

Original Research

Comparison of Prilocaine 3% and a mixture of bupivacaine and lignocaine for peribulbar anaesthesia

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ABSTRACT:

Background: Several different techniques for carrying out peribulbar anaesthesia have been described. The present study was conducted to compare Prilocaine 3% and a mixture of bupivacaine and lignocaine for peribulbar anaesthesia. **Materials & Methods:** 80 patients requiring cataract surgery of both genders were divided into 2 groups. Group I received a mixture of equal volumes of 2% lignocaine and 0.75 % bupivacaine, with adrenaline 5 µg/ml and hyaluronidase 75 µg/ml. Group II received 3% prilocaine, with felypressin 0.03 µg/ml and hyaluronidase 75 µg/ml. Globe and eyelid movements were measured at 2, 4, 6, and 8 minutes. **Results:** In group I, males were 21 and females were 19 and in group II, males were 22 and females were 18. In group I and group II, score 1 was seen in 12 and 7, score 2 in 7 and 5, score 3 in 4 and 4, score 4 in 5 and 3, score 5 in 3 and 2, score 6 in 2 and 3, score 7 in 2 and 2, score 8 in 3 and 2, score 9 in 1 and 6, score 10 in 1 and 4, score 11 in 0 and 2 and score 12 in 0 and 1 patients respectively. The difference was significant (P < 0.05). **Conclusion:** Prilocaine 3% was superior to a mixture of bupivacaine and lignocaine for peribulbar anaesthesia.

Key words: hyaluronidase, lignocaine, peribulbar anaesthesia

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INTRODUCTION

Several different techniques for carrying out peribulbar anaesthesia have been described. Despite differences in the techniques all surgeons who carry out peribulbar anaesthesia agree to its high rate of safety and effectiveness.¹ Peribulbar anaesthesia avoids many of the problems associated with retro-bulbar anaesthesia: globe perforation, direct intravascular injection and perforation of the optic nerve sheath. Despite that increased incidence of these complications, when retro-bulbar injection is performed, many ocular surgeons still perform retro-bulbar anaesthesia.²

Many modifications of the peribulbar technique have been described since the original report of Davis. These include a variety of points of needle entry, direction and depth of needle insertion and of number of injections made.³ Most commonly, a combination of lignocaine and bupivacaine is used as a local anesthetic. Adrenaline and hyaluronidase are frequently added to this mixture in different amounts.

Regional ocular anesthesia has been effectively achieved with prilocaine.⁴ As far as we know, there has never been a formal study comparing prilocaine to a combination of lignocaine and bupivacaine for peribulbar anaesthesia. Preservative-free prilocaine with a 3% concentration is only available in the UK when combined with felypressin.⁵ The present study was conducted to compare Prilocaine 3% and a mixture of bupivacaine and lignocaine for peribulbar anaesthesia.

MATERIALS & METHODS

The present study consisted of 80 patients requiring cataract surgery of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups. Group I received a mixture of equal volumes of 2% lignocaine and 0.75 % bupivacaine, with adrenaline 5 µg/ml and hyaluronidase 75 µg/ml. Group II received 3% prilocaine, with felypressin 0.03 µg/ml and

hyaluronidase 75 µg/ml. Every gaze direction was recorded and the movement of the globe was scored. Every direction had a maximum score of three points at any given time, with a maximum total of twelve points. Globe and eyelid movements were measured at 2, 4, 6, and 8 minutes, and then every 2 minutes up to 16 minutes if the block was deemed sufficient for

surgery 8 minutes following the initial injection. Another injection of the same medication was administered if, after ten minutes, the block was still insufficient. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I (40)	Group II(40)
Agent	2% lignocaine and 0.75 % bupivacaine, with adrenaline 5 µg/ml and hyaluronidase 75 µg/ml	3% prilocaine, with felypressin 0.03 µg/ml and hyaluronidase 75 µg/ml
M:F	21:19	22:18

