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First aid for eye injuries in protest settings: When to irrigate and when to shield

Anna Fierz[1]

1 Private practice, Zurich, Switzerland. Correspondence to anna.fierz@hin.ch

Torture Journal's Issue 1/2024 highlighted the global problem of eye injuries by less-lethal weapons. At that point, there was an unmet need for guidance on what to do in the event of such an injury before the patient reached an eye doctor. Eye injuries are time-critical. Often, the first people to act are first responders or even bystanders. What happens immediately after such an injury can worsen the prognosis. A clear map of what to do is helpful.

This year, the American Academy of Ophthalmology (AAO) – the professional association of eye doctors in the United States – has risen to the occasion and published a Protest Safety Guide (Turbert, 2026a). It comes as a timely addition to their library of trustworthy information on eye problems for the public and patients, including first aid for eye injuries in wartime (Medeiros, 2024).

Projectiles can cause lasting damage to the eye at much lower energy thresholds than for any other part of the human body; the exact numbers are unknown (Fierz, 2024). Projectiles may penetrate the eye, or their blunt impact may lead to globe rupture. These situations are referred to as open-globe injuries, and their prognosis is poor. In closed globe injuries, the wall of the eye remains intact. While they carry a better prognosis on average, even these can cause profound and permanent visual loss. The most common mechanism is retinal damage. Peripheral retinal detachments are treatable by surgery, but as a rule, a pathology of the central retina – the macula – is not. (If surgery can be attempted, as in a traumatic macular hole, the result is often unsatisfactory.) Other mechanisms for visual loss include traumatic glaucoma or traumatic optic neuropathy. Traumatic cataracts are common, but they are usually treatable with cataract extraction and artificial lens implants; however, the operation is more challenging when the original lens is dislocated and/or the eye has suffered additional damage. Traumatic corneal scars are treatable, too: by corneal transplants.

The clinical consequences of a chemical injury to the eye are different from those of a mechanical injury. Chemical injury may cause lasting damage to the ocular surface, including the cornea. To remain transparent, the cornea must constantly renew its surface epithelium with the help of stem cells at its border, the so-called limbus. Chemical burns may not only lead to scars in the cornea itself (which, again, would be treatable) but may also damage these stem cells at their edge. The result is a condition known as limbal stem cell deficiency, in which the cornea cannot regenerate normally, and its surface keeps breaking down. It causes both pain and visual loss that can be challenging to manage (for details, see Narala, 2026). This injury pattern has been known for almost as long as tear gas itself, though the concept of limbal stem cell deficiency is newer (Hoffmann, 1967). Deeper layers of the eye may also be affected in chemical injuries, mainly when there is an additional mechanical injury (Hoffmann, 1967; Kim, 2016). Eye injuries from tear gas and even pepper spray have the potential to be far more than a transient annoyance. On the other hand, layperson first aid has a much better chance of preventing serious consequences in such cases than in mechanical injuries.

The AAO's Protest Safety Guide highlights the benefits of eye protection, specifically safety glasses, and recommends their use. Safety glasses are made of plastic, not glass, which will scratch and bend rather than splinter like glass. For guidance on what types of glasses to use in which situations, see the AAO article on safety glasses (Turbert, 2026b). However, nothing will provide 100% protection. Anecdotally, probably everything that comes between a projectile and the eye is better than nothing: A young man whose spectacles made of glass splintered when hit by a rubber bullet in Zurich's youth unrests in the 1980s suffered superficial corneal abrasions but no lasting consequences (personal communication from the patient, unpublished). The outcome would almost certainly have been worse if he had not worn them.

Mechanical injury

If the eye is hit by a projectile, it should not be touched or rubbed but covered by a temporary shield that does not come into contact with the eye, such as the bottom part of a Styrofoam or paper cup. If there are visible fragments that appear to be stuck in the eye, they should be left in place. If possible, the injured person should stay upright and keep their head up.

If the eye has burst open, it is mandatory to see an eye doctor as soon as possible. Before going to the emergency room at a smaller hospital, it makes sense to call and ask whether an ophthalmologist is available. Painkillers like aspirin, ibuprofen and other non-steroidal anti-inflammatory drugs should be avoided as they thin the blood and may increase bleeding.

