

Ocular emergencies 1: traumatic

Introduction

This pair of articles aims to familiarize physicians with acute ophthalmic conditions requiring urgent referral and attention. It therefore primarily focuses on conditions that pose a direct threat to patients' vision and/or life, as well as on problems seen frequently in clinical practice.

A wide range of ocular emergencies, conditions and manifestations of systemic illness are encountered regularly in the primary care setting. Prompt recognition and appropriate referral of ocular emergencies are essential when the outcome may depend on timely management. Ocular trauma is a common casualty referral with important medicolegal implication and is therefore considered separately from non-traumatic ocular emergencies which will be covered in the second article.

Traumatic ocular emergencies

Ocular trauma forms a major part of the workload of the eye casualty department and includes mechanical injury as well as damage from chemical or physical agents (Table 1). The incidence of eye injuries requiring treatment has been estimated as 975 per 100 000 population (Glynn et al, 1988) and most patients are young with an average age around 30 years (Schein et al, 1988). Mechanical trauma is the most common form seen and occurs with both

blunt and penetrating injuries; in the latter, an associated intraocular foreign body may occur. Various ocular injuries can be seen in the context of mechanical trauma, including lid haematomas and lacerations (Figure 1a), corneal or scleral wounds (Figure 1b), traumatic uveitis and lens injuries, as well as vitreous haemorrhage, retinal oedema and retinal detachment.

In general, eye injuries from mechanical trauma can be divided into injuries with full-thickness eye wall laceration or rupture (open globe injuries) and injuries where there is no full-thickness wound of the eye wall (closed globe injuries) (Kuhn et al, 1996). It is vital to take an accurate history regarding the mechanism of injury, as this will help to determine the kind of ocular injury that may be expected. In addition, it is important to accurately record the results of the examination, including the patient's visual acuity, as this is often of later medicolegal relevance.

Open globe injuries

Open globe injuries usually result from penetrating trauma, although they can uncommonly occur with severe blunt

trauma. After excluding any other serious body injuries, examining physicians are advised to accurately record the visual acuity, protect the eye with a shield and refer the patient as soon as possible to the nearest eye unit. No further clinical examination is required, but a plain X-ray or orbital computed tomography may be justified if the history suggests the possibility of an intraocular foreign body.

Closed globe injuries

Although less serious, closed globe injuries do need to be reviewed by an ophthalmologist within 24 hours, mainly to exclude serious problems such as hyphaema (blood in the anterior chamber) (Figure 1c), vitreous haemorrhage, choroidal rupture (Figure 1d) and retinal injuries (retinal tears, oedema or retinal detachment).

Orbital floor fractures are an important complication of blunt trauma, especially with larger objects such as tennis balls. They typically manifest with lid swelling, decreased vertical ocular motility and double vision on looking upward (Figure 2a). Computed tomography can usually image the fracture although large fractures may show up well

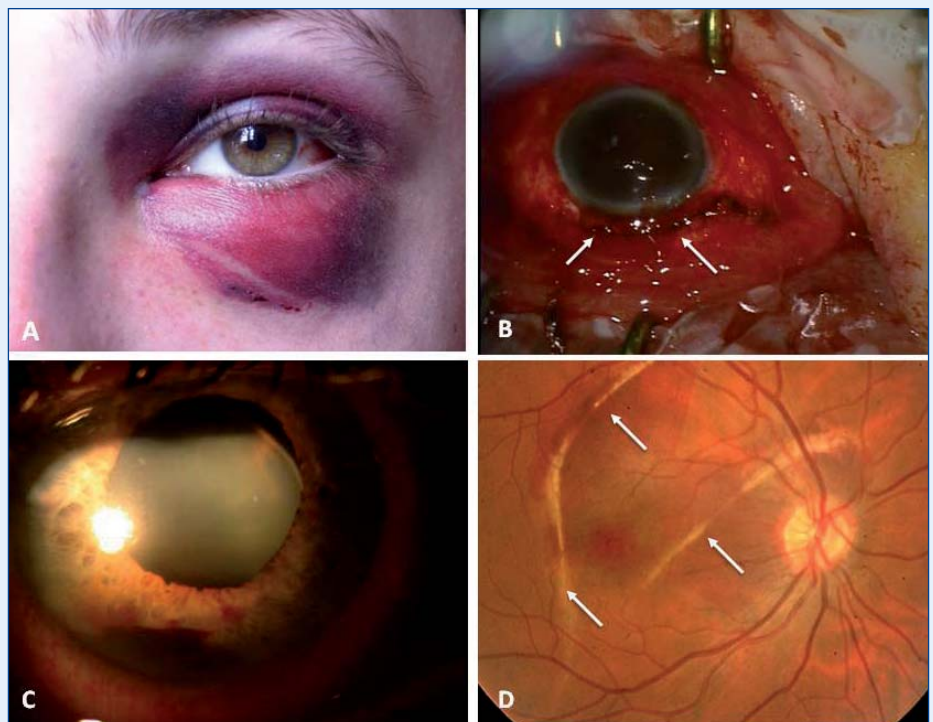
Table 1. Types of traumatic ocular emergencies

Mechanical	Closed globe injury
	Open globe injury
	Intraocular foreign body
Chemical	Alkali injury
	Acid injuries
Physical	

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Figure 1. Ocular injuries resulting from mechanical trauma. a. Lower lid haematoma. b. Scleral wound after surgical repair (arrows). c. Hyphaema. d. Choroidal rupture (arrows).



