



Blinding as a Weapon of Suppression in Iran



An Ophthalmological Review

by Katherine Hignett
and Aida Ghajar

Introduction

By Katherine Hignett

Warning: the following report contains graphic photography showing severe injuries.

Over many months of protests, Iranian demonstrators have been assaulted, arrested, and, in some cases, have lost their lives. Violent crowd control methods have been reported since protests began in September 2022, including the firing of metal pellets, an indiscriminate and brutal practice that does not just injure; it maims.

When individuals are shot in the head with metal pellets, sometimes dozens of times, eye wounds are inevitable. As this IranWire report shows, these painful injuries can cost a person their appearance, sight, and even their eyes.

In Iran, reports of injured eyes among demonstrators and bystanders are not uncommon, but it's hard to quantify exactly how often they occur. Fear of further consequences may prevent victims from seeking immediate medical care, and, in some cases, doctors may be hesitant to treat the wounds of protesters.

But the fact that eye patches have become a symbol of pride among demonstrators in Iran shows a clear link between the demonstrations and blinding as a weapon to suppress these protests.

This report is an attempt to document a small portion of these injuries.

IranWire is aware of more than 50 serious eye injuries sustained by protestors and bystanders over the past five months. Around a dozen individuals have provided their medical records for this report.

With the help of three independent ophthalmologists, we have reviewed these records and compiled a comprehensive medical report. Our cohort includes men and women, adults and children, demonstrators and bystanders. Mostly under 40, these patients will feel the effects of their injuries for decades. The youngest – a five-year-old shot in the head some twenty times with metal pellets – will never see from her left eye again.

The ophthalmologists' invaluable efforts provide context to largely opaque and often sparse medical records, full of acronyms and technical terms unknown to most of us. As a result, the experts have given our report a fuller sense not just of how seriously each patient has been injured but of how these injuries will fundamentally affect their lives.

Unable to examine the patients themselves, the ophthalmologists had to rely on often-limited medical records. When doctors encounter serious eye injuries, severe swelling can make it hard to thoroughly examine the wound. When the eye itself has been punctured, it can be impossible to perform such examinations as this may risk pushing other material out of the eyeball. The paucity of diagnostic data, in other words, may reflect the severity of the wounds.

Nonetheless, the ophthalmologists were clear in their assessments. For most of patients in the IranWire cohort, the long-term prognosis is poor. Some have already lost their vision, and others are likely to experience poor sight, pain, and further complications long into the future.

As well as assessing each case, the ophthalmologists provided valuable context for treating these types of injuries. Ophthalmology is primarily a discipline that addresses the needs of older patients: emergencies like those found among our cohort are rare and in Iran are likely straining available medical resources. One compared them to rare but severe accidents – like being shot in the eye with a paintball. Another likened them to injuries she saw treating survivors of inner-city gang warfare

in the United States. Specialist expertise and surgical tools are required to treat these kinds of wounds. And even the best medical systems would be overwhelmed by a glut of cases.

IranWire is protecting the identities of some of the ophthalmologists who contributed to our report because they are concerned about speaking out publicly against the Iranian government.

We hope this report will raise awareness of the dangers facing protesters and bystanders in Iran and encourage others to share their stories. Violent, indiscriminate dispersal methods, such as firing pellets and targeting eyes, have consequences that last far longer than a single protest. They leave scars, cause chronic pain and rob young people of their vision.

IranWire will continue to document these injuries as we learn of more cases from the public. This report is just the beginning.

Special thanks

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In Iran,

numerous protesters and bystanders have been seriously injured and even blinded at demonstrations in the months since the death of Mahsa Amini. They have been shot by metal pellets and kicked and hit in the head by regime agents: violent crowd dispersal methods that have likely cost untold numbers of demonstrators – and bystanders – their eyes.

IranWire has recorded around 50 cases of serious eye injuries sustained during the recent protests. This group represents a small portion of what is undoubtedly a much larger number of cases. But many injuries are likely to go unchecked, with survivors reluctant and sometimes unable to access care and the specialist capacity required to treat such emergencies likely unable to meet surges in demand.

Twelve individuals in IranWire's subset have provided medical records following their injuries. They are generally young, with nine of them male. The oldest patient appears to be in his forties, while the youngest was five years old at the time of her injury. Benita Kiani Flavarjani was simply a bystander when her head was struck by 20 metal pellets. She will never use her right eye again.

