



Harminder Singh Dua

Standardised protocol is essential for the treatment of infectious keratitis

Roibeard O'hEineachain
in Dublin

A STANDARDISED and methodical approach will yield optimum results in the management of corneal infections, said Harminder Singh Dua FRCS, FRCOphth, MD, PhD, University Hospital, Queens Medical Centre, Nottingham, UK, in his Dermot Piers memorial lecture which he delivered at the 6th International Refractive Meeting, held in Croke Park, Dublin, Ireland. Dermot Piers (1922-1994) was a consultant ophthalmologist at the Croydon Eye Unit, Surrey UK. He was a pioneer of ocular microsurgery and was an inventor of microsurgical instrumentation.

"Microbial keratitis is the most common cause of unilateral blindness worldwide. Meticulous clinical and laboratory assessment, constant review of symptoms and signs, and establishing and working to protocols helps," said Prof Dua.

Prof Dua said that in his initial patient work-up he investigates the patient's history with particular regard for those factors that may influence the ocular infection's pathology. Those factors include a history of contact lens wear, previous ocular surgery, ocular surface disease, nasolacrimal obstruction and cold sores. In trauma cases he also tries to get as much information from the patient as possible about how the injury occurred and what types of material were involved.

He noted that examining the cornea and eye layer by layer, from the outside inwards provides a more complete picture of the disease processes involved and the treatment strategies to be undertaken. It is a good idea to first examine the eyelids and lashes and the conjunctiva for signs of blepharitis, he said.

"Untreated blepharitis provides a reservoir of bacteria for colonisation of the cornea. In addition the associated conjunctival lesions, such as papillae, follicles and ulcers may impose a mechanical stress on the corneal surface which can, in turn, delay corneal healing."

It is also important not to overlook nasolacrimal sac obstructions, the simple syringing of which can reveal blockage, which may need to be overcome to successfully treat bacterial keratitis. Examination of the limbus with fluorescein staining can reveal inflammation (limbitis), which can be a sign of infections like herpes simplex or Acanthamoeba.

In the early stages of infection, the best clinical clues can be obtained with fluorescein staining by first instilling an anaesthetic, then the fluorescein, and allowing the patient to blink and waiting about 30 seconds before examining the cornea. When examining the corneal surface, fluorescein staining will reveal pseudodendritic patterns on the epithelium

that are a frequent feature of Acanthamoeba infections in their early stages. Prof Dua noted that viewing the ulcers and infiltrates separately will allow a more accurate tracking of the infection's pathology since the one will exceed the other depending on the disease's progress and its response to therapy.

Assessing the stroma is possible either with lower-tech approaches like slit-beam or higher-tech approaches like the Pentacam and OCT. Stromal features found in active infections include stromal thickening, melts, and perforation. In cases of perforation, the leak will become more clearly visible when stained with 2.0 per cent fluorescein.

Vascularisation in both the deep and superficial layers of the stroma are sometimes related to active inflammation, although they don't generally occur until the very late stages with Acanthamoeba infection, Prof Dua said. "Immune rings" sometimes occur on the stromal surface. Those manifestations respond well to sterilisation with antimicrobials followed by topical steroids.

Intraocular signs and symptoms

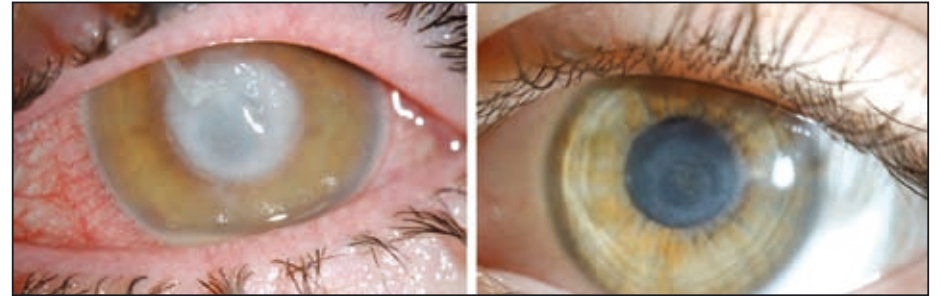
Examination of internal structures such as the anterior chamber, the iris and the pupil, will reveal features such as hypopyon and hyphaema, dilated iris vessels and synechiae. In cases of corneal infection, hypopyon is generally sterile and results from toxins percolating through the stroma.

Therefore tapping the anterior chamber for culture samples is generally unwise, since it will raise the chance of microbes entering the eye, he cautioned. The pupil may be secluded, when ring synechiae occur or occluded with exudate or fibrin. Rigorous dilation is necessary in such cases to break the adhesions, he added.