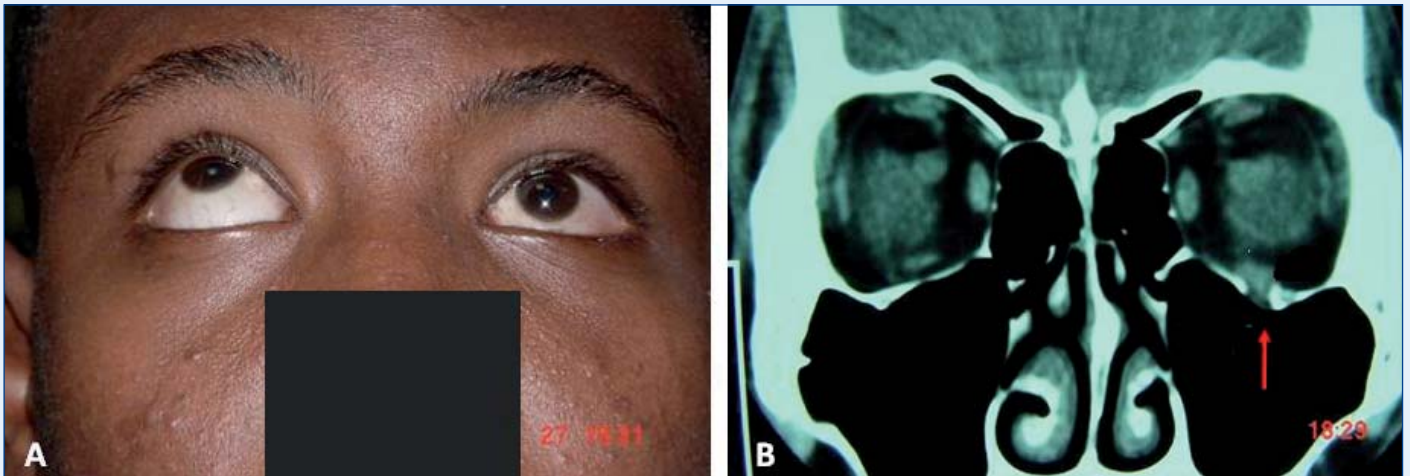


Figure 2. a. Left orbital fracture with limited upward eye movement. b. Computed tomography scan showing a small orbital floor fracture and entrapment of the inferior rectus muscle (arrow).

on plain X-ray (Figure 2b). Rapid referral is important as early surgery is indicated in large fractures and in cases with significant diplopia or inward displacement of the globe into the orbit (enophthalmos).

Chemical injuries

Chemical injuries of the eye are a potentially blinding problem and require prompt attention. They usually involve the ocular surface although they may rarely affect the lens or posterior segment. Alkali burns are more serious than acid burns as they have the potential to penetrate deeper into the ocular tissues.

Patients usually present with a history of chemical ingress into the eye, associated with severe pain, redness and reduction in visual acuity. Anterior segment manifestations include lid burns, conjunctival inflammation and corneal epithelial defects (Figure 3). Blanching of the conjunctiva (especially immediately adjacent to the cornea) or the presence of corneal oedema are poor prognostic indicators for regaining corneal clarity and surface epithelialization.

Figure 3. Chemical burn with a fluorescein-stained corneal epithelial defect.



First aid treatment of chemical burns is vital and should start as soon as possible – ideally at the scene of injury. The eye should be copiously irrigated with water from the nearest source of running water followed by urgent referral to the nearest accident and emergency department. At the hospital, particulate matter is gently removed by cotton buds and further irrigation is carried out with normal saline until the pH is neutralized. It is important to evert the lids during irrigation to allow complete irrigation of the eye surface. Urgent ophthalmology consultation is mandatory to assess the degree of damage and plan further management.

Physical injuries

Ocular injuries from physical agents are uncommon, with the commonest presentation occurring in those using welding arcs: so-called 'arc-eye'. Patients present with ocular redness and bilateral multiple erosions of the cornea. Although acutely painful, this condition is usually self-limiting and responds well to cycloplegia and ocular patching.

Conclusions

Trauma to the eye is an important cause of severe visual impairment and blindness. A good knowledge of potential ocular injuries is imperative for the emergency medicine physician to ensure rapid diagnosis and early ophthalmic consultation. The second part of this article will discuss non-traumatic ocular emergencies based on their presenting features and outline the important points in their management. **BJHM**

Figure 1 is reproduced courtesy of Mr H Zamabarakji, Whipps Cross Hospital, London, and Figure 3 is reproduced courtesy of Mr H Sherifat, Whipps Cross Hospital, London.

Conflict of interest: none.

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KEY POINTS

- Trauma has medicolegal implications and good recording of ocular findings (especially visual acuity) is important.
- In polytraumatized patients, life-threatening conditions take precedence, but it is important to give attention to the eye once the patient is stabilized.
- Emergency medicine physicians need to be aware of signs that suggest the presence of an open globe injury such as an obvious eye wall wound, severely distorted globe, peaked pupil, prolapsed uveal tissue and marked hypotony.
- Detailed examination of children and uncooperative adults with penetrating ocular trauma should be deferred until under general anaesthesia.
- When dealing with chemical burns, ocular irrigation is paramount and should be started as soon as possible, even before detailed history taking.