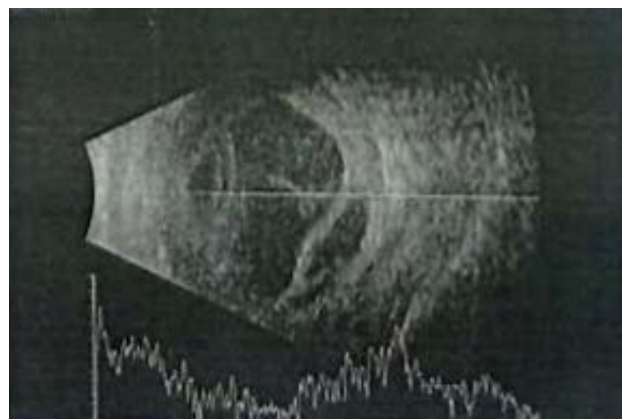
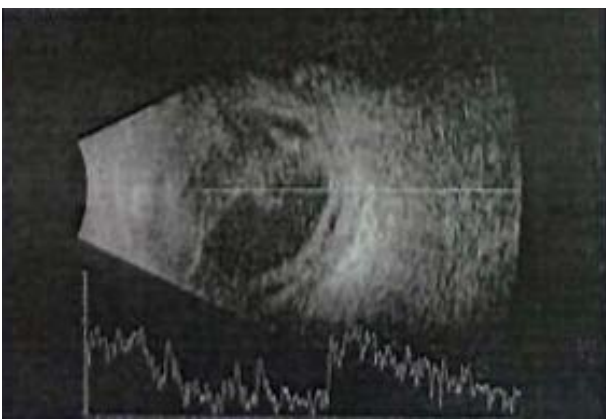
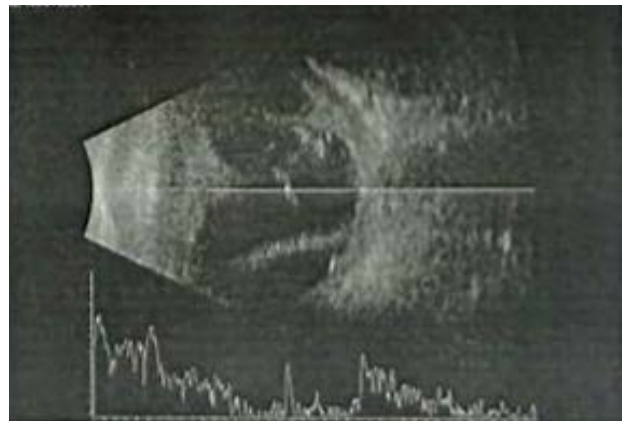
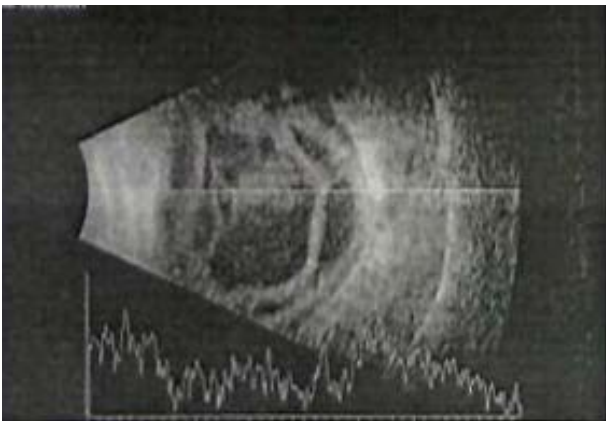
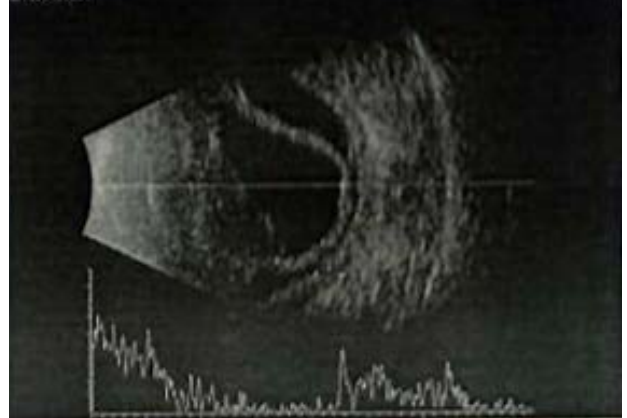
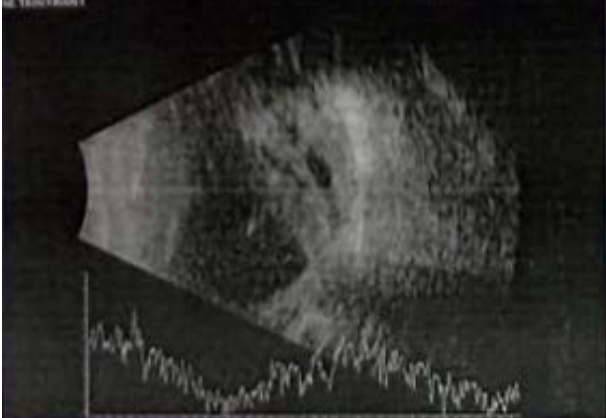
According to independent ophthalmologists, most of the injuries are so severe that they will significantly impair sight in the affected eyes – if this is not already the case. Several of the cohort report likely irreversible sight loss. One patient only has been given a good visual prognosis by multiple experts, and even this is guarded given the possibility of future complications.

1 The injured eye



1.1

The main injuries observed in the IranWire cohort



Ultrasound images of the eye show severe damage to the back of the eye in the form of retinal detachment



There are two general types of injury noted in the cohort, an ophthalmologist whose identity IranWire is protecting (SM), explained.

The first is blunt injury to the eye, which may be caused by impact from a kick or a baton, for example. One patient in the IranWire cohort has this kind of injury.

In mild cases, there is usually a good prognosis for sight. But in more severe cases, this kind of trauma can have a devastating impact on the eye, tearing open the eyeball (the “globe”) and damaging components in the back of the eye.

A second ophthalmologist, AA, explained:

“Just because it’s blunt trauma... doesn’t mean that it may not cause significant damage. Blunt trauma can also lead to globe rupture, where that trauma causes pressure inside the eye to go up so high that it’s almost like it explodes.”

Any injury to the back of the eye is difficult to fix with surgery. The retina – a layer of light-sensitive tissue at the back of the eye – and other components that sit there are considered particularly fragile parts of the eye. They can also be difficult to access surgically, requiring an extra level of special training and tools. Injuries to the back of the eye tend to carry a worse visual prognosis than those at the front of the eye.

This wound appears to have been caused by a pellet



The second – and most common – type of injury found in the IranWire group are high velocity penetrating injuries, where projectiles like pellets pierce the eye or the surrounding tissue. In milder cases, these may lodge in the orbit: the part of the skull that house the eyes. If this happens, a patient’s eyeball itself is not affected and the sight may be preserved even if it is too risky to surgically remove the debris. These less severe wounds are still vulnerable to pain, inflammation and infection. If the optic nerve – which connects the eye to the brain – is involved, they can still lead to blindness.

