At her last clinic visit, the patient's visual acuities were 6/9 unaided and intraocular pressures were 21 and 20 mmHg, right and left respectively, with no additional anti-glaucoma treatment.

Discussion

These two cases illustrate the spectrum of 'phaco-shrapnel'. Metallic foreign bodies shed from phacoemulsification hand-pieces can be macroscopic or microscopic.

The common cause of metallic fragments from phacoemulsification hand-pieces is second instrument touch.[3] However, with single-handed use this is not possible. Other possibilities include poorly polished lumens, milling and lathing problems and metal fatigue.[3,4] It is possible for other instruments to be the source of metal fragments. One would expect, however, that an instrument vibrating at about 28 kHz would be a richer source than, for example, a simcoe cannula.[5]

There are few reports in the medical literature of macroscopic intraocular metallic foreign bodies.[6] However, all incidents that are brought to the manufacturer's attention are reported to the FDA in the USA, in Scotland to Scottish Healthcare Supplies and in England and Wales to the Medical Devices Agency. In most cases there is the strong suspicion of second instrument touch or inadequate maintenance.

Given the potential bioreactivity[7] of titanium alloy, the question of microscopic particulation by phaco-emulsification hand-pieces needs to be addressed. Do these fragments need to be removed? If so, when? What effect would a shower of fine metal particles have on the trabecular meshwork? Could such damage only be evident in years to come by the development of glaucoma? Given the incidence of glaucoma in the population, would such development be noticed?

It was thought that each manufacturer would be aware of how much particulation their hand-pieces shed, of what size and under what conditions of use. This question of particulation has been posed by the authors – most comprehensively at the trade fair during the Royal College of Ophthalmologists Annual Congress in May 1995. Anecdotally, it was admitted that all hand-pieces shed micrometre-sized particles, but to date no manufacturer has responded formally to our repeated requests for information. We note that a similar request in a publication in 1993 was declined.[3]

We assume that commercial confidentiality is the main reason why manufacturers do not release information on particulation directly to phacosurgeons. As this problem is apparently universal in all phaco machines, we feel that there would be no commercial implications affecting one manufacturer over another should all publish their information. We believe that this information should be made available.

Although incidences of particulation are reported, not all are fully investigated. The FDA does not issue regular reports and Scottish Healthcare Supplies does not hold enough data to make any conclusions. We believe that regular incidence reports should be made available for scrutiny by both doctors and patients.

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Sir,

I was most interested to read Mr David Boase's editorial[1] and the two papers by Gillow *et al.*[2,3] It is timely to remind all those involved of the risks of serious sight-threatening complications of local anaesthesia such as globe perforation, and to stress, as Mr Boase does, the need for detailed anatomical knowledge of the eye and orbit, proper training and regular practice. I agree that a knowledge of the axial length and its significance is paramount, and would agree that this might be used as a discriminatory question in evaluating the knowledge of those who wish to perform these blocks. However in the six cases described by Gillow none had an axial length longer than 25.10 mm, and the mean length was only 23.35 mm, implying that normal-length eyes are also at risk of perforation.

As Mr Boase rightly points out, there is increasing involvement of anaesthetists in this field – a

development that he seems to welcome. However, he proceeds to suggest that their complication rate is probably higher, and to cast doubts on their knowledge and ability. Without figures for the numbers of blocks done by each specialty, it is not possible to draw conclusions as to their relative complication rates. It should be acknowledged that the major contributions to the field since the Davis and Mandel[4] description of the peribulbar block have undoubtedly been the anatomical studies of the orbital fat by Leo Koorneef,[5] an orbital surgeon, and the improvements in the techniques described by Roy Hamilton[6] and Bob Hustead,[7] both anaesthetists. Incidentally the latter two both advocate shallow retrobulbar rather than peribulbar blocks as being more effective and no more dangerous – a view with which I concur.

All six cases of globe perforation described by Gillow *et al.* used the traditional Davis and Mandel percutaneous inferotemporal and superonasal injection sites, whereas the majority of anaesthetists are now using transconjunctival approaches either solely in the nasal compartment or a combination of transconjunctival inferotemporal and nasal injections. The nasal injection is relatively easily learnt and probably has the lowest complication rate. It is our practice to familiarise trainees with it first, and only then allow them to move on to the inferotemporal injection. The idea that an anaesthetist may do a peribulbar block but not a retrobulbar block is preposterous. Both have their learning curve and some complications, and the studies of Koorneef[5] demonstrate clearly that in the inferotemporal region the orbital fat is continuous both within and outside the muscle cone so that it is the same compartment and merely a matter of the direction and depth to which the needle is inserted. We do not advocate the use of a needle longer than 2.5 cm. Davis and Mandel[8] in their multicentre trial reported an incidence of globe perforation of only 1 in 16 214 or 0.0062%, and that should be considered the gold standard to which we should all aspire. Units with a higher rate should examine critically the technique employed and the practitioners involved, whether ophthalmologists or anaesthetists. The problem must be a defect in training and practice rather than inherent in the methods themselves, which have been shown to be remarkably safe.

