reported case where the use of a nasal decongestant has been linked to the development of bilateral AACG. Although the exact mechanism of action remains uncertain, it is likely that absorption of the contained sympathomimetic agents through the nasal mucosa (as has been reported for cocaine[7,8]), aggravated by the patient sitting in a darkened room to relieve his photophobia, was the trigger factor in an, albeit low, hypermetropic patient to produce bilateral AACG. We would suggest that the packaging of such products should alert patients (and their doctors) to this risk.

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Sir,

Globe perforation by the second peribulbar injection

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Despite the increasing popularity of sub-tenons and topical anaesthesia, peribulbar anaesthesia remains an important technique for providing anaesthesia for ocular surgery. The National Survey for Local Anaesthesia for Ocular Surgery in the UK showed that peribulbar anaesthesia made up 65% of the local anaesthetic techniques used.[1] Peribulbar anaesthesia was originally introduced by Mandel and Davis as a safer alternative to retrobulbar anaesthesia.[2] The relative risk of globe perforation between the two techniques is unknown, however. There have been several previously reported series of globe perforation from peribulbar injections, giving a frequency between 1 in 874,[3] and 1 in 16 224.[4] There is a wide variation in the techniques used to administer peribulbar anaesthesia.[4–7] The majority of the previously reported cases of globe perforation have given no details of the precise technique used for administering the peribulbar injections. Over an 8-month period a cluster of cases of globe perforation were referred to the vitreo-retinal service at a British Teaching Hospital. The notes were reviewed and the personnel who administered the anaesthetic were interviewed. The exact technique used to give the peribulbar block for each case was thus identified and related to the perforation sites. Analysis of these cases highlights a potential pitfall in a commonly used technique for peribulbar anaesthesia.

Case reports

Five cases were identified. In every case the patient received an inferotemporal injection of 4–5 ml of lignocaine/bupivicaine at the junction of the medial two-thirds and lateral third of the orbital rim. This was followed by a medial injection, placed medial to the caruncle. This was then followed by approximately 10 min of compression with a Honan balloon. In case 4, the medial injection was placed following approximately 1 min of digital ocular compression. This was not timed, however. In the remaining cases the second injection was placed almost immediately after the first. Hyaluronidase was used for each case.

In every case the perforation sites were situated in the nasal retina, in line with the path taken by the medial injection. Cases 1–4 were perforating injuries with an entry and exit site. Case 5 had a linear retinal scar, as if the needle had been withdrawn, or the globe had sustained a glancing blow. The locations of the

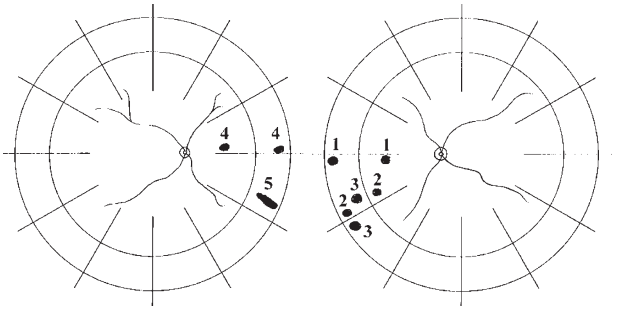

Figure 1 Diagram showing the locations of the perforations in each case.

perforation sites are illustrated in Figure 1 and the details of each case are summarised in Table 1.

Comment

Previous studies have suggested the following risk factors for globe perforation: posterior staphyloma,[8] long axial length[9] and inexperienced personnel.[10] None of the patients presented here had posterior staphyloma and only Case 1 had an axial length at the upper end of the normal range at 25.5 mm. Although none of the doctors giving the anaesthetics were consultants, the personnel administering the anaesthetic for Cases 4 and 5 were very experienced, having performed in excess of 700 peribulbar anaesthetics each. Other series have reported peribulbar globe perforations in the hands of experienced medical personnel.[4] A sharp needle was used in each case, but previous series have reported perforations from blunt needles.[7] It is striking, however, that an almost identical technique for administering the peribulbar anaesthesia was used in each case by different doctors from different ophthalmic departments. In each case the globe was perforated by a medial peribulbar injection placed almost immediately after an initial inferotemporal injection of between 4 and 5 ml of anaesthetic.