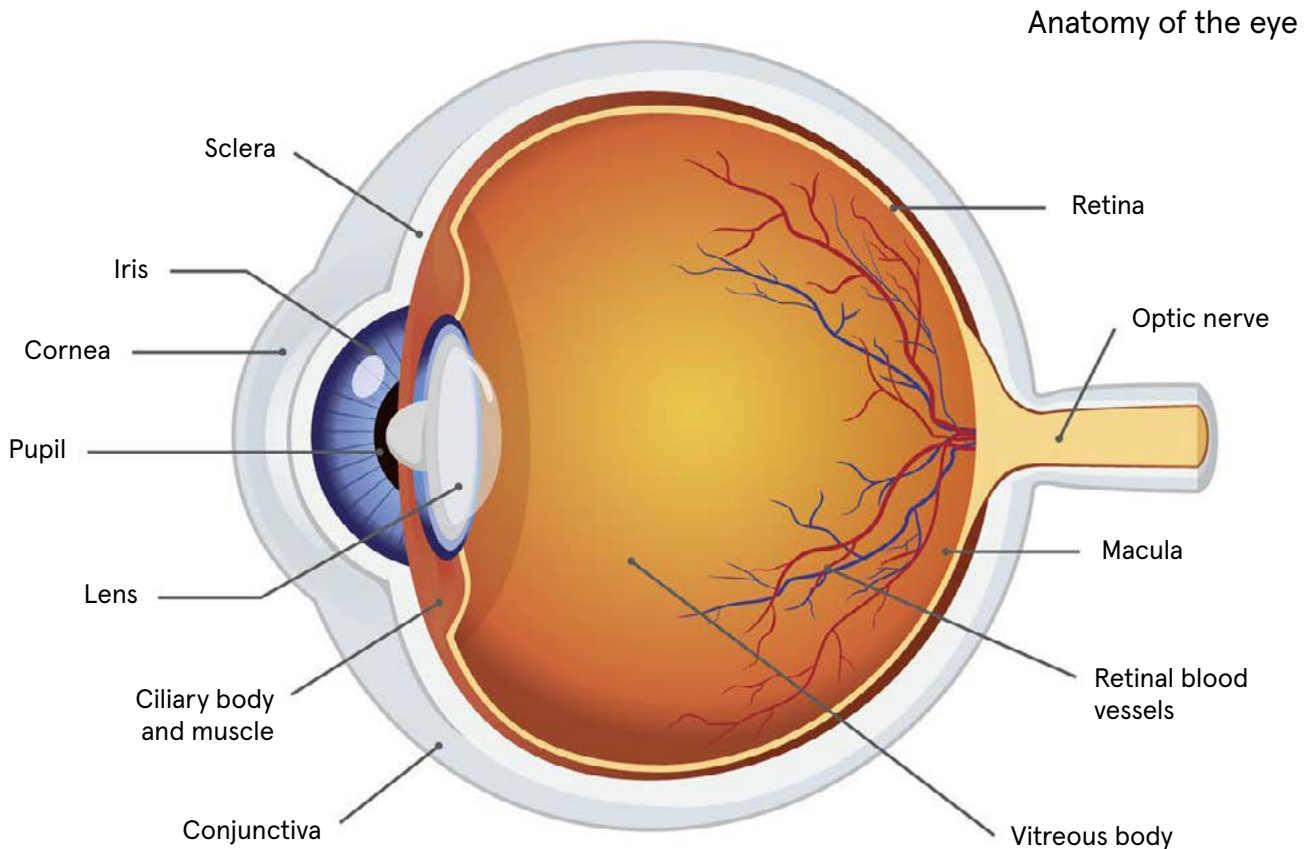
More severe cases are much more damaging to the eye and, among the IranWire cohort, much more common. There is only one case in which a pellet appears to have missed the eye itself.

AA, likened the injuries in the IranWire cohort to those she had witnessed working in American cities with high levels of gang violence. “These usually have a very poor prognosis,” she added.

SM explained that when a pellet or other projectile penetrates the eye, it’s incredibly important to be operated on as soon as possible, as these injuries can change or deteriorate quickly. A surgeon will try to repair perforations to the cornea and the sclera – the clear part of the eye on top of the iris and the white outer layer of the eye, respectively. But in 80 to 90 percent of these severe cases, SM said, it is unlikely a patient also retain good, useful vision in the affected eyes.

1.2

Common accompanying injuries



In the IranWire cohort, patients also experienced injuries including detachment of the choroid, which is a vascular layer under the retina that feeds the retina with blood. If detached, an ophthalmologist explained, this can cause secondary damage to this important part of the eye and result in permanent blindness.

Several patients experienced vitreous haemorrhage, or bleeding in the eye. Although it can clear up on its own, when it accompanies penetrating injuries, retinal damage is likely.

Surgeons may treat a vitreous haemorrhage by removing the blood-filled gel-like vitreous inside the eye and replacing it with saline in

a procedure called a vitrectomy. If there is also a retinal detachment, surgeons may be able to reattach the retina with various tools including laser treatment.

Many patients experiencing such severe trauma are likely to have damage to the front of the eye as well as the back. This can include the development of cloudiness of the natural lens of the eye or a “traumatic cataract”, leading to impaired vision. In some cases, the iris may also be torn, potentially resulting in severe long-term light sensitivity.

Iris injury, which is relatively common in severe trauma cases, can be extremely difficult to repair.

