CASE REPORT

Siderosis bulbi as a consequence of a missed intraocular foreign body

Matthew Lapira,¹ David Karl,² Helen Murgatroyd²¹NHS Tayside, Dundee, UK²Department of Ophthalmology, NHS Tayside, Dundee, UK

Correspondence to

Dr Matthew Lapira,
matthew.lapira@nhs.net

SUMMARY

We present a case of a 56-year-old man who suffered an injury to his right eye in June 2012. He presented to an emergency department, however, the presence of a penetrating injury and an intraocular foreign body was not identified. A year later he was referred to the ophthalmology department due to reduced vision and change of iris colour in the same eye. Examination revealed clinical signs consistent with a previous penetrating injury and a retained ferrous intraocular foreign body.

BACKGROUND

Penetrating eye injuries represent a significant portion of surgical ophthalmic emergency departments' workload, and missing them can have devastating consequences. Our case highlights the importance of taking a careful history and examining with a high index of suspicion patients presenting with eye injury involving power tools, or hammering metal on metal. We discuss the sequelae of a retained ferrous foreign body.

CASE PRESENTATION

A previously healthy 56-year-old builder was referred to the ophthalmology outpatient by his general practitioner after having noticed a reduction in the visual acuity and a change in the colour of his right iris. The patient had always had blue eyes but noticed that over the past 2 months the iris in his right eye had become green. He had no medical history, and was not on any regular medications. On careful questioning he reported that just over a year ago he had suffered an eye injury while working with metal against concrete. At the time he was assessed in an emergency department, but was reassured that he had an eye contusion and was discharged without any follow-up.

In the clinic, the visual acuity of his left eye was 6/5 but in his right eye it was reduced to the perception of light. On examination he had iris heterochromia (different coloured irises), his left eye being blue and his right eye a brownish green. Slit lamp examination of his right eye revealed a healed corneal wound, posterior to which was a traumatic iris defect suggesting an old penetrating injury. Furthermore he had a dense cataract, which precluded a view of the posterior segment (figures 1–4).

The working diagnosis was that of siderosis bulbi secondary to a retained ferrous intraocular foreign body (IOFB).

Figure 1 Iris heterochromia.

INVESTIGATIONS

The patient had a plain facial X-ray that suggested a small IOFB in his right eye, this moved superiorly on the second image taken with the patient in up-gaze. The exact location of the foreign body was confirmed with an orbital CT. A B scan ultrasound was carried out to exclude signs of a retinal detachment. Electrophysiology can be utilised to assess the retinal function and extent of any toxic retinal damage but this was not carried out as we did not feel it would alter the proposed management plan (figures 5 and 6).

OUTCOME AND FOLLOW-UP

With a guarded prognosis the patient has been listed for a combined pars plana vitrectomy and foreign body removal with cataract extraction and lens implantation.

DISCUSSION

This case demonstrates the devastating sequelae that missing an IOFB can have. It also helps to highlight the clinical manifestations of siderosis bulbi.

In 1890, Bunge described a series of ocular changes that occurred as a consequence of a ferrous IOFB, which he termed siderosis.¹ Although quite

Figure 2 Anterior segment view of the eye showing dense cataract.

CrossMark

To cite: Lapira M, Karl D, Murgatroyd H. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-202904

Figure 3 Cataract.

common in the past and well described in textbooks, most of the literature is from the previtrectomy era. In fact as a result of the various imaging modalities available, modern health and safety rules at the workplace and better surgical techniques, siderosis bulbi is very rarely seen in clinical practice. This sight-threatening condition is caused by the presence of an iron containing IOFB that degrades and has an affinity for epithelial surfaces, therefore affecting virtually all ocular tissues: iris, ciliary non-pigmented epithelium, lens and retinal pigment epithelium.² Its effects include iris heterochromia, pupillary mydriasis, brown deposits on the anterior lens capsule, cataract formation and lastly retinal pigment degeneration.

