Entonox as an analgesic agent during panretinal photocoagulation

H L Cook, R S B Newsom, E Mensah, M Saeed, D James, T J ffytche

Background/aims: Panretinal photocoagulation (PRP) reduces the risk of visual loss in proliferative diabetic retinopathy but some patients cannot tolerate PRP because of pain. Inhaled Entonox was evaluated as an analgesic during PRP.

Methods: A randomised, crossover, double masked pilot study was performed. Patients inhaled either air or Entonox and half the PRP was applied. The treatment was completed with the alternate inhaled gas. Patients graded pain experienced during both stages of the treatment using a visual analogue scale. Pain scores were compared using a paired t test.

Results: 20 patients participated. Mean pain scores from the Entonox and air treatments were 2.94 (SD 2.73) versus 3.73 (SD 3.20) respectively (p<0.03).

Conclusion: Entonox can be used as a safe and effective analgesic agent during PRP treatment.

Treatment was performed using a slit lamp mounted argon green laser with topical amethocaine and a panretinal contact lens. Both the patient and the surgeon were masked to the type of gas being administered. There was a 2 minute washout period after half the total planned treatment had been applied, during which the patient completed a visual analogue score chart to indicate the extent of pain experienced during the preceding treatment. A score of 0 represented no pain and a score of 10 represented the worst pain imaginable by the patient. Treatment was then completed using the alternative inhaled gas, and a further visual analogue score was completed at the end of treatment. Pain scores were compared using paired t tests.

RESULTS

Twenty patients participated in the study, 11 in group 1 and nine in group 2. Patients tolerated the administration of Entonox and air via the mouthpiece well and there were no adverse effects.

There were a range of analgesic responses to both the Entonox and the placebo; however, the majority of patients experienced less pain with Entonox administration (Fig 1). The mean pain score for Entonox was 2.94 (SD 2.73) and for air 3.73 (SD 3.20) (p = 0.03). The mean pain scores for group 1 were 2.5 (SD 2.75) for the initial half of the treatment with Entonox and 3.89 (SD 3.86) for the second half of the treatment with air (p = 0.008). The mean pain scores for group 2 were 3.52 (SD 2.39) for the initial half of the treatment with Entonox and 3.46 (SD 2.76) for the second half of the treatment with air (p >0.5).

DISCUSSION

Pain experienced during PRP is very variable but appears to be more common with retreatment and with treatment applied...
anterio to the equator, especially in the 3, 6, 9, and 12 o’clock positions (corresponding to the location of the long ciliary nerves). We found a mean pain score of 3.73 on placebo for PRP treatment. This confirms that PRP is a painful ophthalmic procedure. Weinberger previously found a mean pain score of 5.3 in his PRP control group (compared to pain scores of 1.46 for cataract surgery and 1.73 for vitrectomisation surgery). Some patients respond to pretreatment oral analgesia; however, others require local anaesthetic blockade or even general anaesthesia in order to tolerate treatment. These forms of anaesthesia carry the risk of side effects and require additional monitoring of the patient. There is also a small risk of ocular perforation with sharp needle techniques. This study therefore evaluated a new analgesic technique for PRP treatment.

Entonox is a mixture of 50% nitrous oxide and 50% oxygen. Inhalation produces an analgesic effect without loss of consciousness. Self-administration of Entonox as an analgesic has been widely used for many years, particularly in obstetric practice and by paramedics for prehospital care. Entonox has a good safety record, with no serious side effects recorded for intermittent use, and is rapidly cleared from the circulation by exhalation. There were no adverse effects during this study. It is unlikely that occupational safety limits for Entonox exposure would be exceeded if Entonox analgesia was used only in selected cases. However, it would be good practice to ensure adequate ventilation of the treatment room between cases and consider the introduction of scavenging equipment if large numbers of patients were to be treated consecutively.

The perception of pain is a unique experience to an individual. Many factors influence perception of pain, including age, sex, cultural differences, past experience, and anxiety levels. It is therefore notoriously difficult to compare analgesic effect and pain perception across a group of patients. Our study attempted to overcome this problem by performing a crossover study, whereby the same individual evaluated a treatment in order to have a maximal analgesic effect during PRP treatment—that is, younger patients and those undergoing retreatment, who have previously not been able to tolerate the full planned treatment because of pain and this could hence help reduce the risk of visual loss in diabetic patients.

REFERENCES

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