1.3

Immediate surgical goals for penetrating injuries

Most of the IranWire cohort experienced penetrating injuries to the eye. In such cases, a surgeon's first goal is to close any open wounds, to prevent the loss of organic content from the eye, ophthalmologist Dr David Khorram explained. Every minute a patient does not receive this surgery is a risk, in part because of how easily matter can protrude from an open eye wound. "Every time the patient coughs or bends over, there's a risk of the contents of the eye coming out, which is obviously not a good thing," he said. "So we want to close those wounds."

This may be one reason why many of the patients in the IranWire cohort have limited medical documentation of their injuries, AA explained. Many parts of a complete eye

examination are simply not possible on a swollen and bloody eye, particularly when there is a risk of putting pressure on the eye and pushing more material out of the eyeball.

During these primary surgeries to close a wound, ophthalmologists are sometimes able to perform reconstructive work that may help to preserve sight. This may include removing a cataract and replacing it with an artificial lens, extracting blood that prevents light reaching the back of the eye, reattaching a torn retina, or removing a foreign body.

But in many cases, "we need to initially close the eye and then come back later and do that subsequent reconstructive, rehabilitative type of work," Dr Khorram said.

In cases of severe trauma, it can be hard to even examine a patient's injury without causing further damage to the eye



1.4

Delays to care and ongoing risks

When a patient does not receive primary surgery immediately, opportunities to preserve sight, and in some cases the eye itself, are soon lost.

For example, a detached retina may be deprived of the oxygen and sustenance it receives from other parts of the eye. The effect on vision can vary, depending on the nature of the detachment, but the longer a retina is detached the more serious and permanent these effects are likely to be. If a retina detaches entirely, it is likely that the affected eye will become blind.

Dr David Khorram explained:

“If [the retina] is separated from its primary source of oxygen – the layers beneath it – then it doesn’t really have a lot of time to recover. If that continues for some days, the chances of recovery of the full function of the retina are really, really low.”

The body’s immune response is another concern for ophthalmologists, as this can cause an injury to worsen. The immune response may cause inflammation in and around the wound, damaging components inside the eye, which then develops into scar tissue that can prevent proper healing and lead to chronic pain.

Another dangerous and painful consequence of inflammation comes from changes to pressure inside the eye, Dr Khorram explained.

“The eye is like a hollow ball – like a basketball or a tire – it has a certain pressure inside of it. So if that pressure gets too high, or too low, then that can result in damage to the structures inside the eye and that damage can be permanent.”

Even if an eye wound receives immediate, high-quality care, and certainly for those injuries that do not receive quick attention, the eye remains vulnerable to several complications such as the danger of infection. Severe infection within the eye is possible weeks or months after an incident and can cause complete vision loss and chronic pain.

Any severe eye injury carries the risk of a rare condition called sympathetic ophthalmia, where the body’s immune system mistakenly attacks the uninjured eye, potentially severely damaging sight and leaving a patient with problems in the uninjured eye. Ongoing monitoring may be required so this process can be recognized and treated. Removal of the injured eye is sometimes recommended to prevent sympathetic ophthalmia from occurring.

If a foreign body, such as the metal pellets that have been fired at protesters in Iran, remains in the eye area, this puts a patient at further risk of infection and inflammation. The material of the debris may itself also damage surrounding tissue. The exact composition of the metal pellets used in Iran is unclear but, as AA said, “any metal is risky.”



Example of a pellet removed from a protester’s eye

Foreign bodies like pellets can cause a range of problems, even if they don't penetrate the eyeball.
In this case, the patient was hit by dozens of pellets, twenty of which hit his head



Some metals – such as lead – are toxic and can release poison into the body over time. Others may be biologically inert but still cause harm if they are not removed. Iron, for example, must be extracted from wounds because of the way it reacts with oxygen. And yet in cases where metal has been fired into the eye area, the damage and bleeding can make it difficult to find and remove every piece of debris.

AA explained:

“If you leave iron inside the eye, it rusts, and that inflammation can cause blindness. So even a little tiny sliver of metal – not a big bullet, not like these massive injuries that we’re seeing here – can cause blindness if you don’t get that metal out.”

For many trauma patients, ongoing care will be necessary to retain and rehabilitate any vision that can be saved. “Fixing these injuries is not a one and done type of thing,” Dr Khorram said. “The patient needs ongoing care and ongoing monitoring for those kinds of problems. Oftentimes they may need subsequent surgery.”

Patients may need repeated interventions for numerous possible complications, including recurrent retinal detachment, cataracts, secondary glaucoma and the formation of scar tissue, which can be extensive.

At least 20 pellets hit the face
of 5-year-old Benita Kiani



1.5

Injuries to the young eye



Benita was just five years old when her eye was injured

Security forces shot 5-year-old Benita while she was playing on the balcony of her house in Isfahan



Rapid intervention is particularly important in younger patients both because of the way a younger eye is formed, and because of the strong immune response seen in healthy young people, AA explained. Many of the problems detailed in the preceding section may be more severe in younger patients.

The eyeball can be imagined as a balloon, or a ball, filled with jelly. In younger people, this substance – the vitreous – is relatively firm and strongly attached to the other internal components of the eye. It starts to become more liquid in middle age but, for the bulk of the IranWire cohort, in their 20s and younger, is likely to be relatively solid.

During a blunt or penetrating blow, the vitreous may move and pull on the other components of the eye. The stronger these attachments, the more likely a blow will disrupt the inner eye. The retina is particularly vulnerable to this kind of damage.

“This jelly-like substance is very adherent to the back of the eye, where the retina is. And this retina, we think of it like an extension of brain tissue. Because the cells of the retina are very much like cells of the brain. Once they’re damaged, they don’t regenerate. Once they die, it is permanent,” AA said. “Any time there’s any trauma, especially in a young person, we worry about that jelly-like substance being very adherent to the back wall of the eye and pulling on the retina. This is much more likely to lead to a retinal detachment.”

In some trauma cases, the vitreous itself needs to be removed and replaced, usually with saline. But this can be difficult to extract from the back of the eye, particularly when it is more solid. Failing to remove the vitreous can, however, lead to the formation of scar tissue in this part of the eye.

In addition to this heightened risk of immediate retinal detachment, young people may be more likely to experience detachment further down the road because of their stronger immune response – what is called a “vitreous-proliferative response”. Severe wounds – such as those experienced by those in the IranWire cohort – can trigger inflammation and the production of scar tissue that leads to recurrent retinal detachments and prohibits reattachment.

“All of these injuries look very severe,” AA said. “But even when they’re not – and let’s say you have surgery immediately and it goes beautifully and everything looks very good – as an ophthalmologist, you’re still holding your breath for about six months to a year because younger people are very good at scar tissue formation.”

“It’s another way that these people’s lives will be affected, not just in the short term, but potentially for years and years to come,” SM explained.

1.6

Pain

Pain – both chronic and acute – is always a concern for ophthalmologists because of the eye’s sensitivity. Pain is common after eye injuries, and even in optimal conditions can last for several months. In cases of severe trauma, like those of the IranWire cohort, AA estimated patients may experience pain for a year or longer.

The cornea – the transparent surface that covers the iris and the pupil – is particularly sensitive to pain. Even small injuries to this part of the eye can result in extreme debilitating pain.

“The eye is one of the most sensitive parts of the body,” she explained. “We all know if we get a tiny piece of dust in our eye, it’s terrible, right? And that’s just a tiny little scratch or tiny little eyelash or a piece of sand. But imagine – these patients have a foreign body or high-speed projectiles coming into their eye.”

In more severe cases, where stitches are needed to hold the cornea together, patients will feel the stitches in their eyes constantly until they can be removed. AA likened this to a permanent feeling of having an eyelash or piece of sand in the eye.

In some cases, damage to the cornea may be so severe it needs to be replaced with a cornea donated from a cadaver. Because the immune system is designed to get rid of foreign objects – even donated corneas – in such cases, patients will require eye drops to suppress this immune response for months, and potentially their entire lives, to prevent rejection of the donor cornea.

Many other complications that impair vision, such as glaucoma and scar tissue, can also cause long-term pain. It is one of the few reasons, in addition to the prevention of infection or sympathetic ophthalmia, that might lead doctors to remove an eye itself. Such a decision is made only as a last resort when an eye is completely blind and causing pain.

“As ophthalmologists, obviously our first goal is to save vision, or as much vision as we possibly can,” AA explained. “But then, the second goal is to save the eye itself. Because if we can keep the eyeball, even if it’s not functioning, even if it’s not allowing for vision, cosmetically, it allows for the face to look proper.”

But when patients experience chronic pain, they may beg surgeons to remove the eye, she said. “Imagine how awful that pain must be for a human being to say ‘Yes, please amputate. Please take this eyeball out.’”

SM added: “What [regime agents] are trying to do now is, essentially, intentionally maim people. The pain and devastation that comes with that is more long term, more painful than even death, I would say ... And that’s another feature of it that really makes [this] sad. [People refer to this] as a crime against humanity, which I don’t see how it’s not.”



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از شدت درد چشمم توی اشک و خون ناله می کنم.
دنیا نباید فراموش کند این التماس و ناله های پر دردم را
لحظه ای که بازبینی فیلم آن اشک چشمانم را جاری کرد
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امشب این فیلم که توسط عزیزانی که از اولین لحظات این اتفاق تلخ کنارم
بودن ضبط و تا به امروز به خاطر شرایط روحی من بایگانی شده بود تماشا
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کیست که از شدت سوزش چشم التماس کند که تیر چشمش را همراه با
زیبایی های از بین رفته در بیاورند؟؟؟

#خدا

#شرف

Elahé Tavakolian, a female protester shot in the eye in Khorasan province, wrote about "the unbearable pain and suffering" on her Instagram page on September 20, 2022

1.7

Accessing specialists in an emergency

However advanced a medical system may be, it remains vulnerable to surges in demand



As noted, delays to care can harm a patient’s visual prognosis and increase the risk of infection or other problems. Although none of the ophthalmologists IranWire consulted are familiar with Iran’s capacity to respond to eye emergencies, they cautioned that even the best healthcare systems would struggle with an influx of such cases.

Predominantly a specialty that treats degenerative diseases in the elderly, ophthalmology emergencies are relatively rare, AA explained. In rural areas of the United States for instance, she said, patients can struggle to access an emergency ophthalmologist quickly. “Part of helping patients to save vision and then ultimately save the eye is giving patients timely access to medical care,” she said. “But this depends on how close [patients] are to a medical facility and whether that medical facility has access to an ophthalmologist.”

While timely care may be accessible in larger cities in Iran like Tehran, Shiraz and Mashhad,

specialist care may be harder to find in smaller cities like Sanandaj and Izeh.

According to Dr Khorram, the medical records of IranWire’s cohort showed that eye care in Iran “is far beyond basic.” Nonetheless, he added, anytime you have a dramatic spike in cases, any system can be overwhelmed. And in Iran, reports have also suggested that some physicians may be reluctant to treat patients injured in protests, reducing available capacity.

“Whether it’s in a situation of mass casualties, as we had in the United States with 9-11, or [the earthquake] in Syria and Turkey right now, any time there’s a high volume, there’s a risk of overwhelming the capacity of the health system, no matter how good the capacity is, and how good the skills are,” Dr Khorram said.

In Iran, even when medical care is available, fear of arrest may prevent injured demonstrators from seeking timely care.

1.8

The psychological impact of eye injuries and vision loss

It is difficult to overstate the psychological impact of losing one or both eyes – particularly in younger patients, the ophthalmologists speaking to IranWire said.