Budd *et al* recently presented a series of 1000 consecutive peribulbar anaesthetics performed using the same technique.[11] No globe perforations were detected in this series. However, the fundus was only examined in cases where an abnormality was suspected. Also, the absence of any clinically significant perforations in a series of 1000 is consistent with the previously reported incidence of globe perforation of between 1 in 874[3] and 1 in 16 224.[4]

It is self-evident that a second peribulbar injection at least doubles the risk of perforating the globe. The risk may be further increased by alteration of the orbital anatomy by the first injection of anaesthetic. Rapid diffusion of anaesthetic around the globe is prevented by the presence of orbital connective tissue septa as described by Koorneef.[12] The average orbital volume is approximately 30 ml. The volume of the globe is approximately 7 ml. Allowing for the other orbital structures, let us consider the remaining space within the orbit to be divided into four compartments of approximately 5 ml. Injecting 5 ml of fluid into one of these compartments gives a 100% increase in volume. Injection into the inferotemporal compartment may cause the globe to be displaced medially and superiorly. Therefore, a second injection placed immediately after the first injection and on the opposite side of the globe may have less space to pass safely without perforating the globe. Given sufficient time, assisted by balloon compression, the anaesthetic may spread around the globe, allowing the globe to

Table 1 Summary of cases

	Case 1	*Case 2*	*Case 3*	*Case 4*	*Case 5*
Age (years)	78	77	77	62	60
Axial length (mm)	25.5	24.6	21.8	22.4	22.6
Administered by:	Anaesthetic SpR	Anaesthetic SpR	Ophthalmology SHO	Anaesthetic Staff Grade	Anaesthetic SpR
Needle	Sharp 25 mm 25 gauge	Sharp 25 mm 25 gauge	Sharp 25 mm 25 gauge	Sharp 25 mm 25 gauge	Sharp 25 mm 25 gauge
1st injection site	Inferotemproal	Inferotemproal	Inferotemproal	Inferotemproal	Inferotemproal
2nd injection site	Medial	Medial	Medial	Medial	Medial
Volume of 1st injection (ml)	5	5	4	4.5	4
Perforation site	Nasal	Nasal	Nasal	Nasal	Nasal
Time to presentation (days)	22	5	0	1	28
Intervention	Vitrectomy	Vitrectomy	Vitrectomy	Vitrectomy	Vitrectomy
Final VA (Snellen)	6/12	6/6	6/9	6/6	6/9
Follow-up (months)	9	12	12	9	18

return to its anatomical position and facilitating the passage of a supplemental injection.

There is evidence that an adequate block can be achieved with a single peribulbar injection placed either inferotemporally[4,6] or medially.[7] There is no evidence that a second primary injection decreases the rate of supplemental injections required. We therefore propose that a second primary peribulbar injection is unnecessary and may carry an increased risk of globe perforation.

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Sir,

Optic disc morphology on presentation of chronic glaucoma

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Different patterns of optic disc damage have been described in chronic glaucoma.[1–3] It has been suggested that these morphological appearances may represent different clinical entities with specific pathogenic mechanisms.[1–4] The aims of this study were firstly, to determine the prevalence of various patterns of disc damage in new patients with the diagnosis of primary open-angle glaucoma; and secondly, to compare the mean age, gender distribution and mean intraocular pressure between groups to determine whether the disc patterns may represent different populations of patients with glaucoma.

Participants, methods and results

Between July 1994 and August 1999, 1696 new patients were seen in a glaucoma screening clinic and a diagnosis of chronic open-angle glaucoma was made in 250. Twenty-nine patients who presented with bilateral advanced atrophy of the optic disc and extensive visual field loss were not included in the study. Each patient underwent a comprehensive ophthalmic examination by a glaucoma specialist and Humphrey visual field analysis.

The optic discs were classified by the same observer (JFS) using direct and indirect ophthalmoscopy into six categories:

(1) Inferior neuro-retinal rim loss: a disc with tissue loss localised to the inferior/infero-temporal pole, including shelving, or generalised loss of the inferior rim, but not focal notching.
(2) Superior neuro-retinal rim loss: a disc with tissue