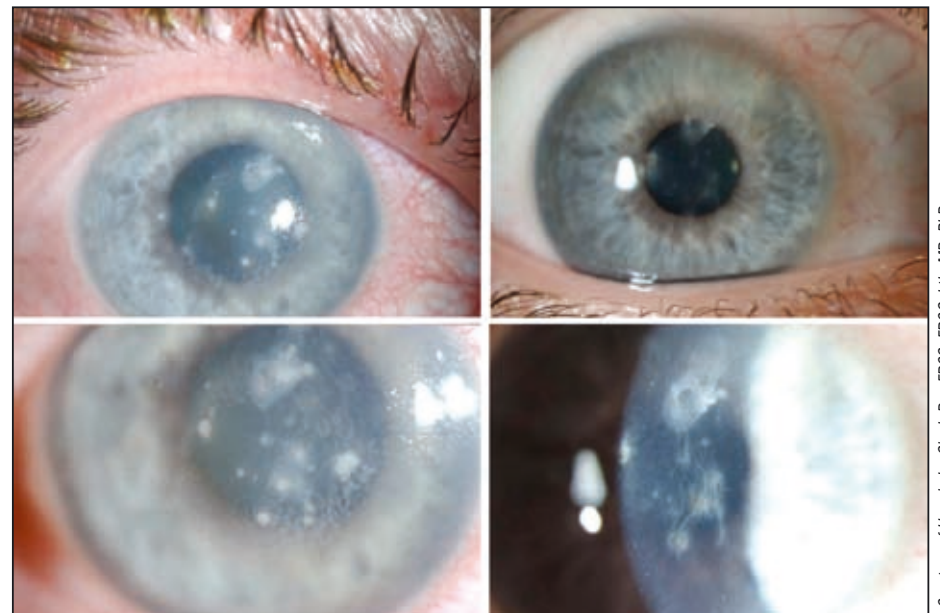
Scleral infection is often overlooked in examination of eyes for keratitis. It can be mistaken for an inflammatory response to the corneal infection. Such infections require special attention and a different treatment strategy, which will generally include systemic antibiotics and at times immunosuppression, he stressed.

Examination of the corneas with Acanthamoeba infection by in vivo confocal microscopy can reveal the presence of cysts, which will present in three forms, depending on the level at which the cyst is scanned. The surface view gives a bright spot appearance to the cyst, further into the cyst the classic double-walled image is seen and when imaged obliquely or towards the margins a signet ring image is seen, he explained.

Infections by fungi such as Aspergillus will often have the appearance of bright intrastromal interlocking filaments when viewed by confocal microscopy. However, dendritic cells can have a similar appearance.



Successfully treated contact lens-related psuedomonas keratitis



Post-LASIK interface candida keratitis, successfully treated. Residual scars remained and the patient needed a rigid gas permeable contact lens for full visual potential

Immediate treatment essential

Prof Dua said that his department ensures that antibiotic drops are commenced at the earliest opportunity even whilst the patient is waiting in the eye casualty prior to admission. The regimen he recommends is cefuroxime 10 per cent every five minutes for 30 minutes, alternating with gentamicin 1.5 per cent every five minutes for 30 minutes. This is followed by hourly administration of the drugs, alternating on the hour and the half hour or 24 to 48 hours and tapered according to clinical response.

He added that while some advocate sub-conjunctival or intracorneal injections, he has not administered one in the past 10 years because intensive topical therapy will achieve the same results.

Once Acanthamoeba has been definitively diagnosed, patients undergo an intensive regimen of treatment with topical anti-Acanthamoeba agents, tapering treatment over two to four months. In the case of mild non-sight threatening infections, monotherapy with topical ciprofloxacin, ofloxacin, or levofloxacin is often adequate. In the case of atypical mycobacteria, amikacin is the drug of choice.

Steroids can be helpful in reducing inflammation of corneal infections, but are best used after there has been a definitive

response to treatment. The agents are particularly beneficial in the treatment of infectious keratitis in eyes that have undergone keratoplasty. In such cases, the eye's immune response to the infection can trigger graft rejection.

Indicators of a good response to therapy include a reduction in pain, discharge and oedema. There will also be a blunting of the infiltrate edge and surrounding 'fuzz,' and a commencement of re-epithelialisation. If therapy has not been effective and the condition is worsening a cessation of therapy, repeated swabs and scrapes and reappraisal of treatment strategy is generally necessary. The causes for treatment failure include additional undiagnosed infectious agents, a low sensitivity of the microorganism to the agent used, or a toxic reaction to the agent.

Prof Dua is chair and professor of ophthalmology at the University Hospital, University of Nottingham. He is also current vice-president and president-elect of EuCornea. The 1st EuCornea Congress will be held in Venice, Italy from June 17-19, 2010.

For further information see: www.eucornea.org

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