The most common presentation is due to decreased visual acuity, and in a case series of patients suffering from ocular siderosis, even though all patients had iris heterochromia none of them seemed to have noticed this,³ unlike in our patient in which this was his main complaint. There are no controlled trials on the management of siderosis bulbi, so treatment is still somewhat controversial with some authors in the past arguing in favour of a watchful waiting strategy with serial monitoring.⁴ However, modern practice seems to advocate immediate removal of the IOFB³ in order to prevent sight-threatening complications. This can be achieved either by performing a sclerotomy wound and then using magnets to retrieve the IOFB or by performing a pars plana vitrectomy and retrieval of the foreign body.³ A recently published retrospective cohort study carried out at Moorefield's looking at the outcomes of surgery for posterior segment IOFBs identified a number of factors associated with a poor visual outcome postoperatively. These include retinal detachment, hyphaema, vitreous haemorrhage,

Figure 4 Brown iron deposition spots on anterior lens capsule.

Figure 5 Oblique section of CT scan showing intra-ocular foreign body (arrow).

uveal prolapse or retinal detachment at the time of presentation. Postoperatively, if a patient developed retinal detachment or proliferative vitreo-retinopathy these too were predictive of poor final visual outcome.⁵

Eye presentations to emergency departments represent a significant workload; a recent article published in *Emergency Medicine Journal* determined that 6% of all referrals to the emergency department are ophthalmic related.⁶ A recent national survey carried out in the UK showed that 69% A&E senior house officers (SHOs) "had little or no confidence in dealing with ophthalmic cases, and 26% received no training in ophthalmic emergencies."⁷ This combined with the fact that most ophthalmic cases in emergency departments are managed by A&E SHOs or emergency nurse practitioners⁶ really highlights the value of this case as an educational learning tool.

If the history is suggestive of a penetrating eye injury then one must exclude the possibility of an IOFB. A ruptured globe, full-

Figure 6 Coronal section of CT scan showing intra-ocular foreign body (arrow).

thickness corneal perforation and/or a traumatic iris wound are all clinical signs that should raise suspicion of the potential of an IOFB instigating further investigations and a dilated fundus examination. The Royal College of Radiologists recommends a plain orbital X-ray as the first-line imaging modality for detection of an IOFB. CT scan is recommended in cases of high suspicion of an IOFB but with a negative plain X-ray, non-metallic objects, multiple IOFBs or when the exact location remains uncertain.⁸

We hope this case highlights the importance of identifying IOFBs.

Learning points

- ▶ Importance of taking a careful history and thorough ophthalmic examination in the emergency department setting.
- ▶ Importance of radiological investigation in selected cases.
- ▶ Sight-threatening consequences of missing an iron-containing intraocular foreign body.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Duke-Elder S, ed. *System of ophthalmology. Vol. XIV: injuries. Part 1: mechanical injuries*. St Louis: Mosby, 1972:525–44.
- 2 Luo Z, Gardiner M. The incidence of intraocular foreign bodies and other intraocular findings in patients with corneal metal foreign bodies. *Ophthalmology* 2012;117:2218–21..
- 3 Hope-Ross M, Mahon GJ, Johnston PB. Ocular siderosis. *Eye* 1993;7:419–25.
- 4 Sneed RS, Weingeist TA. Management of siderosis bulbi due to a retained iron containing intraocular foreign body. *Ophthalmology* 1990;97:375–9.
- 5 Wickham L, Xing W, Bunce C, *et al*. Outcomes of surgery for posterior segment intraocular foreign bodies—a retrospective review of 17 years of clinical experience. *Graefes Arch Clin Exp Ophthalmol* 2006;244:1620–6.
- 6 Ezra DG, Mellington F, Cignoni H, *et al*. Reliability of ophthalmic accident and emergency referrals: a new role for the emergency nurse practitioner? *Emerg Med J* 2005;22:696–9.
- 7 Tan MM, Driscoll PA, Marsden JE. Management of eye emergencies in the accident emergency department by senior house officers: a national survey. *J Accid Emerg Med* 1997;14:157–8.
- 8 Royal College of Radiologists iRefer: making the best use of clinical radiology. T05: Orbital lesions: suspected foreign body. <http://www.irefer.scot.nhs.uk/adult/#Tpc209> (accessed 19 Nov 2013).

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow