CASE REPORT

Evisceration for the management of ocular trauma

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colm.mcalinden@gmail.com**SUMMARY**

Despite the eye being surrounded by orbital bones and protective mechanisms such as the blink reflex, it is vulnerable to trauma. The two key issues to consider when presented with a case of ocular trauma are the visual potential of the eye and the risk of sympathetic ophthalmia. The Ocular Trauma Score can be used to assess the visual potential of the injured eye. Surgical management may be either repair or removal of the eye (evisceration or enucleation). Herein we describe a case of ocular trauma and the decision-making process in the management of the injury.

BACKGROUND

Despite the eye being surrounded by orbital bones and protective mechanisms such as the blink reflex, it is vulnerable to trauma. It is important for doctors to accurately diagnose ocular trauma and penetrating eye injuries to enable prompt referral to ophthalmology for management. It is also important for non-ophthalmology doctors to be aware of the prognosis and the subsequent management that will ensue. Herein we describe a case of ocular trauma and the decision-making process in the management of the injury.

CASE PRESENTATION

A 51-year-old man presented to the accident and emergency department with multiple knife wounds, one of which penetrated the right eye creating a 20 mm full thickness laceration of the upper lid and a 12 mm superonasal full-thickness scleral laceration. The laceration extended radially back towards the optic nerve with prolapse of the intraocular contents. There was ocular hypotony with an extensive subconjunctival haemorrhage, cells and flare in the anterior chamber, positive relative afferent pupillary defect (RAPD) and reduced red reflex. B-scan ultrasound (figure 1) and axial CT (figure 2A) indicated a total retinal detachment (RD). Coronal CT imaging (figure 2B) indicated an orbital floor fracture. The visual acuity (VA) was hand movements.

On admission, the patient underwent primary surgical repair, which involved a 360° peritomy with the four recti muscles isolated with traction sutures. The wound was repaired with 7-0 Vicryl and 10-0 nylon interrupted sutures, followed by subconjunctival injections of cefuroxime 125 mg and chirocaine 0.25%.

Prior to further intervention, a number of issues needed to be considered in consultation with the patient, principally the visual potential of the eye and the risk of sympathetic ophthalmia.

Figure 1 B-scan ultrasound showing a retinal detachment.

INVESTIGATIONS**Ocular Trauma Score**

The Ocular Trauma Score (OTS) was developed by the US Eye Injury Registry to provide a single probability estimate of the visual potential 6 months after injury.¹ The OTS is calculated with the use of a table which allocates scores for the presenting VA and the presence or absence of five factors.

1. Globe rupture
2. Endophthalmitis
3. Perforating injury

A

B

Figure 2 (A) Axial CT showing a retinal detachment. (B) Coronal CT showing an orbital floor fracture.

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4. RD
5. RAPD

The calculated raw score is then looked up in a second table which provides a percentage probability estimate for a range of VAs. In the present case, the patient had an OTS of 35 points which corresponded to the following estimates of the VA 6 months after injury.

- ▶ No light perception, 74%
- ▶ Light perception or hand movements, 15%
- ▶ 1/200 to 19/200, 7%
- ▶ 20/200 to 20/50, 3%
- ▶ $\geq 20/40$, 1%

Sympathetic ophthalmia

Sympathetic ophthalmia is a rare, bilateral granulomatous panuveitis following trauma or surgery to one eye, believed to be a T cell mediated autoimmune response against choroidal melanocytes.² The inciting eye is the one sustaining the injury or surgery and the fellow eye is known as the sympathising eye. It usually presents within 4–8 weeks with 90% presenting within 1 year following trauma, although cases have been described several years after the injury. Anteriorly it manifests as uveitis with mutton-fat keratic precipitates, while posteriorly it is often accompanied by thickening of the uveal tract and Dalen-Fuchs nodules (small depigmented nodules at the level of the retinal pigment epithelium).

The incidence is difficult to determine due to its rarity. The estimated incidence is 0.1% following intraocular surgery and 0.2–0.5% (2–5 in 1000) for open globe injuries.³ In 2000,

Kilmartin *et al*⁴ reported that retinal surgery was the main risk factor for the development of sympathetic ophthalmia. The calculated risks reported were: 1 in 799 vitrectomies, 1 in 1357 external RD repair and 1 in 1152 for either pars plana vitrectomy or external RD repair.⁴ There is a major risk in traumatised eyes with a retained intraocular foreign body, 80% develop sympathetic ophthalmia within 3 months and 90% develop it within 1 year.⁵ Although one may presume, it is not clear if there is an increased risk of sympathetic ophthalmia with repeated intraocular operations or ocular trauma.

TREATMENT

Evisceration and enucleation are surgical options for severely traumatised eyes to reduce the risk of sympathetic ophthalmia. Evisceration involves the removal of the intraocular contents of the eye leaving the scleral shell, whereas enucleation involves the removal of the complete eye. It has been suggested that the chances of developing sympathetic ophthalmia are very low when surgery is performed within 10 days of the initial trauma.⁶

However, evisceration has not always been a favourable treatment option. In 1887, Frost⁷ reported a series of patients who developed sympathetic ophthalmia following evisceration. Furthermore, in 1974, Green *et al*⁸ reported four cases of sympathetic ophthalmia following evisceration but did not document how many eviscerations were performed. However, more recent large-scale retrospective analyses have reported no cases of sympathetic ophthalmia following evisceration.⁹

Figure 3 The main steps in the evisceration procedure. (A) Removal of the contents with a curette. (B) Ensuring all the uveal tissue is removed. (C) Scleral shell was filled with dehydrated alcohol. (D) Implanting the ball. (E) Suturing the eye. (F) Conformer in situ. (G) Hydroxyapatite implant infused with cefuroxime.

The choice of procedure requires an active discussion with the patient, considering risks and benefits of each procedure. In this case, the patient would likely need multiple retinal operations with only a 1% estimate of obtaining a VA $\geq 20/40$ at 6 months and a significant risk of the development of sympathetic ophthalmia in the fellow eye. Evisceration is technically an easier surgical procedure and is perhaps superior in terms of the cosmetic appearance and motility than an enucleation. However, improvements in surgical technique may help reduce the cosmetic differences between enucleation and evisceration. An evisceration is not indicated in the presence of uveal malignancy. It is important to give the patient time following the primary repair to make an informed decision with regard to their treatment options and to come to terms with the prospect of living without an eye. In the present case, the patient opted for an evisceration procedure.

Evisceration procedure

A 360° peritomy was created followed by removal of the cornea. The inner contents of the globe were removed with a curette. The inner sclera was scrubbed and great care was taken to ensure all the uveal tissues were removed. The scleral shell was filled with dehydrated alcohol and removed twice. Two radial scleral cuts were created and a 16 mm hydroxyapatite implant infused with cefuroxime was aseptically placed into the scleral shell. 4–0 Vicryl mattress sutures were used to close the sclera in a double-breasted technique, 4–0 Vicryl purse string suture for the tenons and 6–0 Vicryl for the conjunctiva. Marcaine 0.5% was injected, a conformer fitted and the eye was patched (figure 3). Postoperative topical chloramphenicol ointment and analgesia were prescribed.

CONCLUSION

Patients presenting with ocular trauma require careful consideration. The key issues to address are the visual potential of the eye, risk of sympathetic ophthalmia and informed patient preference. It is important for non-ophthalmology based doctors to correctly identify ocular trauma and they can use the simple Ocular Trauma Score to provide the patient with an idea of their prognosis prior to onward referral to ophthalmology.

Learning points

- It is important to accurately identify ocular trauma, particularly when presented with a patient with multiple injuries.
- The two key issues to consider when presented with a case of ocular trauma are the visual potential of the eye and the risk of sympathetic ophthalmia.
- The Ocular Trauma Score can be used to assess the visual potential of the injured eye.
- The incidence of sympathetic ophthalmia is approximately 2–5 in 1000 for open globe injuries.
- Surgical management may be either repair or removal of the eye (evisceration or enucleation).

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