CONDITION

Interstitial keratitis

Interstitial keratitis is inflammation within the middle layer of the cornea that can cause pain, light sensitivity, and reduced vision.

WHAT IT IS
Inflammation within the clear corneal middle layer

BODY SYSTEM
Eyes and vision

MAIN SYMPTOMS
Eye pain, light sensitivity, redness, blurred vision

WHAT CAUSES IT
Immune reactions, often triggered by infection

HOW IT IS DIAGNOSED
Slit-lamp eye examination and cause-specific tests

MAIN TREATMENT
Anti-inflammatory eye drops and treatment of the cause

CAN IT BE CURED?
Sometimes - inflammation resolves, but scarring may remain

IS IT AN EMERGENCY?
Sometimes - new vision loss or severe eye pain

LONG-TERM OUTLOOK
Often controllable, though corneal scarring can limit vision

Overview

Interstitial keratitis is inflammation in the stroma, the thick middle layer of the cornea. The cornea is the clear window at the front of the eye. It helps focus light and normally contains no blood vessels.

"Interstitial" means within the tissue. Unlike a typical corneal ulcer, interstitial keratitis usually begins below the cornea's surface rather than as an open surface wound. The inflammation may make the cornea cloudy and cause new blood vessels to grow into it.

The condition often results from an immune reaction linked to an infection elsewhere in the body or an earlier eye infection. Syphilis was historically a major cause. Other possible triggers include herpes viruses, tuberculosis, Lyme disease, and inflammatory conditions such as Cogan syndrome. Sometimes no cause is found.

Interstitial keratitis matters because inflammation and scarring can interfere with vision. Early assessment and suitable treatment can often control active inflammation. Existing corneal scars may improve slowly, remain stable, or continue to affect sight after the inflammation has settled.

Symptoms

Symptoms may develop in one eye or both eyes. They can appear gradually, although some people notice a quicker change.

Common symptoms include:

The cornea may look hazy or develop a pinkish area as small blood vessels grow into it. These changes are not always easy to see without magnification.

Symptoms can differ according to the cause. Herpes-related inflammation often affects one eye. Interstitial keratitis linked to congenital syphilis-syphilis passed from a pregnant person to the developing baby-more often affects both eyes, sometimes at different times.

Hearing loss, ringing in the ears, dizziness, or balance problems may occur with Cogan syndrome. This is a rare inflammatory condition involving the eyes and inner ears. These symptoms need prompt medical assessment, but they do not mean that Cogan syndrome is necessarily present.

- A red or painful eye
- Sensitivity to light, called photophobia
- Blurred, cloudy, or reduced vision
- Watering or excessive tears
- A feeling that something is in the eye

Causes and risk factors

Interstitial keratitis is usually an immune-mediated condition. This means the immune system causes inflammation in the cornea, sometimes while responding to an infection.

Possible infectious triggers include:

Not everyone with one of these infections develops interstitial keratitis. In some cases, the infection is no longer active in the cornea, but the immune response continues to cause inflammation.

Non-infectious causes include Cogan syndrome and, less commonly, other inflammatory or autoimmune conditions. "Autoimmune" means the immune system mistakenly attacks the body's own tissues.

A person's history helps identify likely causes. Relevant factors can include a previous herpes eye infection, shingles involving the face, possible exposure to tuberculosis or ticks, sexual health history, hearing changes, and other symptoms of inflammation. Interstitial keratitis itself is not usually inherited.

Contact lens use is a major risk factor for other kinds of keratitis, especially corneal infections, but it is not a usual cause of interstitial keratitis. A painful red eye in a contact lens wearer still needs urgent assessment because the type of keratitis cannot be identified from symptoms alone.

- Syphilis, including congenital syphilis
- Herpes simplex virus
- Varicella-zoster virus, which causes chickenpox and shingles
- Tuberculosis
- Lyme disease

Diagnosis

An eye specialist usually diagnoses interstitial keratitis by examining the cornea with a slit lamp. A slit lamp is a microscope with a narrow, bright beam of light. It shows which corneal layers are inflamed and whether there is clouding, scarring, or new blood vessel growth.