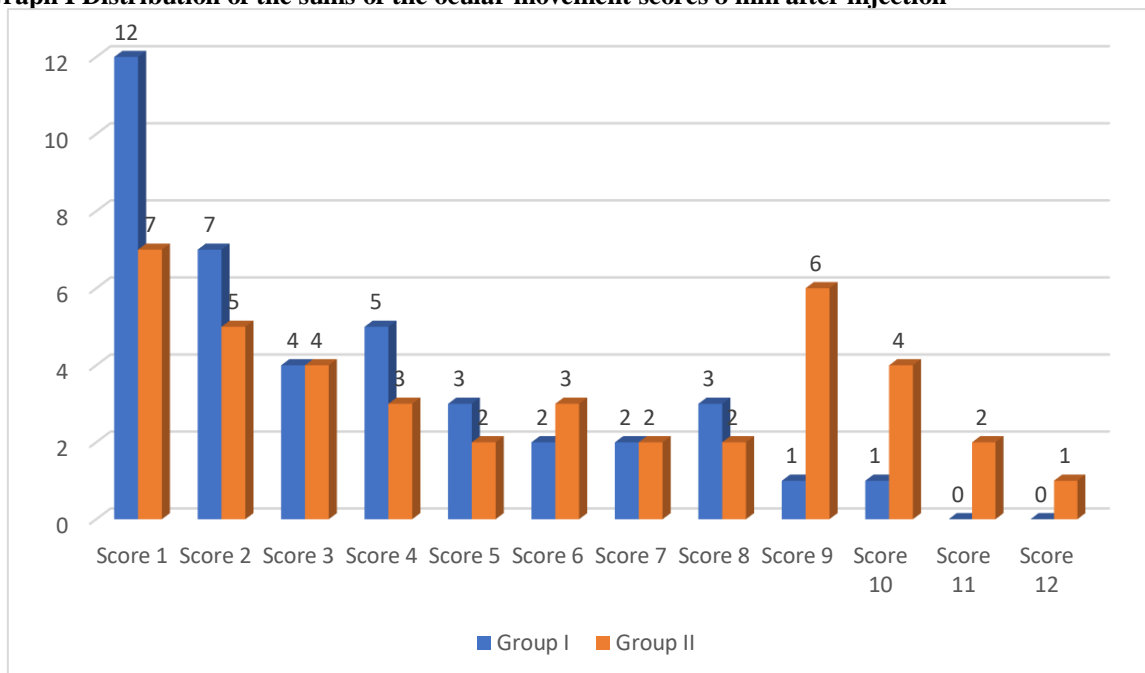
Table I shows that in group I, males were 21 and females were 19 and in group II, males were 22 and females were 18.

Table II Distribution of the sums of the ocular movementscores 8 min after injection

Score	Group I	Group II	P value
Score 1	12	7	0.05
Score 2	7	5	
Score 3	4	4	
Score 4	5	3	
Score 5	3	2	
Score 6	2	3	
Score 7	2	2	
Score 8	3	2	
Score 9	1	6	
Score 10	1	4	
Score 11	0	2	
Score 12	0	1	

Table II, graph I show that in group I and group II, score 1 was seen in 12 and 7, score 2 in 7 and 5, score 3 in 4 and 4, score 4 in 5 and 3, score 5 in 3 and 2, score 6 in 2 and 3, score 7 in 2 and 2, score 8 in 3 and 2, score 9 in 1 and 6, score 10 in 1 and 4, score 11 in 0 and 2 and score 12 in 0 and 1 patients respectively. The difference was significant (P< 0.05).

Graph I Distribution of the sums of the ocular movement scores 8 min after injection



DISCUSSION

Though it is the least hazardous of the routinely used local anesthetics, prilocaine was not widely used in ophthalmology until recently. It shares structural similarities with lignocaine (lidocaine, xylocaine), but it has several benefits in addition: 50% less toxicity with less local irritation; longer duration of anesthesia; no need for adrenaline; greater tissue diffusion but slower systemic absorption.⁶Metabolism is one of the potentially dangerous side effects of prilocaine. This is extremely infrequent, dose-dependent, and only becomes clinically significant at volumes far greater than those required for ocular anesthesia.⁷It is often treated with methylene blue at a dose of 1 mg/kg and is considered clinically as one reason for a declining oxygen saturation detected by pulse oximetry.⁸The benefit of peribulbar anesthesia over retrobulbar anesthesia is that there is no chance of harming the optic nerve or injecting into the subarachnoid space.^{9,10}The present study was conducted to compare Prilocaine 3% and a mixture of bupivacaine and lignocaine for peribulbar anaesthesia.

