Keratitis from abuse of corneal anaesthetics

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SUMMARY Topically applied anaesthetics are potentially dangerous, as frequent and continuous application may lead to anaesthetic-induced keratitis. Three patients with serious corneal lesions are described.

Physicians sometimes fail to realise that topical application of anaesthetics to the eye may lead to severe corneal lesions and permanent reduction of visual acuity. Such a reaction can be evoked in any eye that has been subjected to prolonged application of topical anaesthetics as a means of relieving the discomfort of minor injuries. Although the topical use of these drugs is widespread, relatively few cases have been published of misuse of corneal anaesthetics. This may be due to the fact that damage done to the cornea is mostly limited, and full vision is usually restored.

However, chronically applied corneal anaesthetics cause delay in corneal epithelial healing and produce corneal oedema and epithelial erosions, leading to increased pain. This leads to shortened intervals between applications. Loss of the epithelial barrier may then set the stage for infection and permanent corneal scarring.

Of the 18 cases reported between 1968 and 1973 (Epstein and Paton, 1968; Willis and Laibson, 1970; Hilsdorf and Zenklusen, 1973) 5 were medical professionals. They had treated themselves for a few days up to 2 weeks. It would appear that an occupational hazard exists, since a quarter of all the cases were doctors. Five more cases (no doctors) were seen in the Rotterdam Eye Hospital and in the University Eye Clinic at Essen, Germany. Three cases in which serious loss of vision occurred will be described.

Case reports

Case 1

A 40-year-old man was hit by a chemical fluid in his right eye. The eye was slightly irritated and the cornea showed an erosion. Oxybuprocaine (Novesine) was prescribed by the ophthalmologist for pain relief. The patient continued to use the drug owing to persisting pain, applying it as often as every 30 minutes for 6 weeks.

When he was referred for examination the visual acuity had dropped to hand movements. Examination revealed an allergic reaction of the skin and the eyelids. The conjunctiva was markedly injected. Half the epithelium was missing from the central cornea, and under the eroded epithelium there was full-thickness corneal oedema. Sensibility of the cornea was lost. Superficial and stromal vascularisation existed, and in addition to the anaesthetic-induced keratitis signs of anterior uveitis were clearly present (Fig. 1).

The patient was admitted to hospital. Oxybuprocaine drops were discontinued, and the patient was started on a course of firm pressure patching and cycloplegia with atropine 1%. Strong analgesics had to be given for intolerable pain during the next few days. Five days later the pain was con-
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siderably relieved, and on removing the patch it was
noted that epithelialisation had started and stromal
oedema had diminished.

The cornea partly cleared in about 3 weeks, but
stromal infiltrate was still present. In the next 6
weeks stromal oedema was further reduced, but it
became clear that a thick leucoma in the superficial
stoma would persist in the central cornea.

Four months after oxybuprocaine medication was
discontinued the leucoma was vascularised, and
vision in the right eye was finger-counting at 1 m
(Fig. 2). Keratoplasty was advised but rejected by
the patient. Three years later the patient was exam-
ined again. The condition had not changed
essentially.

CASE 2
A 32-year-old man suffered a painful erosion of the
right eye. His ophthalmologist supplied him with a
bottle of oxybuprocaine (Chibro-Kerakain), to be
returned the next day. The patient, however,
continued the medication as the pain returned in
the period between the instillations. Notwith-
standing an increased frequency of application, the
periods of relief of pain became shorter and shorter.
As the pain became intractable the patient visited
the outpatient department 2 weeks later.

On examination the cornea of the right eye showed
a centrally located erosion, with full-thickness
stromal infiltration and keratitic precipitates. Vision
had decreased to finger-counting at 3 m.

He was admitted to hospital and treatment was
started with, among other things, mydriatics and
antibiotics. The patient avoided mentioning the
continuous use of oxybuprocaine drops, because he
was afraid to lose a medication on which he felt
totally dependent. Thus he managed to continue
for several weeks the instillation of oxybuprocaine
drops, replacing at night the empty bottles by filled
ones. Despite thorough treatment the corneal ulcera-
tion progressed steadily (Fig. 3). Corneal
sensitivity was completely lost. The possibility of
self-medication was suggested more than once, but
this idea was emphatically denied. A thorough
search of the room for incriminating material was
unsuccessful. The situation seemed desperate until
the patient was found asleep with a bottle of oxybu-
procaine in his hand.

CASE 3
At about the same time as the previous case, a man
of 32 years presented himself at the outpatient
department complaining of severe pain in the right
eye due to an erosion of the cornea. Three days
before he had been struck in the eye. He went to
the ophthalmologist (by chance the same one who
treated case 2) and received a bottle of oxybupro-
caine (Chibro-Kerakain) to relieve the pain, to be
returned the next day. But he too continued to
apply the anaesthetic drops owing to recurring pain.

The patient was treated in the outpatient depart-
ment with mydriatics and antibiotics, but his
condition deteriorated. An allergic reaction of the
eyelids surrounding skin, and fingertips developed
(Figs. 4 and 5). As a progressive ulcer of the cornea
developed and the patient complained of intolerable
pain (though sensibility of the cornea was almost
totally lost), he was admitted to hospital.

Despite intensive treatment with antiallergic and
antibiotic drugs the condition deteriorated. The
patient started to complain of his sound eye, and a
central erosion of the cornea was found in it. At
about the same time patient No. 2 also developed an
erosion of the fellow eye, with photophobia and
severe pain. Owing to the similarity of the unusual
resistance to treatment of the 2 patients they

Fig. 2 Case 1. Four months after discontinuation of
anaesthetic drops. A corneal leucoma has persisted

Fig. 3 Case 2. Serious oxybuprocaine-induced keratitis,
showing additional allergic oedema of conjunctiva

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were accommodated in the same hospital room.

Soon they both found out that neither of them could do without the anaesthetic, and so they secretly obtained fresh bottles of oxybuprocaine.

After the bottle of anaesthetic was discovered in the hand of patient No. 2, the condition of the eyes of both patients improved. In both, however, a pronounced vascularised leucoma resulted. Perforating keratoplasty had to be performed, with a favourable outcome in patient No. 2 (Fig. 6). Visual acuity improved to 0.3. In the third patient, however, even renewed perforating keratoplasty did not lead to a favourable outcome.

Discussion

Soon after its surface anaesthetic property was recognised cocaine applied to the cornea was found to cause epithelial erosion. Newer synthetic topical anaesthetics have potentially the same serious implications, as these drugs are derivatives of cocaine. They include tetracaine, butacaine, proparacaine, and oxybuprocaine. The clinical findings in anaesthetic-induced keratitis are similar to those observed in neuroparalytic keratitis. The resulting corneal anaesthesia leads to decreased reflex blinking and consequently increased susceptibility to drying, foreign bodies, trauma, and infection. Topical anaesthetics, moreover, inhibit corneal respiration and glucose metabolism, increase corneal permeability, and decrease mitotic epithelial activity. It is possible that locally applied anaesthetics interfere with epithelial metabolism by impairing the trophic function of the corneal nerve fibres. This too may
result in intolerable pain of the insensitive cornea, 
anesthesia dolorosa, which may force the patient 
to apply the anaesthetic drops more and more 
frequently. This may make the withdrawal of the 
anesthetic in some patients impossible without 
administering massive doses of strong analgesics. 

Clearly physicians should avoid the use and 
prescription of such agents except as office and 
clinic procedures. ‘The topical anaesthetic is a good 
friend but may become an enemy when used too 
often.’ (Willis and Laibson, 1970.)

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