OXYBUPROCAINE 0.4% {SYN BENOXINATE HYDROCHLORIDE} AS A TOPICAL ANAESTHETIC AGENT.

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Abstract: The clinical efficacy and patient compliance of oxybuprocaine 0.4% (benoxinate hydrochloride) is compared to that of 4% lidocaine hydrochloride as a topical anaesthetic . A double blind trial was carried out in 500 patients , it was found that benoxinate hydrochloride is as effective as lidocaine hydrochloride ; however patient compliance is much better with benoxinate hydrochloride .

Aim: To compare the clinical efficacy and patient compliance of benoxinate hydrochloride with that of conventionally used 4% lidocaine hydrochloride.
Material & Methods: 500 patients who had come for routine ophthalmic consultation were included in this double blind trial. The topical anaesthetic was instilled prior to measuring the intra-ocular pressure. Two drops of benoxinate hydrochloride was instilled in one eye 4% lidocaine hydrochloride in the other. The bottles were labeled 'R' and 'L'. Both, the nurse putting the drops and the patient receiving the drops were unaware of the difference in the contents of the two bottles. The right eye bottle contained benoxinate hydrochloride and the left eye bottle contained the conventional 4% lidocaine hydrochloride.

A proforma was prepared as follows:

Name:
Age: Sex:

Stinging sensation: Rt eye Lt eye
(Mild +,Mod ++,Severe+++,V Severe++++)

Effect After 30s/60s
Hyper sensitivity reaction:

Effect on the eye:
Conjunctiva
Cornea
AC
Iris
Pupil

Systemic Effects
CNS
CVS

Any Other

Observations:

NO OF PATIENTS	BENOXINATE 0.4%	LIDOCAINE 4%
5	No sensation	++
30	+	+
45	++	++
316	+	++
26	++	+++
78	+	+++

Effect seen after 30 seconds/60 seconds.

No of Patients	Benoxinate	Lidocaine
6	60	60
4	30	30
490	30	60

Discussion:
Topical anaesthetics are used principally for corneal anaesthesia prior to determining the intra-ocular pressure and for minor optical procedures such as the removal of foreign bodies.
They are classified basically, into the Ester type and the Amide type.

The ester type includes:
1.Tetracaine [syn. Amethocaine]
2.Oxybuprocaine.[syn.Benoxinate]
3.Proxymetacaine.
4.Cocaine.
Oxybuprocaine (syn. benoxinate) also has bactericidal properties. It may be less irritating than tetracaine, and the onset and duration of action are similar to tetracaine. It is also available in combination with fluorescein, for the removal of foreign bodies.

Amide type
Lidocaine (syn. lignocaine) may be combined with

fluorescein and used for tonometry. Lidocaine, with or without adrenaline, is also used for peribulbar and retrobulbar infiltration for eye surgery.
It has a more rapid, intense and prolonged effect than the ester-type local anaesthetics due to the absence of marked vasodilatation and its relative resistance to hydrolysis. It has the same potential as tetracaine to cause adverse effects but hypersensitivity is less likely.

PHARMACOLOGICAL ACTION:
Benoxinate hydrochloride is an effective surface anaesthetic which acts by blocking sensory nerve endings near the site of application. The solution produces little conjunctival irritation or hyperaemia and has no effect on the
pupil; it has a bacteriostatic action and reduces the risk of exposure keratitis.

CONTRA-INDICATIONS:
Caution should be observed when benoxinate hydrochloride is used in patients with allergies, cardiac disease, hyperthyroidism, or open lesions.

.SIDE-EFFECTS AND SPECIAL PRECAUTIONS:
Systemic toxicity is rarely seen following ocular administration, but is identical to that for amethocaine hydrochloride; namely cardiovascular collapse due to idiosyncrasy and occasionally, convulsions and hyperexcitability.

