canaliculal stones in canaliculitis.<sup>6</sup> Histopathological examination often reveals tangled filaments within sulfur granules surrounded by mixed inflammatory infiltrates, although sulfur granules are not specific for *Actinomyces*. Grocott's methenamine silver stain is routinely used to highlight fungal hyphae but readily stains the branching filaments of *Actinomyces*, as does Gram stain.

Histopathological examination of biopsy tissue remains the definitive method of diagnosis. Findings of lacrimal sac inflammation and abscess should prompt the search for sulfur granules, although the rate of dacryoliths in dacryocystitis is in the range of 6%–14%.<sup>5,6,8,9</sup> The differential for branching bacterial organism includes *Nocardia* and *Streptomyces*. Systemic antibiotics are not typically warranted in otherwise healthy patients once the infectious nidus is removed surgically via excision or, more conventionally, by DCR.

## CONCLUSIONS

*Actinomyces* is a rare cause of dacryocystitis. In immunocompromised patients, it can present atypically and may mimic a lacrimal sac tumour, causing diagnostic confusion. Excisional biopsy is essential to securing the diagnosis when malignancy is in question.

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## Tegaderm™ dressing and Lacri-lube ointment moisture chamber to manage exposure keratopathy



A 21-year-old male patient was admitted to the trauma/neurosurgical intensive care unit after a seatbelted, motor vehicle collision with a tree, which involved airbag deployment.

He suffered extensive injuries, including a left parietal skull fracture, basal skull fracture, intraventricular hemorrhage, epidural hematoma, and multiple open extremity fractures. He was intubated and sedated. An initial ocular examination was performed within an hour of admission. Periocular lid ecchymosis and edema were present bilaterally. There were left-sided superior lid and brow lacerations, which were repaired by the emergency team.

## Correspondence

Pupils were miotic and equally reactive bilaterally. There was no relative afferent pupillary defect. Intraocular pressures were 19 mm Hg bilaterally. The right-sided intraocular examination findings were within normal limits. The left globe was mildly proptotic. There was lagophthalmos (8 mm) and an absent Bell's phenomenon, resulting in exposed cornea. There was a large inferior corneal epithelial defect (7 mm) involving the central visual axis with no associated infiltrate. We recommended aggressive hourly lubrication with alternating erythromycin ointment and Lacri-Lube ointment (Allergan Inc, N.J.).

Twelve hours later, the ocular examination was repeated. The left globe had become increasingly proptotic, causing increased lid retraction, chemosis, lagophthalmos (16 mm), and scleral show (6 mm) (Fig. 1). The left pupil was sluggish compared with the right. Intraocular pressure was 12 mm Hg. The corneal epithelial defect now involved 95% of the cornea. Emergent left-sided lateral canthotomy and cantholysis were performed to decompress the orbit. The intraocular pressure fell to 6 mm Hg and the pupil regained brisk reactivity. Aggressive hourly lubrication with alternating erythromycin ointment and Lacri-Lube ointment was continued.

Twenty-four hours later, ongoing proptosis, chemosis, lid retraction, lagophthalmos, and scleral show were noted. The corneal abrasion stained strongly with fluorescein and continued to involve 95% of the cornea (Fig. 2). We felt that a temporary tarsorrhaphy could be beneficial. However, the significant amount of proptosis precluded apposition of the upper and lower lids without a high degree of tension. Given the patient's recent need for orbital decompression, we deferred performing a temporary tarsorrhaphy under these circumstances.

Instead, we created a closed moisture-sealing chamber using Tegaderm transparent adhesive film dressing (3M, Minn.) and Lacri-Lube ointment in hopes of preventing further corneal decompensation (Fig. 3). A piece of Tegaderm dressing was cut to reflect the distance from the nasal bone to the lateral orbital rim horizontally and from the frontal bone to the malar prominence vertically.



Fig. 1—Colour photograph of both eyes, revealing increasing left-sided proptosis, chemosis, lagophthalmos, and corneal exposure 12 hours after initial presentation.