Reading these guidelines, I would like to add that the AAO's advice is valid regardless of whether the eye has burst open or whether its wall remains intact. While large ruptures are usually obvious by the loss of the globe's normal contours or by a visible entry wound, telling the difference between a penetrating injury and a closed globe injury can be impossible without specialised ophthalmological equipment. Such patients, therefore, need an eye doctor and not a general practitioner. It is not possible to rule out an open globe injury from the history, either: It does not require a sharp object, blunt force can result in a globe rupture too. Seeing an ophthalmologist makes sense anyway, unless there is rapid and complete resolution of symptoms.

Chemical injury

In case of exposure to tear gas, the first thing is to get away as quickly and safely as possible, ideally to fresh air and/or higher ground, since tear gas is heavier than air. As soon as possible, the eyes should be flushed with plenty of clean water or an eyewash solution (available at most pharmacies). Milk is not recommended for flushing the eyes because it is not sterile. If irrigation is not possible, frequent blinking may help produce more tears, which also help flush the eyes. Contact lenses should be removed, as should any clothing near the face. Rubbing the eyes should be avoided. If symptoms persist, it is ideal to seek medical help immediately.

First aid after exposure to pepper spray (nebulisers) is almost the same as for tear gas. Again, the most important thing is immediate and copious irrigation. Pepper spray is oil-based, so avoid touching the eye area, as it may spread the oil. The skin around the eyes may be washed with baby shampoo, which will break down the pepper spray without harming the eye.

Reading these guidelines, I wondered how many protesters carry eye wash or clean water in sufficient quantities. The literature suggests flushing the eye for up to twenty minutes (Kim, 2016). As long as the injury is purely chemical and there is no possibility of an open globe, water from used drinking bottles will probably do. It is important to lift the lids gently, a little away from the eyeball to reach the cul-de-sac beneath the upper and lower lids, where irritant chemicals may accumulate and continue to harm the ocular surface if not eliminated. When flushing under the lower lid, ask the patient to look up; when flushing under the upper lid, ask the patient to look down. The procedure should be continued until the patient feels well again, or for at least ten to fifteen minutes. The most common mistake in chemical injuries is insufficient irrigation: too little, too late. In a severely irritated eye, I would personally even use milk if I were confident that the injury was chemical only, with no possibility of globe rupture. Perhaps it is worth noting that topical anaesthetic eyedrops are contraindicated in chemical injuries, even if the patient is in pain: they interfere with the protective tearing reflex, and there is clear evidence that they worsen the damage caused by chemical injuries in animal models (Kim, 2016). A patient whose symptoms persist after adequate irrigation needs an ophthalmologist.

Mixed mechanical and chemical injury

The safety guide does not mention the rarer but particularly worrisome possibility of mixed mechanical and chemical injury from «pepper pistols» with capsaicin-containing projectiles that burst on impact, or that deliver a liquid stream of capsaicin-containing fluid rather than a spray or a projectile. The patient will usually suffer a chemical burn in the region around the eye, suggesting there was not only a mechanical impact of a rubber bullet to the eye. In cases of mixed mechanical and chemical injury without globe rupture, irrigation with clean water would be important.

The dilemma that poses itself is that such weapons may be lethal at close range (Borges, 2022; Hajdu, 2026; Rodriguez McRobbie, 2022). It follows that they can produce an ocular rupture at close range. In such cases, irrigation would be contraindicated because of the open globe, at least in theory. In practice, however, an eye with such a profound injury might not be salvageable in any case, with or without irrigation.

This conundrum may well remain unresolved from a strictly scientific point of view. My educated guess is that gentle irrigation - with *clean* water or eye wash, and without pressure - will almost certainly be beneficial in almost all cases without obvious globe rupture and will carry a very low risk of significant further harm. The AAO's recommendation to ophthalmologists is: "Additional management strategies should be tailored to the individual clinical findings, following established principles for chemical or traumatic ocular injury." (DeParis, 2026)

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