Mr Boase does not discuss the fundamental question of diagnosis of globe perforation, and the need for early treatment when required if a good visual result is to be secured, although this is emphasised in the papers by Gillow *et al.* While prevention is to be stressed, in this era of day stay surgery, which in the case of cataract surgery is rapidly becoming 2 hour stay surgery, is it not important that the eye is examined carefully before the patient is discharged and again at the next-day visit? This is clearly a task for the ophthalmologist and not the anaesthetist. Whoever causes the perforation, it must be recognised by the ophthalmic staff and appropriate treatment implemented. May I venture to suggest that a similar protocol is necessary for retrobulbar haemorrhage? It is not enough to tell the patient that their operation has had to be postponed due to the high pressure, and that they should go home and re-present in a few weeks, as the high orbital pressure may have devastating effects on the blood supply to the retina.

The increasing use of sub-Tenon's and topical anaesthesia is an interesting development, and if the ophthalmologists can produce adequate results without an increased need for sedation, anaesthetists would, I suspect, be willing to bow out. However, there is evidence that the requirement for sedation does increase with these techniques, and the worst combination for the patient, surgeon and anaesthetist is inadequate anaesthesia and akinesia covered by increasing sedation. I believe that since anaesthetists have been involved, the need for sedation has become a rare event. In addition the need for resuscitation has almost disappeared, because warning signs are recognised and appropriate measures taken long before the patient requires resuscitation. I find alarming the concept of the surgeon downing tools in the middle of a cataract operation under topical anaesthesia to resuscitate the patient – a skill of which the surgeon is likely to have very little recent experience and practice, and dare I say probably lacks current knowledge.

I feel that the interests of the patient are best served by the presence of an anaesthetist properly trained in the field, and at the present time both theoretical and practical teaching is widely available. The skills of the anaesthetist should allow the surgeon to concentrate on what he does best – the provision of high quality surgery – without being distracted by any other needs of the patient.

I am glad that Gillow *et al.* and Boase have brought to notice what is clearly a problem that deserves attention. We await with great interest the results of the audit into local anaesthesia in eye surgery which has recently been completed by the Royal College of Ophthalmologists, as it is only by such studies that the true facts will emerge and practice and results may be expected to improve.

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Sir,

David Boase's excellent editorial is most welcome.[1] One question posed is whether it is better for a peribulbar block (with bupivacaine) using a 'short' 25 mm needle possibly performed by an anaesthetist, or for topical anaesthesia with an anaesthetist in attendance for intravenous sedation. Having had the experience of a junior doctor perforate an eyeball with this so-called 'short' needle, may I offer a compromise that will give both patient and surgeon considerable satisfaction as well as improved safety.

We now recommend 2% prilocaine, 3.0 ml of which is given inferotemporally and 3.0 ml superonasally through a 16 mm (orange) needle to ensure peribulbar location followed by standard oculocompression. The effect lasts 2½ hours. Advantages over bupivacaine (with or without lignocaine) are that it is less toxic, is much more comfortable, has better diffusion properties so obviating the need for hyaluronidase, is more readily metabolised so safer, provides faster return of vision, does not require a post-operative pad and is cheaper. Advantages over topical anaesthesia are akinesia, that it is more reassuring for the patient 'to have the eye frozen', that it is more relaxing for the surgeon should complications occur or the operation be unexpectedly prolonged, and there are no problems should bridle sutures, iris or scleral surgery be necessary. Above all, there is no need for an attendant anaesthetist!

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Sir,

I read with interest Mr David Boase's editorial entitled 'Local anaesthesia revisited' (Eye 1996;10:531–2). May I make the following remarks:

1. The surgeon is responsible for his or her surgery, which means that the surgeon should be involved in the anaesthetic administered in the case. One should never allow a college doctor, ophthalmologist or anaesthetist to administer the anaesthetic – it is the surgeon's direct responsibility!

2. No mention was made of intraocular anaesthesia, which is an excellent method for cataract surgery, either by itself or whenever the patient feels the intraocular manoeuvre during surgery. I have performed 428 cases already this way.

3. Subconjunctival mercaine 0.5% 0.2–0.3 ml at the upper limbal area between 10 and 14 o'clock is sufficient to start and end cataract surgery.

4. Local anaesthesia is a misnomer. It should be called regional anaesthesia, as it is anaesthetising a major nerve to a whole organ! Peribulbar anaesthesia is local anaesthetic. One should always remember that switching from retrobulbar anaesthesia to peribulbar, topical, intraocular or subconjunctival anaesthesia involves a whole different approach to the surgical manoeuvres as the eye moves freely and a sudden move is critical in different operations.

All the above remarks are related to manual small-incision, sutureless, sclero-corneal pocket tunnel surgery. If it is good for manual extracapsular cataract extraction (ECCE), it should be enough for phaco ECCE too.

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Sir,

We read with interest the article by J. T. Gillow *et al.* entitled 'Ocular perforation during peribulbar anaesthesia'.[1] In the vitreo-retinal unit in this hospital we have recently had similar experience which supports their findings.

Seven patients have been seen in this hospital over a 20 month period following ocular perforation during peribulbar anaesthesia prior to cataract surgery. Axial lengths ranged between 22.06 mm and 23.58 mm. All the local anaesthetic procedures were performed by anaesthetists of the following