Fluorescein dye may be placed on the eye to reveal damage to the corneal surface. In interstitial keratitis, the surface may remain intact, although surface damage can sometimes occur.

The examination may also include:

Further tests are chosen according to the examination and medical history. Blood tests may check for syphilis. Testing for tuberculosis, Lyme disease, or other infections may be appropriate when there are specific risk factors or symptoms. Testing everyone for every possible cause is not always helpful.

Hearing tests may be arranged if there is hearing loss, ringing, dizziness, or concern about Cogan syndrome. Other specialists may become involved when the findings suggest an infection or a condition affecting more than the eyes.

- Measuring vision in each eye
- Checking eye pressure
- Examining the pupils and the inside of the eye
- Looking for signs of an active infection or earlier inflammation

Treatment and management

Treatment has two goals: reduce damaging corneal inflammation and treat any underlying cause. Care is usually supervised by an ophthalmologist, a doctor specialising in eye conditions.

Corticosteroid eye drops are often used to control inflammation. These medicines can be very effective, but they require monitoring. Steroid drops can raise pressure inside the eye, contribute to cataracts, and worsen some infections if used without suitable antimicrobial treatment.

For that reason, leftover steroid drops should not be used for a new red eye. Treatment is usually reduced gradually rather than stopped suddenly, according to repeated eye examinations.

Other management may include:

Treating an infection may stop further damage, but it does not instantly remove inflammation or existing scars. Syphilis treatment is important even when the eye inflammation appears to be an immune reaction rather than direct infection.

Severe or recurrent inflammation may require tablets, injections, or infusions that affect the immune system. These treatments need specialist supervision because they can have important side effects.

When a central corneal scar continues to limit vision after the condition becomes quiet, a corneal transplant may be considered. Surgery is not needed for everyone. New blood vessels and continuing inflammation can make transplant care more complex, so the timing is planned carefully.

- Antiviral treatment for herpes-related disease
- Antibiotic treatment for syphilis or another bacterial cause
- Medicines that relax the focusing muscles and reduce painful spasms
- Lubricating drops for surface discomfort
- Systemic immune-suppressing treatment for severe inflammatory disease

Complications

The main complication is reduced vision from corneal clouding or scarring. Vision is more likely to be affected when the central cornea becomes involved.

Inflammation can cause blood vessels to grow into the normally clear cornea. Fatty material may later leak from these vessels and leave pale deposits. Even after the vessels become inactive, faint "ghost vessels" may remain.

Other possible complications include:

Some complications come from the condition, while others are possible effects of treatment. Regular pressure checks and slit-lamp examinations help detect problems before they cause noticeable symptoms.

- Recurrent episodes of inflammation
- Irregular corneal shape, causing distorted vision
- Raised pressure inside the eye or glaucoma
- Cataract, especially after prolonged inflammation or steroid treatment
- Rare corneal thinning
- Lasting hearing or balance problems when Cogan syndrome is present

Prevention

Many cases of interstitial keratitis cannot be reliably prevented. An immune reaction may occur even when the original infection has been treated, and some cases have no identifiable cause.

Some underlying infections can be prevented or detected early. Testing and treatment for syphilis during pregnancy greatly reduces the risk of congenital syphilis. Safer-sex measures can lower the chance of acquiring syphilis. Recommended vaccination can reduce the risk of shingles, which may sometimes involve the eye.

Prompt care for herpes or shingles affecting the eye or nearby skin may reduce complications. Prescribed antiviral or anti-inflammatory treatment should not be changed without medical advice.

Do not share eye medicines. Avoid wearing contact lenses during any episode of eye pain, redness, discharge, light sensitivity, or blurred vision until the eye has been assessed.

Living with it and what to expect

The course depends mainly on the cause, how much of the cornea is affected, whether inflammation returns, and whether scarring crosses the centre of the cornea.

Active symptoms may improve over days or weeks after treatment begins, but treatment and follow-up can continue for weeks or months. Anti-inflammatory drops often need a slow reduction because inflammation can return if treatment is stopped too quickly.

