

Traumatic injury of right eye at workplace: A case study

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ABSTRACT

The patient had sustained injuries to right eye following activities in the construction site. The penetrating injury resulted laceration over cornea, traumatic cataract, iridodialysis and hyphema. Assessment of workplace revealed that the patient was not wearing any personal protective equipment such as safety glasses nor face shield. The patient is not fit momentarily to return to the job but able to perform modified duties. The safety eyewear or glasses with high impact resistant with ANSI Z87.1+ or EN 166 and face shield as secondary protection should be worn by the workers involved in the construction activities to prevent eye injuries.

Keywords: Iridodialysis, personal protective equipment, traumatic eye injury

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I. INTRODUCTION

There are more than two million eye injuries occur yearly and accounts for one million of patients presenting to emergency department in the US (1). The commonest cause of monocular blindness in the US is traumatic eye injuries. Almost all eye injuries are preventable with appropriate personal protective equipment. The males are more likely to have penetrating eye injury.

II. CASE REPORT

A 55 years old gentleman had sustained injuries following hammering activity while attempting to join two pieces of wood of different thickness. The common nails with broad heads were used. He had sustained injury after being struck in right eye by the nail. He complained of his vision on right eye was not as clear as before. The patient worked as a laborer in a company for more than five years. He was involved in construction where hammering activities are required. He rarely would wear eye goggles during the actions.

During examination, his visual acuity of right eye able to appreciate counting fingers only while the left eye was 6/12 with no improvement on using pin-hole. There were no obvious foreign body seen. The relative afferent pupillary defect (swinging light test) was negative. His right cornea showed horizontal laceration wound paracentral to 4 o'clock at limbus. The lens capsule breached with superior iridodialysis in the same eye. Hyphema was noted in anterior chamber of right eye. However, there was no scleral involvement on the right eye.

A walk-through survey was conducted and noted that a worker was doing the similar job that of the patient. He was not wearing any personal protective equipment such as safety glasses or face shield. There were no workers were wearing safety boots. In addition, the workplace was very dusty.

He was diagnosed to have right penetrating injury with corneal laceration wound and traumatic cataract, iridodialysis and hyphema. Exploration under anesthesia was performed where the corneal laceration wound was sutured, iris at wound was separated with viscoelastic material and intravitreal vancomycin and ceftazidime was given. Post-operatively, the patient was covered with systemic Ciprofloxacin and eye drops of Moxifloxacin, Dexamethasone and Atropine to the right eye.

The patient is not fit temporarily to return to his job and preferably should not carry out the activities of hammering as one of the eyes visions able to appreciate counting fingers only. He may be able to perform modified duties as discussed with the employer such as cleaning activities. The management should purchase the safety eyewear or glasses with high impact resistant meeting standard of ANSI Z87.1+ or EN 166 and also face shield as secondary protection for face for the other workers involved in the construction activities. The safety shoes should also be given to protect against puncture wounds. The patient didn't contribute to the Social Security Organization, but the employer had purchased other form of insurance covering the employees. The workers from other countries are advised to be protected under Workmen's Compensation Act 1952. The management was very committed since the patient had been paid on days that he was hospitalized and during medical leave for this injury.

III. DISCUSSION

The aim of the management was to return the patient to similar or different job with the same employer. The assessment of fitness for work was important and hence, he had been continuously assessed for his visual acuity. The support of the organization was as significant during the absence period of the employee and the symptom levels (2). The Workmen's Compensation Act 1952 (3) protects all foreign workers while Employees' Social Security Act 1969 (4) protects Malaysian employees. These Act safeguards and preserves the quality of life of workers from injuries at workplace, occupational diseases, medical attention and death. The management had to purchase appropriate insurance for the patient and also other Malaysian and foreign workers.

The patient worked as a laborer in a company and perform hammering activity in construction activities. The employees of similar job should be provided approved safety eyewear or glasses with high impact resistant meeting standard of ANSI Z87.1+ or EN 166 and also face shield as secondary protection for face, as shown in Figure 1 and Figure 2. Safety and Health training should be given to all employees on regular basis.



