CASE REPORT

Sparfloxacin-associated corneal epithelial toxicity

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SUMMARY

Sparfloxacin is a broad-spectrum fluoroquinolone antibiotic commonly used for various bacterial corneal infections. Topical use of fluoroquinolones is considered to be safe leading to their widespread use. Common indications include blepharitis, conjunctivitis and corneal ulcers. However, unsupervised prolonged use is associated with deposition of crystalline material in the epithelial and anterior stromal layers of the cornea. These may be associated with significant visual symptoms including diminution of vision and glare/photophobia. We present a case of a 40-year-old man who was treated with topical 0.3% sparfloxacin unsupervised for a long time. The patient developed significant visual impairment due to diffuse epitheliopathy. Cessation of the drug was slowly followed by reversal of manifestations and normalisation of corneal morphology.

BACKGROUND

Topical use of fluoroquinolones is highly successful in treatment of common ocular infections caused by Gram-positive as well as Gram-negative pathogens due to their high solubility and broad antimicrobial spectrum.^{1–4} Although otherwise considered safe and effective, a problem common to all drugs of this class is crystalline drug deposition over the cornea.^{2 5–9} This problem is especially noted in unsupervised use of older generation fluoroquinolones such as sparfloxacin. It is important to recognise the toxic manifestation of this antibiotic and ensure prompt discontinuation.

Crystalline drug deposition affects the corneal epithelium, diffusely presenting with disabling visual symptoms including glare and photophobia. The literature has under-reported the corneal epitheliopathy secondary to sparfloxacin toxicity. This case highlights the importance of regular follow-up and use of safer alternative drugs in infectious keratopathy.

CASE PRESENTATION

A 40-year-old man presented with bilateral mucopurulent conjunctivitis. There were no previous ocular symptoms and no history of any known allergies. On examination, there was bilateral conjunctivitis with mucopurulent discharge with lid matting. The corneas were clear and visual acuity was 20/20 in both eyes. He was prescribed topical sparfloxacin 0.3% four times a day and advised to return after 4 days for review. This patient was lost to follow-up but continued to use the eye drops unsupervised. The patient presented again after 2 months with significant drop in visual acuity and blurring of vision. At this visit, his visual acuity was

recorded as 20/80 in the right eye and 20/100 in the left. He complained of glare and photophobia leading to difficulty in performing clerical work.

On examination, there was diffuse conjunctival congestion, redness and lacrimation. There was heavy deposition of refractile sparfloxacin crystals in the corneal epithelium with diffuse epitheliopathy (figure 1A). Slit-lamp examination revealed presence of crystalline deposits involving the epithelium, Bowman's layer and anterior stroma (figure 1B). The posterior corneal layers appeared normal and there was no inflammation recorded in the anterior segment. The patient was advised immediate cessation of topical sparfloxacin and adherence to follow-up visits.

Three months later, there was near complete resolution of the crystalline deposits after cessation of topical antimicrobial. The patient was prescribed topical lubricants with active ingredients polyethylene glycol 400 0.4% and propylene glycol 0.3% (Systane). Slit-lamp examination revealed healthy corneal epithelium and anterior stroma with disappearance of the refractile deposits resulting in resolution of symptoms.

OUTCOME AND FOLLOW-UP

The patient was followed up for 3 months. His visual acuity returned to 20/20 and the slit lamp examination revealed presence of normal corneal epithelium.

DISCUSSION

Fluoroquinolones such as topical ciprofloxacin 0.3%, ofloxacin 0.3%, sparfloxacin 0.3% and norfloxacin 0.3% are commonly used to combat superficial corneal infections as well as corneal ulceration due to susceptible organisms.¹ Antibacterial action of these agents is achieved through inhibition of bacterial DNA topoisomerase II enzyme halting nucleic acid replication.^{4 5 10} After topical application of sparfloxacin 0.3%, sufficiently higher concentrations have been shown in aqueous humour than the minimum inhibitory concentration for common ocular pathogens such as *Staphylococcus*, *Streptococcus*, *Hemophilus*, *Pseudomonas* and *Klebsiella*.⁵

Fluoroquinolones have a tendency to deposit when there is a change in the pH on mixing with the tear film.⁶ This has been reported in as many as 16.6% patients with 0.3% ciprofloxacin.¹¹ Sparfloxacin drug deposition was demonstrated in a patient with previous corneal graft by Gokhale,⁶ which resolved after stopping the drug therapy. Claerhout *et al*⁹ have shown crystalline deposition of ofloxacin after use in two children with vernal keratoconjunctivitis. Norfloxacin crystal deposition

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Figure 1 Corneal epithelial deposits of sparfloxacin. (A) Diffuse light examination of the cornea showing presence of refractile crystalline sparfloxacin drug deposit along with epitheliopathy. (B) Slit-lamp biomicroscopy reveals presence of the deposits in the epithelium and anterior stroma of the cornea.

was noted in three patients treated for bacterial keratitis reported by Castillo *et al.*⁷ These deposits are temporary and resolve without scarring on stopping drug therapy.^{5 6}

This propensity of sparfloxacin and other drugs from this category to get deposited in the cornea must be kept in mind when the drug is required in higher concentration or for longer durations, such as in patients with corneal ulcers. Misuse of eye drops and unsupervised use is associated with deposition leading to reversible but significant ocular morbidity. Conservative management along with symptomatic therapy is sufficient for reversal of toxic manifestations.

Learning points

- ▶ Unsupervised use of eye drops and misuse of antibiotics considered 'relatively safe' may have deleterious effects on the eyes with potential vision threatening complications.
- ▶ Propensity of sparfloxacin to get deposited must be kept in mind and alternative safer antibiotics must be prescribed especially in patients who are likely to be lost to follow-up.
- ▶ Clinical suspicion and early recognition of the complication is important and symptomatic treatment is sufficient for reversal of toxic manifestations.

Competing interests None.

Patient consent Obtained.

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