Although IranWire is aware of cases in which patients have lost vision in both eyes, the injuries in this cohort primarily affect one eye. But this can still have a “tremendous” psychological effect, “particularly in a young person,” Dr Khorram explained. “There’s still significant grief around it.”

Many patients with severe eye injuries will experience potentially stigmatizing disfigurement. “With any disability, there are two sides of it. There’s the way you interact with the world and what challenges that disfigurement or disability has for you,” Dr Khorram added. “But there’s also the equally difficult side in how the world interacts with you and how people react to you.”

Serious eye injuries can permanently disfigure a person’s face



Cosmetic prostheses can help patients who have sustained the disfiguring loss of an eye. Artificial eyes and other prostheses can be customized to fit a patient's eye socket and to match the appearance and colour of a surviving eye. In the United States, these are made by highly skilled specialists called ocularists. They may also be made by an ophthalmologist. But SM suspects it is unlikely that Iran has the capacity to supply many such prostheses – especially many more than normal.

Losing vision – even in only one eye – not only changes the way a patient looks but also the way they see and experience the world. The loss of an eye can have a greater psychological impact than losing a limb, AA said. “It’s your sight. It’s how you view the whole world and it’s your entire future of how you are going to interact with the world around you,” she explained.

But “the good thing is people with one eye can function and function very, very well. They learn compensatory mechanisms [for the loss of depth perception]. People learn to use one eye [well],” Dr Khorram said.

Losing one eye does, however, leave a person more vulnerable to degenerative conditions. The risk of normal degenerative disorders that affect vision increases as a person ages, which is normal with many fully sighted people, but the impact of these disorders may be higher in someone who only has one eye remaining.

Dr Khorram and AA both recommended that patients with severe injuries, and only one eye, should wear glasses with polycarbonate lenses, if available, to protect the eye from

harm. Because even outside of political demonstrations, any number of daily activities can lead to accidents that may result in eye injuries.

If a patient does lose vision in both eyes, whether initially or over time, the psychological burden is grave. Dr Khorram said: “I know that many people, when asked, would say they would rather be dead than be blind. It’s our primary way of interacting with the world and it can be really devastating.”

SM said there is some evidence to suggest that “next to cancer, a diagnosis of blindness is one of the most difficult psychological diagnoses to give to an individual... the psychological devastation of someone being told they might have a cancer that can kill them is pretty close to par.”

The use of projectiles as a crowd control method has been condemned by medical organizations around the world because of their indiscriminate nature and their known impact on sight. In 2020, for example, the American Academy of Ophthalmology called for an end to the use of rubber bullets by US law enforcement authorities. The organization said in a statement: “While classified as non-lethal, they are not non-blinding. These life-altering eye injuries are a common result of urban warfare, rioting and crowd dispersion... You shouldn’t have to choose between your vision and your voice.”



2

The IranWire cohort

IranWire

has obtained medical records and photographs for 12 individuals seriously injured during the recent protests in Iran.

The documentation for each patient varies, with some able to provide medical imaging and follow-up reports, while others have only basic photographs and notes, which may be because of the extent of their initial injuries. Nonetheless, SM explained the severity of the injuries is clear, even in cases with limited data.

Ophthalmologists have reviewed the cases and their insight has informed the following assessments of each patient.

1

AH

AH, a 30-year-old man, has been hit with a pellet. He presents with retinal sclopetaria of the left eye, which means that something has passed near his eyeball at high velocity. The heat and shockwave from this object have damaged the wall of the eye and the retina, which appears to have ruptured.

AH also has a haemorrhage in the vitreous of his eye. In other words, bleeding into the jelly-like substance that fills the eyeball. This can resolve by itself, but surgery is often required to remove the blood and the vitreous to allow light to pass to the retina. In this case, we don't know how severe that tear was.

It's not clear whether AH received surgery to remove the bloody vitreous or to repair any other damage following his injury. But if the retina has not detached, he could have a good prognosis in terms of sight in the affected eye.



2

AM

This 22-year-old man has experienced blunt trauma to his left eye. He has a ruptured globe, a prolapsed uvea and a vitreous haemorrhage.

The globe is a general term to describe the eyeball. AM's eyeball has ruptured, which is always considered a serious condition. It tends to carry a worse prognosis the further back in the eye it occurs, both because the components in the back of the eye – the retina and optic nerve – are particularly delicate, and because they require highly specialized expertise to treat. The back of the eye is highly vascular, with many blood vessels. Serious damage can occur when it is deprived of a blood supply bringing fresh oxygen to the area.

In addition, this delicate area requires highly specialized tools and expertise to treat. Ruptures to the back of the eyeball can lead to long-term problems and a need

for repeated interventions. AM's records indicate that he had a vitrectomy, where the jelly-like substance inside the eye was removed, but it is not clear how successful that procedure was.

AM's injury was severe enough to also cause his uvea to prolapse. This middle layer of the eye contains the iris – the colored part of the eye – and extends all the way around the eye. If matter from this layer is protruding out of AM's wound, along with vitreous matter, it is possible the retina is also sticking out through the wound.

This is a very serious injury, regardless of the surgical outcome. Given the possible involvement of the retina, this eye has a poor visual prognosis.



3

BH

This 43-year-old man was shot in the left eye with a projectile fired from a paintball gun. Glass from the lens of his glasses shattered on impact and penetrated his eye area. In addition to cuts to his eyelid, he presented with a traumatic cataract – a clouding of the lens – and detachment of both the retina and the choroid. The choroid is a thin layer of tissue filled with blood vessels that supply the eye with oxygen and nutrients. It is part of the uveal layer of the eye.

It is likely that a sharp foreign body such as glass caused these injuries.

