LETTERS TO THE EDITOR

Sir,

We share Davis, Wilkins and Elliott's concern for reducing pain and discomfort after vitreoretinal surgery[1] and read with interest their conclusion that the *topical* instillation of 0.5% bupivacaine into the surgical field prior to conjunctival closure was ineffective in reducing post-operative pain and analgesic requirements.

We have recently conducted a comparable study on post-operative pain in scleral buckling procedures[2] and have demonstrated that the infiltration of bupivacaine between the external sheath and the belly of the exposed rectus muscles at the end of the operation is a safe and effective modality for reducing pain and analgesic requirements in the first post-operative 24 hours: 40 patients undergoing general anaesthesia for scleral buckling surgery gave informed consent to prospective double-masked randomisation to either intraoperative extraconal delivery of bupivacaine or to no injection. The premedication and general anaesthetic technique was standardised for all patients and *no agent, with known analgesic properties, was administered as part of the anaesthetic.* The extraconal infiltration technique consisted of the delivery of 4 ml of 0.5% bupivacaine, evenly distributed between all the exposed rectus muscles, and infiltrated via a blunt cannula between their external sheath and belly at the end of the surgical procedure. The immediate (i.e. 0–2 and 2–4 hour) post-operative pain levels were lower in the bupivacaine group than in the control group (Wilcoxon's rank sum $p<0.005$ and <0.01, respectively) and the bupivacaine group required less post-operative narcotic analgesia and anti-inflammatory medications (Fisher's exact test, $p = 0.001$). The extraconal infiltration of bupivacaine via a blunt cannula positioned between the rectus muscle belly and its external sheath limits the potential for damage to the globe and intraconal structures such as the optic nerve and other neural and vascular structures which may be damaged with retrobulbar approaches such as that used by Duker *et al.*[3] Our approach is effective in reducing post-operative pain, and additional trauma to the eye is minimal because the rectus muscles have already been dissected from Tenon's in order to place the bridle sutures prior to positioning the scleral explant. The only adverse effect encountered was a transient ptosis in the first 24 hours after surgery in two patients who had recovered normal lid function when they were assessed at 1 week.

It is interesting to speculate why Davis *et al.*[1] found relatively low pain scores in all their patients, and similar post-operative pain scores in both the treatment and control groups. These authors studied post-operative pain in a wide variety of vitreoretinal procedures: it is our experience that 'simple' vitrectomies without the placement of a scleral buckle are relatively pain free. Would it therefore not have been prudent to have studied a subgroup of patients undergoing similar surgical procedures that are at a significant risk of developing post-operative pain such as those undergoing scleral buckling procedures? Any analgesic or mixture of analgesics used as part of a general anaesthetic technique may also have affected their results (they avoided only the use of long-acting analgesics). Assessing pain within the first 2 hours after surgery may have shown a difference in Davis *et al.*'s study because we found that the most significant difference in pain scores occurred at this time and also that this was when narcotic analgesia was most required (with 4 of 19 control patients requiring narcotic analgesia in the immediate post-operative period whereas only 1 patient needed it after 4 hours).

We would recommend the infiltration of a total of 4 ml of 0.5% bupivacaine evenly divided between the bellies and external sheaths of all exposed rectus muscles (i.e. 1–2 ml per muscle) at the end of a scleral buckling procedure as a safe, effective and complication-free technique for reducing post-operative pain and analgesic requirements in patients following scleral buckling procedures.

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2. Bourke RD, Dowler JGF, *et al.* Extraconal bupivacaine in scleral buckling procedures. Retina (accepted).
3. Duker JS, Nielsen J, *et al.* Retrobulbar bupivacaine irrigation for postoperative pain after scleral buckling surgery. Ophthalmology 1991;98:514–8.

Sir,

Gray *et al.* have observed a post-operative analgesic effect of bupivacaine administered under the rectus muscle sheaths during scleral buckling surgery and criticise the methodology of our study which failed to show any post-operative analgesic effect of bupivacaine applied topically at the end of vitreoretinal surgery prior to conjunctival closure. Unfortunately the full method and results of their study are so far unpublished; however, they have kindly provided us with sufficient details to allow comment.

There were indeed a variety of procedure types in our trial of topical bupivacaine in vitreoretinal surgery.[1] We agree with Gray *et al.* that it is prudent to study comparable subgroups to eliminate the diluting effect of presumed painfree 'simple' vitrectomies, which is precisely why we did so. As we stated in our letter, a separate analysis of procedures involving looping of four muscles, i.e. those cases with most explant material applied, was performed and no benefit of topical bupivacaine was evident. Neither were pain scores for patients receiving plombs lower in patients randomised to receive bupivacaine. Acceptance of our original report in letter form necessitated some abbreviation, but these results are now presented in Tables I and II.

Pain scores were also separately analysed for patients having fewer muscles looped and also for those receiving an encircling band. No effect on pain scores of topical bupivacaine was observed.

Gray *et al.* avoided all analgesics during the anaesthetic and surmise that our results may have been affected by intraoperative analgesics. Whilst we disallowed all long-acting analgesics, short-acting analgesics such as fentanyl were acceptable and we believe that any effect on pain scores would be negligible at 4 hours when our assessments began. Short-acting analgesics are commonly used during general anaesthesia and we would not have been happy to contrive an alternative technique simply to increase the likelihood of a positive result.

Table I. Median pain scores (and 95% confidence limits) at times stated on a 0 to 10 visual analogue scale for retinal surgery patients having all four recti muscles looped

	Bupivacaine (n = 17)	Controls (n = 19)
4 hours	0.2 (0–3.0)	0.3 (0–2.6)
8 hours	1.1 (0–3.6)	0.2 (0–1.7)

Table II. Median pain scores (and 95% confidence limits) at times stated on a 0 to 10 visual analogue scale for retinal surgery patients requiring a plomb

	Bupivacaine (n = 15)	Controls (n = 12)
4 hours	1.9 (0-5.4)	0.3 (0–2.6)
8 hours	1.0 (0–3.9)	0.1 (0–1.7)

Another difference between Gray's method and ours was in their assessment of pain. We used the widely accepted 10 cm ungraded line to provide a continuous visual analogue of pain, whereas Gray *et al.* used a calibrated line which was annotated with descriptions such as 'moderate' and 'excruciating'. This may well behave more like a verbal rating scale, which when compared with the visual analogue has been shown to exaggerate changes in pain perception.[2]

Nevertheless, the results of Gray *et al.* are credible and indeed it would be amazing if bupivacaine applied in sufficient quantity within the orbit did not have an analgesic effect: after all, its pharmacological efficacy is not in doubt. Presumably in the case of topical irrigation insufficient anaesthetic reaches the sensory nerves. However Gray's technique does involve distending the rectus muscle sheaths with anaesthetic and is hardly less invasive than Duker's method of blunt needle retrobulbar irrigation.[3]

The whole rationale of our study of topical irrigation of anaesthetic was based on the supposition that surgeons are unlikely to feel comfortable with a traumatic technique for delivering anaesthetic at the end of a retinal procedure that has itself subjected the eye to significant trauma, and for this reason we feel our negative study is important.

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