We found that in group I, males were 21 and females were 19 and in group II, males were 22 and females were 18. Dopemeter et al¹² compared motor block of the extraocular muscles produced by injections of 3 % prilocaine and a mixture of equal parts of 2 % lignocaine and 0.75 % bupivacaine into the medial compartment of the orbit. A volume of 8 ml was used initially, and a vasoconstrictor and hyaluronidase were added to both solutions. Ninety patients undergoing cataract surgery were allocated randomly to one of two groups. Eight minutes after block insertion, the median ocular movement score in the prilocaine group was 1 and in the lignocaine bupivacaine group 3. This difference was statistically significant. Twenty of the patients who received prilocaine and 29 of the patients who received the lignocaine bupivacaine mixture required an additional inferotemporal injection. This difference was not statistically significant.

We found that in group I and group II, score 1 was seen in 12 and 7, score 2 in 7 and 5, score 3 in 4 and 4, score 4 in 5 and 3, score 5 in 3 and 2, score 6 in 2 and 3, score 7 in 2 and 2, score 8 in 3 and 2, score 9 in 1 and 6, score 10 in 1 and 4, score 11 in 0 and 2 and score 12 in 0 and 1 patients respectively. Henderson et al¹³ assessed the efficacy of prilocaine 2% plain versus a mixture of lignocaine 1% and bupivacaine 0.5%, each with hyaluronidase. Seventy-five patients were recruited. Local anaesthetic was given by a two-injections transconjunctival peribulbar technique. Injection and perioperative pain were graded by visual analogue pain score (range 0-10). Akinesia and orbicularis function were graded by the surgeon. The two anaesthetic mixtures were comparable in efficacy in producing anaesthesia and akinesia. The pain of injection ranked as a mean of 0.88 for prilocaine and 1.03 for lignocaine and bupivacaine ($p = 0.48$, $U = 635.5$). Perioperative pain was ranked as a mean of

1.17 for prilocaine and 0.91 for lignocaine and bupivacaine.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that Prilocaine 3% was superior to a mixture of bupivacaine and lignocaine for peribulbar anaesthesia.

REFERENCES

- 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.
- Bellamy MC, Hopkins PM, Halsall PJ, Ellis FR. A study into the incidence of methaemoglobinaemia after a 'three-in-one' block with prilocaine. *Anaesthesia* 1992;47:1084-5.
- Wittapenn JR, Rapoza P, Sternberg P Jr, Kuwaashima L, Saki ad J, Patz A. Respiratory arrest following retrobulbar anaesthesia. *Ophthalmology* 1986;93: 867-70.
- Kobet AA. Cerebral spinal fluid recovery of lidocaine and bupivacaine following respiratory arrest subsequent to retrobulbar block. *Ophthalmic Surg* 1987; 18:11-3.
- Hustead RF, Hamilton RC, Loken RG. Periocular local anaesthesia; medial orbital as an alternative to superior nasal injection. *J Cataract Refract Surg* 1994;20: 197-201.
- Stevens JD, Franks WA, Orr G, Leaver PK, Cooling RJ. Four quadrant local anaesthesia technique for vitreoretinal surgery. *Eye* 1992;6:583-6.
- Turner D, Williams S, Heavner J. Pleural permeability of local anaesthetics: the influence of concentration, pH and local anaesthetic combinations. *Reg Anesth* 1989;14:128-32.
- Spiegel DA, Dexter F, Warner DS, Baker MT, Todd MM. Central nervous system toxicity of local anaesthetic mixtures in the rat. *Anaesth Analg* 1992;75: 922-8.
- Schimek F, Steuhl KP, Fahle M. Retrobulbar blocks of somatic, motor and visual nerves by local anaesthetics. *Ophthalmic Surg* 1993;24:171-80.
- Ali-Melkkila T, Virkkila M, Leino K, Ptilve H. Regional anaesthesia for cataract surgery: comparison of three techniques. *Br J Ophthalmol* 1993;77:771-3.
- Whitsett JC, Balyeat HD, McClure B. Comparison of one-injection-site peribulbar anaesthesia and retrobulbar anaesthesia. *J Cataract Refract Surg* 1990; 16:243-5.
- Döpfmer UR, Maloney DG, Gaynor PA, Ratcliffe RM, Döpfmer S. Prilocaine 3% is superior to a mixture of bupivacaine and lignocaine for peribulbar anaesthesia. *British journal of anaesthesia*. 1996 Jan 1;76(1):77-80.
- Henderson TR, Franks W. Peribulbar anaesthesia for cataract surgery: prilocaine versus lignocaine and bupivacaine. *Eye*. 1996 Jul;10(4):497-500.