CLINICAL STUDY

# Prilocaine versus lignocaine for minor lid procedures

ANTHONY J.M. BURTON,
OLIVER BACKHOUSE,
TIMOTHY W. METCALFE

**Abstract**

***Purpose*** **To determine whether prilocaine is a more comfortable local infiltration anaesthetic agent than the more widely used lignocaine for minor eyelid procedures.**
***Methods*** **A prospective randomised study was undertaken to compare the discomfort between local infiltration of plain 2% prilocaine versus its equivalent, plain 2% lignocaine. One hundred and twenty-five patients were recruited. Pain was assessed subjectively using a visual analogue pain score, graded from 0 to 10.**
***Results*** **The mean pain score for the prilocaine group was 1.82 compared with 3.19 for the lignocaine group. Using the Mann–Whitney *U*-test for significance, $U = 1236.5$; $p < 0.001$.**
***Conclusion*** **Prilocaine is a more comfortable local infiltration anaesthetic agent than lignocaine when used for minor eyelid procedures.**

*Key words* Eyelid, Lignocaine, Local anaesthesia, Prilocaine, Pain

Prilocaine is a well-established local anaesthetic agent, which has been used in ophthalmology for local infiltration and more recently for peribulbar anaesthesia.[1] Its chemical structure is similar to that of lignocaine but it has a slower systemic absorption, is therefore less toxic and avoids the requirement for adrenaline.[2] In addition its only potentially serious side-effect, that of methaemoglobinaemia, requires volumes never reached when used for ophthalmological purposes.[3]

In our constant pursuit of improved quality of patient care, it is of little surprise that we continue to try to find ways of reducing discomfort during local anaesthesia. Much has been published regarding the warming[4–6] and buffering[7] of anaesthetic solutions in order to reduce patient discomfort during infiltration. Surprisingly it has been shown that the speed of infiltration,[8] concentration[9] and volume[10] of local anaesthetic agent used do not significantly affect discomfort.

The aim of this study was to demonstrate whether an alternative agent, such as prilocaine, would be superior to the standard lignocaine solutions currently used, with regard to discomfort on administration. Previous studies have shown prilocaine to be as effective an anaesthetic agent as lignocaine and less toxic; however, they have been unable to demonstrate any significant advantage with regard to discomfort on administration.[1]

## Patients, materials and methods

A pilot study had shown that prilocaine was likely to be more comfortable than lignocaine when used as a local infiltrative anaesthetic agent during minor eyelid procedures.

One hundred and twenty-five patients undergoing routine minor eyelid procedures (Table 1) were recruited into the study. Informed consent was obtained. The assisting nurse randomly drew up 1 ml of either 2% lignocaine plain or 2% prilocaine plain into a 2.5 ml syringe mounted with a 25 gauge needle. The surgeon and patient were masked as to which agent was being used. All solutions used were at room temperature (17–21 °C).

A standard set of instructions was read out to each patient prior to the procedure, outlining the aims of the study and explaining that it was the discomfort of the actual injection and not the transdermal insertion of the needle that was to be recorded.

The injection was performed by one of two surgeons and all the anaesthetic was used regardless of the procedure. After the injection the patient was asked to record the level of pain perceived on a visual analogue scale, where 0 = no pain and 10 = worst pain imaginable.

At the end of the procedure the nurse disclosed which anaesthetic agent was used and a data sheet was completed. The results were analysed using the Mann–Whitney *U*-test for non-parametric data.