In our series, we found that 90% of patients had effective anaesthesia , 30 seconds after Benoxinate and 60 seconds after Lidocaine4%.i.e. these patients could comfortably keep their eyes open and allow their I.O.P. to be measured after this time interval .The actual onset of the anaesthetic effect should actually be measured with a corneal aesthesiometer.
Patient compliance was measured by subjectively classifying the stinging sensation as mild, moderate, severe and very severe or intolerable, on instilling the anaesthetic drop. As seen in the observation table 1% had no sensation on instilling benoxinate, yet had moderate irritation or sensation to lidocaine4%. However, this is a miniscule or a stray finding. 30 patients had mild irritation on instilling both drops, and 45 patients had a moderate response to both drops. Together, that is 75 patients found no difference between the two different molecules. These form 15%, that is a small minority, who probably have such sensitive eyes that any drop is so irritating that they cannot grade the difference. Also, the socio-educational background of patients being so varied, we have to assume that they probably did not follow the trial.
The most striking finding is the response of 316 patients i.e. 63.2% who had a mild stinging sensation to Benoxinate but a moderate stinging sensation to Lidocaine. Also, another 26 patients i.e. 5.2% had a moderate stinging sensation to Benoxinate but a severe stinging sensation to Lidocaine4%. 78 patients i.e.15.6% patients had only a mild sensitivity to Benoxinate but a severe stinging sensation to Lidocaine4%. These patients together form a statistically significant 84%. It is in this majority group, that 394 patients i.e.75% had only a mild stinging sensation to Benoxinate and 6.2% had a moderate irritation. In contrast, 316 patients i.e.75.24% had a moderate stinging sensation while 94 patients i.e.22.38% had a severe stinging sensation to Lidocaine. This difference in the patient response is not only statistically significant but obvious.
None of the patients found any anaesthetic intolerable i.e. ++++.
All local anaesthetic agents can cause superficial corneal lesions. With repeated and prolonged use this damage is intensified due to chemical toxicity and mechanical damage. This can result in severe keratitis, corneal opacification and loss of visual acuity. They also delay corneal healing. In all our patients the drops were used only once. As expected, we had no ocular complications.
Allergic reactions to topical anaesthetics are extremely rare. Literature quotes, that ester-type agents are associated with more allergic reactions than are amide –type. In our trial, there were no allergic reactions.
Signs of systemic toxicity may also occur very rarely and include CNS stimulation or depression, sweating, arrhythmias and muscle twitching. Fortunately, no patient had any toxic effect.
An interesting difference to note is that tetracaine and oxybuprocaine are thought to be safe in porphyria, but lidocaine should be used with extreme caution.

Conclusion: The clinical efficacy of Benoxinate hydrochloride 0.4% is comparable to that of lidocaine 4%.Patient discomfort disappears earlier with Benoxinate than with lidocaine4%. The stinging sensation is generally mild with Benoxinate but varies from moderate to severe with lidocaine4%.
The patient acceptance thus being greater for Benoxinate, it can safely be preferred to lidocaine 4% for routine topical anaesthesia.

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References:
1.Clinical Ocular Pharmacology Part1-

3rdEdition.BarlettJ.D., Jaanus S.D.
2.Topical Anaesthesia with Benoxinate 0.4% for Pterygium Surgery-Joseph Frucht-Pery,MD. –Ophthalmic Surgery and Lasers. Vol.28[3]. Mar.1997.
3.Control of pain after photorefractive surgery. Seema Verma, John Marshall.—Journal of Refractive Surgery-Vol.12[3] Mar-April 1996.
4.The South American Medicines Formulary-Ophthalmologicals.
5.Comparison of the analgesic efficacy of topical morphine and a topical local anaesthetic for corneal abrasions.-Thomas Burns. B.Patel W.Soscia et al. Dept. of Anaesthesia and Dept of Ophth. Univ.of Utah, Salt Lake City, UT.

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If I have seen further than others, it is by standing upon the shoulders of giants.