

## **Chemical Eye Injury**

### General Principles and Procedures of Ocular Decontamination

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The first step in assessing a chemical eye injury is to evaluate the extent of chemical exposure. Patients who have inhaled or ingested chemicals can be at risk of edema, compromising their airways, and may require intubation<sup>3</sup>. The patient should be stabilized before proceeding with decontamination.

The cornerstone of ocular chemical burn management is immediate and thorough irrigation<sup>1</sup>. Prompt irrigation with large volumes of fluid is essential to dilute and remove the offending chemical agent and restore the tissue to physiological pH, thereby minimizing continued damage<sup>1,2,5</sup>. Do not attempt to neutralize pH with additional acidic or alkaline agents<sup>1</sup>. Further information on the exposure event and patient history can be gathered while decontamination is taking place and should not delay irrigation<sup>5</sup>.

pH testing of the ocular surface should be conducted before and after irrigation using litmus or pH paper, if possible, to restore the ocular surface to a physiological pH between 6.0 and 8.0. If one eye is unaffected by the chemical injury, the pH of that eye can be used as a control and a target for the damaged eye's pH. If a longer irrigation is necessary, the pH should be checked every 15-20 minutes<sup>6</sup>. If the pH is in the target range, irrigation can be stopped. Otherwise, irrigation should be continued, following the same steps for remeasurement<sup>3</sup>.

A variety of solutions may be used for irrigation, including clean water, balanced salt solutions, or active decontamination agents. Sources agree that minimizing time to irrigation is more important than the choice of irrigant solution.<sup>1,5,6</sup> In settings where multiple decontamination fluids are available, active decontamination agents such as Diphoterine and cedarroth are preferred.<sup>3,4,6</sup> If such solutions are not available, pure water or balanced salt solutions may be used. Currently, there is no consensus on which liquid is preferred.<sup>1,6</sup>

Contact lenses and any visible particulate material should be removed carefully during the irrigation process. Soft, moistened cotton buds are excellent tools to accomplish this. A comprehensive assessment for particulate matter should be undertaken, with eversion of the lids, double lid eversion as needed.<sup>6</sup> It is possible that if the pH is not returning to the target range, chemical residue within the eye is eluting acidic or alkalotic material, preventing the return to baseline<sup>3</sup>.

Patients should be positioned supine or slightly reclined, with the head turned so the affected eye is lower than the unaffected eye. This positioning helps prevent runoff from contaminating the opposite eye<sup>1</sup>. Irrigation fluid should be applied continuously and from the inner canthus outward to the outer canthus. Gentle retraction of the eyelids manually or the use of lid speculums may be required. Specialized irrigation tools, such as the Morgan Lens, can aid in continuous ocular lavage while freeing up medical personnel to assist other patients.

Ideally, the patients should receive topical anesthetics (such as tetracaine or oxybuprocaine) before this process to improve comfort and tolerance of irrigation and examination<sup>3</sup>.

## References

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