SCIENTIFIC CORRESPONDENCE

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.

The World Health Organization (WHO) recently reported that 2.2% of the UK population have diabetes mellitus. Furthermore, the prevalence of diabetes is predicted to double by the year 2010. The annual incidence of new cases of proliferative diabetic retinopathy (PDR) is 2.7–4% for patients with type 1 diabetes and 0.6–3.2% for those with type 2 diabetes. Untreated high risk characteristic PDR results in a 33% risk of severe visual loss at 3 years. The risk of severe visual loss, however, is reduced by 50% by adequate laser PRP.

The Diabetic Retinopathy Study (DRS) recommended that between 800 and 1600 argon laser burns of 500 μm size should be applied to the peripheral retina in a scatter fashion. Pain experienced during PRP is very variable but appears to be less than the DRS recommendation treatment. Therefore, a possible reason for this undertreatment is patient intolerance because of pain. We therefore describe the use of a new analgesic method for PRP treatment, inhaled Entonox.

Methods: A randomised, crossover, double masked pilot study was performed to evaluate the efficacy of Entonox as an analgesic agent during PRP treatment. All patients undergoing PRP were eligible for inclusion. Ethics committee permission was obtained and all patients gave informed consent.

Entonox was administered through a disposable mouthpiece attached to a portable Entonox cylinder via a one way demand valve system. The patients were randomised to two groups. Group 1 received Entonox for the first half of the treatment (approximately 500 burns) and air for the second half. Group 2 received air for the first half of the treatment and Entonox for the second half.

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 air and 3.46 (SD 2.76) for the second half of the treatment with Entonox (p >0.5).

DISCUSSION

Pain experienced during PRP is very variable but appears to be more common with retreatment and with treatment applied.
anterior 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 vitreoretinal 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 analgesia 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 administered from commencement of PRP treatment in order to have a maximal analgesic effect during PRP treatment. Inhaled Entonox is a useful addition to the current methods available to facilitate adequate PRP treatment in selected patients who have a greater pain perception—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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