

DEFINITION

1. Corneal ulceration occurs when the epithelium of the cornea is disrupted.

CLINICAL MANIFESTATIONS

2. Symptoms include irritation, discharge, pain and impaired vision. On examination the ulcer may be visualised and its presence can be confirmed by staining with a vital dye. There may be also redness of the eye. In more serious cases pus may accumulate in the anterior chamber of the eye to produce a hypopyon.

AETIOLOGY

3. **Trauma** This is the commonest cause of corneal ulcer. Both abrasive and incisional injuries may cause epithelial loss and consequent ulceration, especially when complicated by infection.
4. **Chemical injury** Chemical injuries of varying degrees of severity are also a common cause of corneal ulceration, and a wide variety of substances have a direct toxic effect on the cells of the corneal epithelium. Chemical ulcers are frequently slow to heal.
5. **Other injurious agents** Other injuries include excessive exposure to ultraviolet radiation of a wavelength of approximately 290nm and include snow blindness, welder's arc burns and exposure to sun lamps and UVC (germicidal) lamps.
6. **Infection** Infection alone rarely causes corneal ulceration. One exception is herpes simplex virus infection which may cause dendritic or geographic ulceration. Bacterial, fungal or amoebic agents are not normally able to invade an intact cornea and usually only do so in the presence of damaged epithelium. This may arise for example from a traumatic abrasion or a minor degree of epithelial abnormality as when an amoebic infection arises in a contact lens wearer.
7. Marginal corneal ulcers, which occur mainly in the elderly, are due to an immune reaction to staphylococcal protein. As the name suggests they occur mainly around the corneal margin.
8. **Dystrophic changes** Dystrophic changes of various kinds may result in corneal epithelial damage and ulceration. Inherited corneal dystrophies which may be complicated by ulceration include anterior membrane dystrophy, Reis-Buckler's dystrophy, granular, and lattice dystrophies. Corneal epithelium previously involved in ulceration may fail to adhere to the underlying stroma and such dystrophic epithelium is prone to recurrent ulceration.
9. **Stem cell insufficiency** Some eye disorders are associated with a deficiency of the cells which normally replenish the corneal epithelium. This stem cell deficiency may cause recurrent and intractable ulceration.

10. **Epitheliopathy** The normal process whereby these limbal stem cells develop and differentiate into corneal epithelial tissue may be disrupted by a number of factors. These include tear film disturbance and consequent altered nutrition and oxygenation. Tear film disruption may also be caused by recurrent trauma, e.g. due to entropion (inverted eyelashes) or contact lens wear.
11. **Denervation** The anaesthetic cornea is especially prone to ulceration, e.g. in trigeminal nerve injury. This may be due to the absence of neuropeptides, which are normally supplied by the neural tissue and appear to have a role in maintaining the corneal epithelium.
12. **Inflammation of the corneal stroma** Inflammation of the corneal stroma from any cause, e.g. herpetic keratitis, may damage the overlying epithelium and result in frank ulceration.
13. **Miscellaneous causes** Other, rarer causes of corneal ulceration include chronic serpiginous ulcer, an autoimmune condition which occurs mainly in elderly subjects.

CONCLUSION

14. Corneal ulcer is a condition in which the epithelium of the eye is disrupted. It may arise from injury, infection, intrinsic abnormalities of the cornea and neighbouring structures and, rarely, due to autoimmune processes.

REFERENCES

Yanoff M, Duker JS, editors. Ophthalmology. London: Mosby, 1999.

Albert DM, Jakobiec FA, Azar DT, Gragoudas ES, Editors. Principles and practice of ophthalmology. Philadelphia: W.B.Saunders Company, 2000.

Fekrat S, Bressler NM, Bressler S, Easty DL, Sparrow JM, Editors. Oxford textbook of ophthalmology. Oxford: Oxford University Press, 1999.

Coster DJ. Cornea. London: BMJ Books, 2002.

Kaufman HE, Barron BA, McDonald MB, Kaufman SC. The cornea. Boston: Butterworth Heinemann, 2000.

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