Cloudiness may fade as inflammation settles. New corneal blood vessels can become less visible, although they may not disappear completely. Established scars often change more slowly and may remain. Glasses or contact lenses can sometimes improve vision if the corneal shape has changed, but they cannot make an opaque scar clear.

Some people have one episode and retain useful vision. Others have recurrences or need longer-term treatment for an underlying inflammatory condition. Severe scarring may require specialist visual aids or corneal surgery.

Routine follow-up remains important even when the eye feels better. Eye pressure can rise without causing early symptoms, and inflammation may still be visible on examination. Keeping appointments also allows medicines to be adjusted safely.

When to get medical help

Arrange urgent, same-day eye assessment for:

These symptoms have several possible causes, including infections that require rapid treatment. They cannot be safely distinguished at home.

Seek emergency care for sudden major vision loss, a serious eye injury, or chemical exposure. After a chemical splash, rinse the eye immediately with plenty of clean water while arranging emergency help.

During treatment, contact the eye clinic promptly if symptoms worsen, vision declines, or new discharge develops. Do not wait for a routine appointment.

Stable mild blur from an old scar, without pain, redness, light sensitivity, or sudden change, is usually suitable for routine follow-up. Keep planned appointments for eye-pressure checks and monitoring even if there are no new symptoms.

- New eye pain with redness
- New blurred or reduced vision

- Strong sensitivity to light
- A cloudy area on the cornea
- Eye symptoms during facial shingles
- A painful red eye while wearing contact lenses

Common questions

Is interstitial keratitis contagious?

The corneal inflammation itself is not contagious. An underlying infection may be transmissible in other ways. For example, syphilis can be sexually transmitted, while herpes viruses can spread through close contact. Having interstitial keratitis does not usually mean that casual contact will spread an eye condition.

Is interstitial keratitis the same as a corneal ulcer?

No. Interstitial keratitis mainly affects the cornea's middle layer, and the surface is often intact. A corneal ulcer is an open area of surface tissue loss, commonly caused by infection. Both can cause pain, redness, light sensitivity, and blurred vision, so an eye examination is needed to tell them apart.

Will my vision return to normal?

Vision may improve when inflammation and swelling settle. The result is less predictable if a dense scar has formed in the centre of the cornea. Glasses, specialist contact lenses, visual aids, or corneal surgery may help some people, but no treatment can guarantee normal vision.

Can interstitial keratitis come back?

Yes. Recurrence is possible, particularly with herpes-related inflammation or an ongoing immune condition. A new episode may affect the same eye, the other eye, or both eyes. Returning pain, redness, light sensitivity, or blurred vision needs prompt review.

Can I wear contact lenses with interstitial keratitis?

Contact lenses should not be worn during active pain, redness, inflammation, or treatment unless the eye specialist specifically approves them. After the condition settles, lenses may be possible. Some people use specially fitted lenses to improve vision from an irregular corneal surface.

Why might I need a hearing test for an eye problem?

Interstitial keratitis can occur with Cogan syndrome, which also causes inner-ear inflammation. A hearing test helps detect hearing loss that may not yet be obvious. New ringing, dizziness,

balance problems, or reduced hearing should be reported promptly.

Sources

- American Academy of Ophthalmology EyeWiki. Interstitial Keratitis . Clinical overview of causes, diagnosis, and management
- MSD Manual Professional Edition. Interstitial Keratitis . Overview of presentation, diagnosis, and treatment
- Schwartz GS, Harrison AR, Holland EJ. "Etiology of immune stromal (interstitial) keratitis." Cornea . 1998;17(3):278-281
- Wilhelmus KR, Gee L, Hauck WW, et al. "Herpetic Eye Disease Study: A controlled trial of topical corticosteroids for herpes simplex stromal keratitis." Ophthalmology . 1994;101(12):1883-1895
- Centers for Disease Control and Prevention. Sexually Transmitted Infections Treatment Guidelines, 2021: Syphilis During Pregnancy and Congenital Syphilis . Guidance on diagnosis, treatment, and prevention of congenital infection
- Vollertsen RS, McDonald TJ, Younge BR, et al. "Cogan's syndrome: 18 cases and a review of the literature." Mayo Clinic Proceedings . 1986;61(5):344-361