BH, whose injured eye was described as “blind” when he presented to doctors, received extensive surgery including a pars plana vitrectomy, which is used to help repair retinal detachment, and eyelid surgery.

He has since had the eye removed entirely and is searching for a prosthetic replacement. The ophthalmologists IranWire consulted have not seen documentation to comment on his enucleation (eye removal).

Vision in BH’s right eye, which was already near-sighted, has also reportedly deteriorated significantly since his injury.



4

Benita Kiani



This five-year-old girl lost vision in her right eye after her head was struck by some 20 metal pellets. She had extensive injuries including retinal detachment and a full-thickness corneal laceration. This is a deep cut to the cornea, the transparent part of the eye that covers the iris. A foreign body – likely a metal pellet – is lodged in the eye on initial presentation, with possible debris found in the vitreous.

She received surgery to remove the foreign body and repair the wound, but ultimately lost vision in this eye. Relatives say she experienced severe pain in her eye, as well as headaches. Her other eye was reportedly so swollen following the injury that she could not open it.

Treating children brings extra challenges for physicians. For one, their eyes are smaller and behave differently during surgery than those of adults. Because of this, specialist paediatric ophthalmic surgeons may be required. Children may also have particularly robust immune responses to trauma, causing extensive and damaging inflammation.

In addition, it can simply be more difficult to perform examinations and procedures on children. A child may need general anaesthetics for examinations that would be performed on an alert adult. Repeated anaesthetics may therefore be required for follow-up appointments.

5

HE

This 29-year-old man presented with what appears to be a pellet lodged in the orbit around his right eye. This is the area of the skull that houses the eye, the eye socket.

Although the foreign body appears to have missed the eyeball itself, there is evidence of a second injury to the eye. Blood seems to have pooled between the cornea and the iris. This is called a hyphema and is typically seen after blunt trauma. This blood, which has likely come from the delicate vessels on the iris, can prevent light from reaching deeper into the eye, limiting a patient's vision.

Hyphemas can resolve on their own, with the body re-absorbing the leaked blood. But this can clog up the drainage system of the eye and lead to an increase in pressure inside the eye. This is known as glaucoma, and it can cause pain and permanent loss of vision.

HE's hyphema is accompanied by a laceration to the conjunctiva, which is the clear outermost layer of the eye that covers the sclera – the white part of the eye. These tend to have a good prognosis and may resolve themselves within a few days. Larger lacerations may require the placement of sutures to help them heal.

It's possible the hyphema and laceration were caused by a second pellet or some other shrapnel or debris.

HE has a relatively good visual prognosis following his injuries. However, this remains guarded given the risks of future complications. Although he does not appear to have had the foreign material removed from around his eyes, extraction may

eventually be required, depending on what it is made from and whether it causes further inflammation. The possibility of this surgery will depend on whether the foreign object in the orbit can be accessed safely.

While it remains in place, the metal will likely preclude him from certain medical tests, such as magnetic resonance imaging, which may be necessary for him in the future.



6

HN

The cause of this 24-year-old male's injury is not documented, but it is likely the result of blunt force trauma. His lens has been disrupted and become cloudy (cataract), and he also presents with a ruptured sphincter, iridodialysis and zonulysis in his left eye.

The zonules of the eye are delicate fibres that hold the lens in place, a little like the springs that hold a trampoline to its frame. Zonulysis occurs when some of those fibres have torn or become detached. This may cause the lens to shift or wobble and, in severe cases, even fall into the vitreous chamber behind.

Iridodialysis describes a detachment of the iris from its root. In mild cases, this may not cause visual disruption. It can, however,

cause inflammation and asymmetry of the pupil. The iris sphincter – which encircles the pupil and functions to constrict the pupil in bright light – has also been damaged. When the pupil does not constrict in bright light, there is severe light sensitivity leading to poor vision and eye pain.

HN's cataract has been removed and replaced with an artificial lens. Surgeons also placed a capsular tension ring to help keep the lens in place, compensating for the weak zonules.

Given that the damage appears to be limited to the front of the eye, and it has received treatment, HN has a relatively good prognosis among this cohort.



7

KE

This 22-year-old woman has a rupture to her right eyeball in addition to a corneal laceration following blunt trauma. She was reportedly hit in the eye with a projectile from a paintball gun.

When she presented to physicians, some of the contents of her right eye were found to be protruding from the eyeball. An ultrasound taken before surgery showed that internal components were significantly disorganized. It is not clear from her medical records where in the eye the rupture took place, but given it is mentioned in addition to the laceration, this may indicate the eye was injured in more than one place. KE has extensive retinal detachment and is unable to perceive light when she is examined.

A loss of sight to this degree is usually considered irreversible. KE received surgery to repair some of the damage, but there is no hope for recovery of vision in this eye. Remnants of the eye are left in place.

It is likely KE's injury took place [some time] before she was examined, as her ultrasound shows both inflammation and consolidation of her retinal detachment.

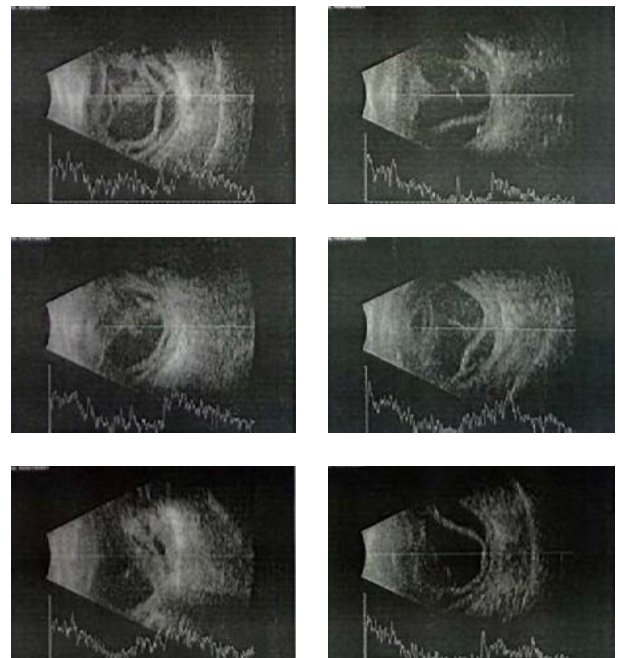
The fact she has had an ultrasound at all supports this conclusion, as it is very difficult to perform an ultrasound on an open wound without risking further disruption to the contents of the eye.