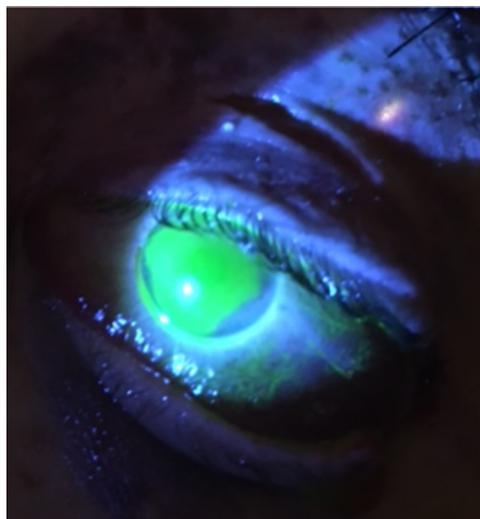


Fig. 2—Colour photograph of the left corneal surface with a large epithelial defect and fluorescein staining under cobalt blue light.

The exposed ocular surface (cornea and conjunctiva) was layered with Lacri-Lube ointment. The Tegaderm dressing was then tented over the prelubricated corneal surface, with the edges of its adhesive surface secured to skin beyond the orbital rim. The moisture chamber was left in place for 24 hours. On re-examination, the edges of the corneal epithelial defect demonstrated signs of re-epithelialization. The moisture chamber was replaced until the proptosis and edema improved (which took a few days), and pressure patching was sufficient to appose



Fig. 3—Creation of a temporary, closed moisture chamber using Tegaderm and Lacri-Lube ointment.

the upper and lower lids, thus eliminating corneal exposure.

To our knowledge, this is the first report to describe the use of Tegaderm transparent film dressing and Lacri-Lube ointment to create a temporary, closed moisture chamber in the treatment of severe exposure keratopathy. Tegaderm transparent film dressing consists of a thin film backing with a hypoallergenic, latex-free adhesive that gently but securely adheres to skin.<sup>1</sup> It is occlusive to liquids, bacteria, and viruses, yet allows the exchange of water vapour, oxygen, and carbon dioxide, essential to skin function.<sup>1</sup> Its traditional application has been for protecting catheter sites and to cover wounds while maintaining a moist environment to facilitate wound healing. It can be cut to any size to create a waterproof, sterile barrier that is adhesive to the skin.<sup>1</sup> In this case of severe exposure keratopathy in which we could not achieve adequate lid closure, we used Tegaderm transparent film dressing to create a temporary closed moisture chamber, sealing in Lacri-Lube ointment for 24 hours to optimize the environment for re-epithelialization. Tegaderm dressing was readily accessible in the intensive care setting and easy to apply with no maintenance required from nursing staff.

Numerous approaches to treating exposure keratopathy in the intensive care unit have been described in the literature. These include eye toileting (regular cleaning of the eyes with sterile water), frequent lubrication (ointment and drops), lid taping, passively closing the lids when noted to be open by the nursing staff, Geliperm transparent hydrogel dressings, and moisture chambers fashioned out of swim goggles or polyethylene covers (i.e., Gladwrap, Glad<sup>®</sup>, Oakland, California).<sup>2-4</sup> Long-term surgical approaches to managing lagophthalmos and resultant exposure keratopathy include gold weight placement in the upper lid, palpebral spring implantation, hyaluronic acid gel injection, and tarsorrhaphy.<sup>5-8</sup>

A systematic review and meta-analysis by Zhou et al.<sup>9</sup> found that moisture chambers are significantly better than lubrication at preventing exposure keratopathy in intensive care unit patients. A randomized control study by Shan and Du<sup>10</sup> comparing lubrication with artificial tears to moisture chambers and polyethylene film covers found that the latter options were statistically significantly more likely to prevent exposure keratopathy than artificial tears.

Premade moisture chambers and polyethylene covers are not always readily available in the medical setting. Tegaderm transparent film dressing and Lacri-Lube ointment is an efficient strategy that can be used as an alternate approach to tarsorrhaphy to create a temporary closed moisture chamber

to manage exposure keratopathy while lid closure cannot be achieved. The pupil may still be assessed, which is crucial in patients who are admitted to the intensive care unit, who are unconscious or sedated, or from whom informed consent may not be obtained.

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