Figure 1: Safety glasses ANSI Z87.1



Figure 2: High impact face shield

Ocular injuries range from subconjunctival injury, laceration of lid, corneal abrasion, traumatic iritis, hyphema, injury to lens, vitreous hemorrhage, retinal detachment, traumatic optic neuropathy, orbital fracture and ruptured globes. The open globe injuries may be penetrating or perforating(5). The close globe injuries are due to blunt trauma causing hyphema, vitreous hemorrhage, retinal detachment and macular edema. The size, velocity and hardness of object are predictors of severity of eye injury. The smaller objects cause injury to eyeball, while the larger objects cause fracture to the bones. Penetrating injuries have poor prognosis on visual acuity even after surgery. Hyphema is presence of blood between cornea and iris following blunt trauma. Due to obstruction of aqueous outflow, presence of hyphema may increase intraocular pressure.

Corneal laceration may be partial or full-thickness injury to cornea (6). The full-thickness injury cornea causes ruptured globe, aqueous humor escaping from anterior chamber causing flat cornea, asymmetric pupil or air bubbles under cornea. Patients with full-thickness injury complains of strong pain. The complications of corneal laceration are endophthalmitis, complete or partial loss of vision, loss of eye, systemic infection, corneal scarring, cataract formation and secondary glaucoma. The prognosis of corneal laceration depends on the length and depth of laceration, location and degree of scarring. The prognosis is guarded if lens, retina or uveal tissues are involved. The affected person may give history of injury resulting in changes of vision and may complain of sensation of a foreign body in the affected eye. Particles from high-speed machinery may penetrate eye while blunt object may cause laceration of cornea. The visual acuity is examined for both the eyes and compared with pre-injury visual examination. Each eye is tested separately using a Snellen chart. The lens can be evaluated for dislocation on both eyes. The cornea of both eyes is examined using slit lamp for any penetration. The corneal perforation may show shallowed anterior chamber, teardrop pupil, hyphema or flat cornea in full-thickness corneal lacerations. Dilution of fluorescein indicates positive Siedel test, suggestive of aqueous humor leaking from anterior chamber. The corneal laceration usually occurred in the inferior aspect of the globe due to Bell phenomenon whereby blinking as protective mechanism resulting in upward and outward rotation of globe preventing foreign material. The corneal laceration may occur due to flying sharp objects, metal fragments, fireworks, explosion and blunt force trauma. The complication of corneal lacerations are infections, traumatic cataracts, secondary glaucoma and corneal or intraocular foreign bodies. The radiography and CT scanning are

indicated to recognize intraocular foreign bodies or associated orbital, cranial or facial trauma. The MRI is avoided for metallic foreign body. The ultrasonography is contraindicated when globe rupture is suspected. A bandage adhesive soft contact lens may be applied on a small corneal laceration for three to six weeks. Other medical care includes tissue adhesives for small puncture wounds, cyanoacrylate glue and fibrin glue for small corneal lacerations. The surgical care comprised of removal of foreign body, repair of laceration and preventing further damage. The postoperative complications include corneal scarring, cataract and endophthalmitis. The corneal laceration may be associated with disruption of lens capsule where surgical removal of lens is indicated. Prophylactic lens removal is not encouraged as to prevent release of intraocular release of lens protein (7). However, medical management such as antibiotics, non-steroidal anti-inflammatory agents and mydriatic have fewer vision-threatening conditions compared to surgical repair on corneal injuries and removal of lens.

Iridodialysis is tearing away of iris from its attachment to the ciliary body due to blunt or penetrating trauma. Surgical intervention is required only for large iridodialysis (8, 9). The temporal iridodialysis is symptomatic giving rise to diplopia, glare, photophobia, polycoria and ectopic pupil may occur.

IV. CONCLUSION

Traumatic eye injuries are the commonest cause of monocular blindness ranging from subconjunctival injury to orbital fracture and ruptured globes. These injuries are preventable with suitable personal protective equipment.

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