In the months following her injury, KE reportedly received an injection of stem cells to the remnants of her eye, at her own expense. There is no medical documentation

available yet with further details of the nature and outcome of this procedure.

In general, the use of stem cells in the eye is considered an unorthodox approach to vision loss, with an unknown but unlikely chance of success. But it is possible research into this area has progressed faster in Iran than in other countries.

In the US, for example, the use of stem cells in ophthalmology is highly experimental and would only take place within a research setting. Risks associated with stem cell use include the formation of new scar tissue. In many cases, the cells simply fail to have any notable outcome.



8

N

This 40-year-old man received around 90 pellet wounds to his body, some 20 of which were to his head. Many metal pellets and fragments remain in place.

Photographs show severe bruising and signs of two or more pellet entries to the left eyelids. An image with the eye open shows that it is bulging and has some bleeding to the white of the eye and swelling of the conjunctive membrane. There is evidence of increased blood flow to the general area. It is not clear how soon after the injury these images were taken, nor if they were taken at the same time.

The eyeball itself and the front part of the eye appear intact, but visual status cannot be assessed from the available documents.

Accompanying x-rays show some pellets remain in the deep posterior orbital area – the back of the eye socket. At this depth, it is possible a pellet could have disrupted the optic nerve, which carries information from the eye to the brain. But it is unclear whether this happened based on the available documentation.



After these images were taken, N reportedly received a silicone oil fill into the eye. This indicates he experienced a retinal detachment, which would make this a severe injury. Silicone oil is used when doctors are trying to hold the retina in place for an extended period, to encourage reattachment, and may need to be removed at a later date. The oil itself can prevent good vision and, in some cases, is toxic to the cornea, retina and nerve of the eye.

Before this procedure, N reportedly retained around 10% of the vision in this eye. Although medical documentation of the surgery and its outcome are not currently available, it is unlikely he will experience significant improvement to his vision in this eye.



9

RB

This 41-year-old man has experienced what appears to be a significant laceration to his eyelids caused by trauma from a weapon. Although the patient described this as a baton, doctors reportedly said it may have been a blade. The injury itself required a graft, where skin from another part of the body or a donor cadaver was used to close a wound.

There are no further medical documents available, but if the man's injury did not extend to the eye itself, he may have a good prognosis.

The functionality of his eyelid before and after the graft is unknown. Images suggest a suture was used to hold the eyelid shut at some point, suggesting the muscle of the eyelid may have been damaged.

Without functional lids to keep the surface of the eye coated with moisture, it can quickly become dry. This can lead to serious and permanent damage, including blindness.

If his reconstructed eyelid retains good function in the long term, and if the eye itself was not damaged during injury, RB may have a good visual prognosis. But this is not certain, from the available evidence. In addition to potential visual problems, RB will also likely have some degree of scarring from the injury and skin graft.



10

SS



This 27-year-old man experienced a trauma that resulted in the removal of the eye. The trauma is described in his notes as “sharp”, but images of SS’s face show what appears to be two pellet entrance wounds on the eyelids of one eye.

He had extensive surgery to repair the wound, including the removal of the lens, a pars plana vitrectomy (which enables access

to the back of the eye) and the removal of a foreign body from within the eye. It may be that a pellet pierced the eye and lodged itself deep in the posterior part of the eye, as doctors had to remove the vitreous to access it.

The specific outcome of these procedures is not known, but SS ultimately had his eye removed.

11

Saman

This 30-year-old man had severe bruising and bleeding around the eye after reportedly being shot by a projectile from a gun while sitting on a motorcycle at a stop light.

Non-medical images taken shortly after the injury suggest that Saman experienced

a significant trauma to his eye. His records show that he had no light perception when examined by doctors, which means he has no realistic prospect of visual recovery in the affected eye.



12

P

This 16-year-old girl had an exceptionally severe injury to her left eye, affecting many of its structures. Her eyeball was perforated twice, which may indicate both an entrance and exit wound from a pellet. She presented with a foreign body inside the eye, a subretinal haemorrhage, retinal detachment, choroidal detachment, blood in the conjunctiva, swelling to the conjunctiva and discontinuity of the globe wall. This indicates that part of the eyeball itself is missing.

A subretinal haemorrhage is bleeding behind the retina, and in this case, the blood has spread and caused the retina to detach. Specifically, the macula, the most important part of the retina involved in central vision, has detached. Damage to this area can have a particularly severe impact on sight. Patients without a functional macula may describe seeing the world as if someone is holding a thumb in the centre of their vision.

It is not clear in this case how severe the detachment was, meaning it is hard to know how severely the eye's central vision is affected. In most cases where there is subretinal haemorrhage in the macula, the patient never regains central vision.

P received surgery to repair the eye, but the outcome is unknown. Given the extent of her injuries, even with successful surgery, prognosis for her vision is likely to be poor. The eye does appear formed in a photograph taken sometime later. This means it has a normal-looking round shape and no longer seems to be open. But that does not necessarily mean its vision is good. In addition, the eyelid seems to be drooping, which can also inhibit vision.





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