grades: one by a consultant, three by associate specialists, one by a registrar and two by senior house officers. Details relating to the method of peribulbar injection have been obtained for six cases. A sharp 25 mm 25G needle was employed in four cases and a 38 mm 25G retrobulbar needle for two. All the anaesthetists used two injections sites, namely the infero-temporal or inferior approach followed by a second injection via the medial, supero-nasal or superior approach. Four of the perforations occurred in either the superior or supero-nasal aspect of the globe, one occurred nasally and in one case the site of the perforation was not clear.

The possibility of a perforation was entertained before or during surgery for three cases: one was noted to have a hyphaema before surgery, one a very soft eye before surgery and in one no red reflex was present after expression of the lens. The diagnosis of a perforation was made within the first week for six of the seven patients, all of whom had a vitreous haemorrhage. Four had either cryotherapy or laser to close a retinal break without sub-retinal fluid, two required pars plana vitrectomy with fluid–gas exchange and endolaser, while one patient refused further surgery. The final acuity has been reduced to perception of light for two patients.

Our experience supports the belief that the incidence of ocular perforation during peribulbar anaesthesia is rising and the figure is certainly higher than the 0.006% incidence quoted by Davis and Mandel.[2] Although most peribulbar injections are performed by consultant anaesthetists in this area, most of the perforations were caused by other grades. This implies that the training and supervision of those performing peribulbar blocks could be improved, and a case could be made for avoiding the superior or supero-nasal routes. Fresh vitreous haemorrhage on the first post-operative day is a hallmark of ocular perforation. With early recognition that a perforation has occurred the visual prognosis is better, although the final visual outcome is mixed.

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Sir,

The papers by Gillow *et al.* again emphasise globe perforation as a complication of ocular local anaesthesia administered by means of injection.[1,2] Their report of six cases from the vitreo-retinal unit at Birmingham is very similar to that made concerning 20 cases over a 2 year period referred to Moorfields Eye Hospital,[3,4] although in one of these latter cases sympathetic ophthalmitis occurred in the fellow eye to the ocular perforation. The principal difference between the reports from these two centres is in the number and distribution of the perforation sites: the retinae of patients who had received peribulbar injections are characterised by the presence of multiple perforations (one patient demonstrated a row of eight puncture holes extending from the retinal periphery to the infero-temporal arcade) where those with retrobulbar injections have only one or two puncture sites. Like Gillow *et al.*, we also found that eyes presenting with a retinal detachment tended to require multiple vitreo-retinal procedures and also had a worse visual prognosis.

The reported cases of inadvertent ocular perforations have been reviewed.[3] For both types of injection there is a bimodal distribution of visual outcome (Fig. 1), and an analogy with ocular perforations complicating strabismus surgery, where careful ophthalmoscopic examination reveals occult ocular perforations in up to 9.2% of surgical cases[5] although in a retrospective study only 0.13% of patients were recognised to have a perforation at the time of surgery and an even smaller proportion (0.0025%) developed complications (retinal detachment and endophthalmitis) as a consequence of a perforation.[6] There is probably a spectrum of such perforations, ranging from the occult and those presenting with a transient vitreous haemorrhage with an underlying chorioretinal scar[7] which will carry a relatively good prognosis, to those who present with significant vitreo-retinal pathology with a correspondingly worse visual prognosis.

With all vitreo-retinal pathology, early diagnosis is associated with a better prognosis and accordingly ophthalmologists should exercise a high index of suspicion in all suspected globe perforations, especially in patients who experience atypical pain or visual symptoms such as floaters or visual blurring during the administration of the injection and those with dense post-injection vitreous haemorrhages. A prompt and early referral of such cases should be made to a vitreo-retinal centre for further assessment. Indeed vitrectomy should be considered in those patients with dense vitreous haemorrhages in order to facilitate fundal examination and the treatment of any puncture sites which cannot be detected ultrasonically.[4]

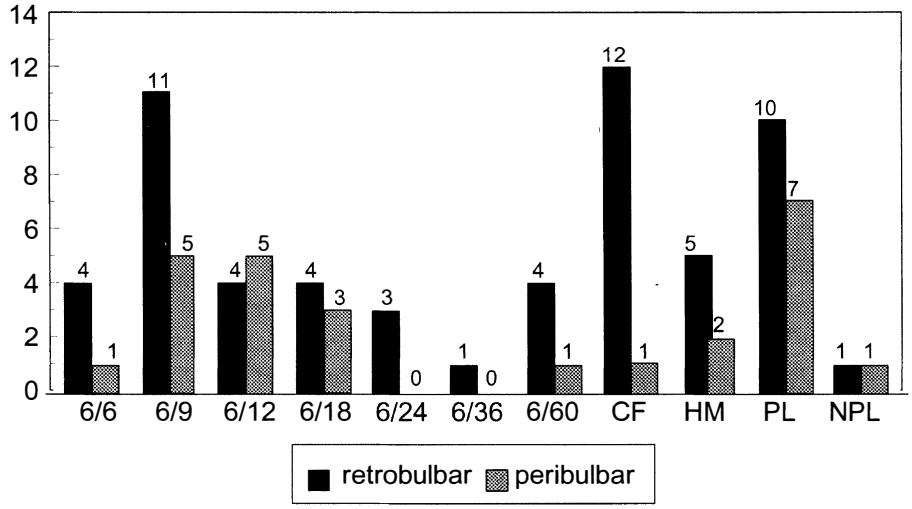

Fig. 1. *Visual outcomes in reported cases of inadvertent ocular perforations following ocular local anaesthetic injections. (Redrawn from Gray et al.*[3])

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Sir,

The two papers by Gillow *et al.*[1,2] and the accompanying editorial[3] suggest that anaesthetists are inflicting more ocular perforations than ophthalmologists. There are some alternative explanations for this assumption, which should have been considered in the editorial if it was intended to be a balanced viewpoint.

In recent years there has been an increase in cataract surgery and an even greater increase in the proportion carried out under local anaesthesia, as the advantages of day case surgery and rapid turnover have become more apparent. Anaesthetists have been keen to maximise efficiency and safety by assisting this process and have become confident in administering the blocks in ever increasing numbers.

If more blocks are being performed, and more anaesthetists are performing them, then it is hardly surprising that more ocular perforations are both being reported and associated with anaesthetists, rather than with ophthalmologists. The overall rate of perforation may be increasing, although it is clearly inaccurate to use 1990 figures[4] as the denominator for data collected during or after 1994.[2] To determine if the rate is actually different between the two professions, a randomised, prospective, observer-blinded study should be carried out. With a rate of observed perforation between 0.0062%[5] and 0.114%,[3] an extremely large, multicentre study will be necessary to achieve sufficient power. The current National Survey of Local Anaesthesia for Ocular Surgery may go some way towards addressing this question, but a case series of six patients[1] and a retrospective postal survey[2] does not.

It is well known that both retrospective surveys and postal questionnaires are extremely unreliable in minimising the problem of bias. For example, it is possible that some of the 29% of questionnaires not returned were from surgeons and units with a high perforation rate. It is also possible that quite unintentionally, a reporting ophthalmologist might be inclined to forget, dismiss, or find an alternative explanation for a lesion induced by himself or one of his own speciality, whilst being more eager to report the failings of others.

Nevertheless, these two papers[1,2] and others[6,7] do give some cause for concern and I fully endorse the recommendation for proper training and supervision.