**Table 1.** *Minor eyelid procedures included in study*

| |
|---|
| Incision and curettage of chalazion |
| Excision of papillomata |
| Excision of retention cyst |
| Electrolysis of lashes |
| Quickert's everting sutures for entropion |
| Punctal occlusion by electrocautery |

A.J.M. Burton
O. Backhouse
Leeds General Infirmary
Leeds, UK

T.W. Metcalfe
Harrogate District Hospital
Harrogate, UK

Mr A.J.M. Burton ✉
Department of Ophthalmology
Leeds General Infirmary
Leeds LS1 3EX, UK
Tel: +44 (0)1132 286288
e-mail:
tony.355@virginnet.co.uk

Received: 25 October 1999
Accepted in revised form:
10 February 2000



**Table 2.** *Summary statistics*

| Group | *n* | Pain score | | |
|---|---|---|---|---|
| | | Median | Minimum | Maximum |
| Prilocaine | 66 | 1.0000 | 0.00 | 7.00 |
| Lignocaine | 59 | 3.0000 | 0.00 | 8.00 |
| Total | 125 | 2.0000 | 0.00 | 8.00 |

**Table 3.** *Mann–Whitney test results*

(*a*) *Ranks*

| Group | *n* | Mean rank | Sum of ranks |
|---|---|---|---|
| Prilocaine | 66 | 52.23 | 3447.50 |
| Lignocaine | 59 | 75.04 | 4427.50 |
| Total | 125 | | |

(*b*) *Test statistics*[a]

| | Score |
|---|---|
| Mann-Whitney *U* | 1236.500 |
| Wilcoxon *W* | 3447.500 |
| *Z* | −3.565 |
| Asymptotic significance (2-tailed) | 0.001 |

[a]Grouping variable: 'Group'.

## Results

Of the 125 patients recruited, 66 were eventually allocated to the prilocaine group and 59 to the lignocaine group. The results are summarised in Table 2 and Fig. 1. The mean pain score for the prilocaine group was 1.82, while that of the lignocaine group was 3.19. The Mann–Whitney *U*-test for significance showed $U = 1236.5$ and $p < 0.001$ (Table 3). The median pain score for the prilocaine group was 1.00 whilst that for the lignocaine group was 3.00. The lowest recorded score was 0 and this represented the largest group of patients within the prilocaine group (22/66, 33%). This was greater than twice the number with this score in the lignocaine group (9/59, 15%). The highest recorded pain score was 8, and this represented 1 patient within the lignocaine group. Two patients were seen on separate occasions for a repeat of their procedure. The first had prilocaine on both visits and recorded a pain score of 1 on each occasion. The second received prilocaine on one visit and recorded a pain score of 1, whilst on another visit received lignocaine and recorded a pain score of 3. In all cases adequate anaesthesia was achieved and maintained throughout the procedure.

## Discussion

The results of our study show that there is a significant reduction in patient discomfort with the use of prilocaine as a local anaesthetic agent when compared with lignocaine for minor eyelid procedures. During the pilot study more extensive procedures such as entropion/ectropion correction were included. These were subsequently removed from the study. Although good anaesthesia was achieved initially, its effect began to subside before completion of the procedure.

Although the numbers were not significant, it was reassuring that the two patients who happened to attend twice during the course of the study showed consistency of their results and supported our conclusion that prilocaine is a more comfortable local anaesthetic to administer than lignocaine.

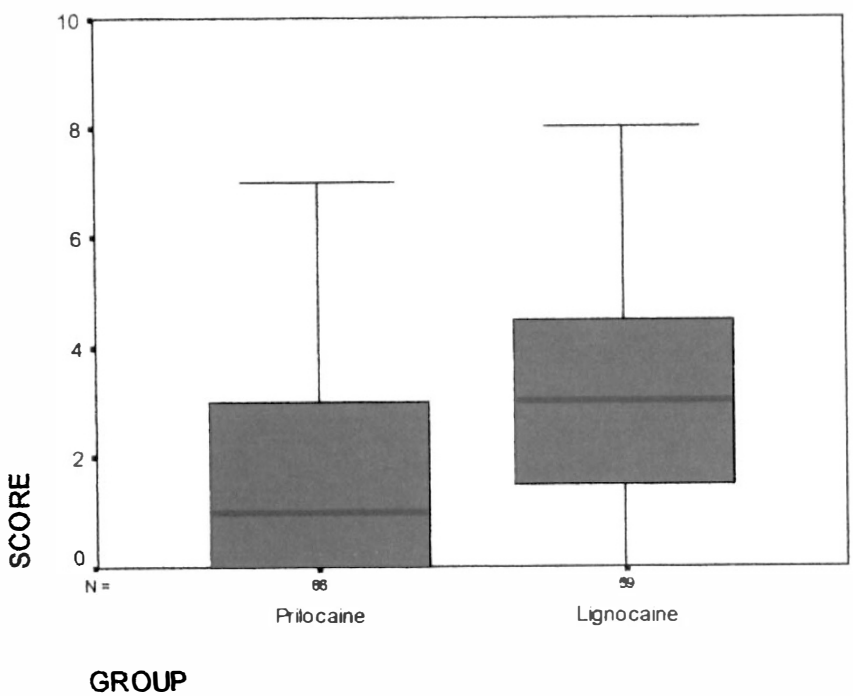
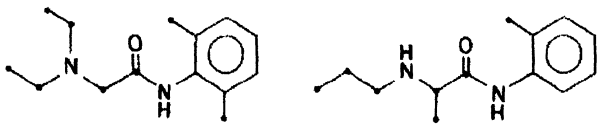



**FIg. 1.** *Box plot showing the pain scores for the prilocaine and lignocaine groups.*



**Lignocaine** **Prilocaine**

**Fig. 2.** *The molecular structure of lignocaine and prilocaine.*

It is difficult to ascertain why prilocaine should be less painful than lignocaine on injection as the two agents are very similar in most respects. They share a very similar molecular structure (Fig. 2) and are both basic compounds with identical ionisation constants (pKa = 7.9). It is possible that lignocaine produces more pain on injection because of a greater local vasodilator effect than prilocaine. If this were the case, it would be interesting to determine whether the addition of adrenaline reduces the pain induced by plain lignocaine infiltration.

This study supports prilocaine as a superior local anaesthetic agent to lignocaine for the purposes of minor eyelid procedures. It is as effective, less toxic[2] and is less painful to administer.

## References


1. Henderson TR, Franks W. Peribulbar anaesthesia for cataract surgery: prilocaine versus lignocaine and bupivacaine. Eye 1996;10:497–500.
2. Moorman LT, Kenny GS. Prilocaine as a local anaesthetic useful in ophthalmic study. Am J Ophthalmol 1971;72:468–71.
3. Goggin M, Crowley K, O'Malley K, Barry P, Kelly G, Blake J. Serum concentrations of prilocaine following retrobulbar block. Br J Anaesth 1990;64:107–9.
4. Ursell PG, Spalton DJ. The effect of solution temperature on the pain of peribulbar anaesthesia. Ophthalmology 1996;103:839–41.
5. Bell RW, Butt ZA. Warming lignocaine reduces the pain of injection during peribulbar local anaesthesia for cataract surgery. Br J Ophthalmol 1995;79:1015–7.
6. Bell RW, Butt ZA, Gardner RF. Warming lignocaine reduces the pain of injection during peribulbar local anaesthetic eyelid surgery. Eye 1996;10:558–60.
7. Eccarius SG, Gordon ME, Parelman JJ. Bicarbonate-buffered lidocaine–epinephrine–hyaluronidase for eyelid anaesthesia. Ophthalmology 1990;97:1499–501.
8. Krause RS, Moscati R, Filice M, Lerner EB, Hughes D. The effect of injection speed on the pain of lidocaine infiltration. Acad Emerg Med 1997;4:1032–5.
9. Criswell J, Gauntlett IS. Pain on intradermal injection with lignocaine: the effect of concentration. Anaesthesia 1991;46:691–2.
10. Gillart T, Bazin JF, Montetagaud M, Bevillard F, Amara S, Schoeffler P. The effects of volume and speed of injection in peribulbar anaesthesia. Anaesthesia 1998;53:486–91.