

# EYE INJURY

## (Acute Care Case Study)

### Introduction

M.R. is a 10-year-old male patient who presented to a local emergency department complaining of sudden onset of severe left eye pain after being struck by a stone that had ricocheted off a nearby tree while he throwing stones with a friend. The patient reported the following: denied wearing any protective or prescription glasses, no past history of ocular disorders, was current immunized for tetanus (confirmed by the parents), had non-contributory family and medical history and lives at home with his parents and younger sister and attends elementary school.

On examination, M.R. was a well-developed 10-year-old male in acute ocular distress. On examination, his vision, using the Snellen visual acuity card at two feet, was 20/40 in the right eye and no light perception in the left with good illumination. The flashlight examination revealed no facial abnormalities. The right eye pupil was round, about 3.5 mm in diameter constricting to about 2.5 mm on direct light exam, no reversed afferent papillary defect and also reacted normally to accommodation.

The left pupil was very difficult to evaluate due to the presence of blood in the anterior chamber. It had normal eyelids without bruising, mild subconjunctival haemorrhage, mild conjunctival chemosis, and had an irregular linear corneal laceration extending from seven to one o'clock. Examination of the left eye anterior chamber revealed significant iris prolapse through the corneal laceration and hyphema. Visualization of the lens was obscured by the hyphema and necrotic iris tissue. Examination of the anterior and posterior segments of the right eye was normal without signs of trauma. A computerized tomography (CT) of the orbits revealed a small round foreign body at the level of the iris plane.

The patient's diagnosis was penetrating eye injury with corneal laceration and intraocular foreign body. The ocular examination was terminated, the eyes protected with bilateral eye shields, the patient was given Fentanyl for pain control, informed consent was obtained from the parents, was prepared for exam under general anesthesia, for repair of corneal laceration, and removal of intraocular foreign body.

### Pathophysiology

According to Rüedi, Buckley and Moran (2007), intraocular foreign body injuries resulted into soft tissue injury. The result of this is eye endothelial damage and the activation of coagulation cascade (Rüedi, Buckley & Moran, 2007). Endothelial damage brought about a laceration to the patient's cornea, one of the patient's diagnoses. On the other hand, the coagulation cascade activation activated the normal body's response to activate the formation of neutrophil granulocytes that increases the permeability of the injured soft tissue (Rüedi, Buckley & Moran, 2007). This is why the client experienced mild conjunctival haemorrhage, conjunctival chemosis and hyphema (Rüedi, Buckley & Moran, 2007). The increase of permeability also resulted to oedema that aggravated to

ischemia (Rüedi, Buckley & Moran, 2007). The ischemia caused tissue necrosis, resulting to eye pain and obscured lens visualization (Rüedi, Buckley & Moran, 2007).

### Medications

According to the case given, the patient was given Fentanyl for pain. Fentanyl is classified as an opioid analgesic which was indicated to the patient who will undergo an operation to manage the pain during surgery and enhance the effect of the general anesthesia (NursingTimes.Net, 2004). Nurses must make sure that the patient that will receive this drug is not experiencing acute respiratory depression, alcohol intoxication and increased intracranial pressure for these conditions are contraindicated and the use of Fentanyl may aggravate them (NursingTimes.Net, 2004). The drug, aside from analgesia, also causes respiratory depression, physical depression and euphoria (Karch, 2004) that is why nurses must watch out for bradycardia, respiratory depression, decrease in physical activity, nausea and vomiting and muscle (especially chest wall) rigidity (Karch, 2004). Important nursing considerations for this drug include the administration of the drug to the patient in a slow manner for IV push, to observe the patient's respiratory rate and watch out for signs of respiratory distress, and after the operation, advise the patient to avoid activities that require alertness not until the drug wears off (NursingTimes.Net, 2004).

### Medical Procedures and Diagnostic Tests

The main medical procedure that was done to the patient was a surgical procedure to remove the foreign body in the patient's eye. The patient was placed under general anaesthesia and for an operation that is performed under this aesthetic, nurses are required to give crucial care to patients.

However, there were four diagnostic tests performed to the patient during his admission to the emergency room: the Snellen's Visual Acuity test, Swinging Flashlight test, external and internal eye exam and the Computerized Tomography scan.

The first test, the Snellen's Visual Acuity test, was done to assess the distant vision of the patient (Crisp & Taylor, 2008). The normal visual acuity measurement for a person is 20/20 and the higher the denominator of the result, the poorer the client's vision (Crisp & Taylor, 2008). The client had a 20/40 visual acuity result for his right eye. This means that the client, standing 20 feet away from the Snellen chart, could read a line that a person with normal vision could read at 40 feet away with his right eye (Crisp & Taylor, 2008). However, the patient had no light perception when reading using his left eye.

The second test performed was the Swinging Flashlight test. This test measures both the patient's pupils for size, shape, equality, accommodation and reaction to light (Crisp & Taylor, 2008). The examination of the right pupil revealed it was round, reactive to light, and accommodation (Crisp & Taylor, 2008). The left eye however, was difficult to examine due to the presence of blood in the anterior chamber.

External and internal eye exams were done to the patient's eyes (Crisp & Taylor, 2008). The patient was asked to look directly into the nurse's face so his external eye structures were examined and it revealed that he had normal eye lids without bruising but there was mild subconjunctival haemorrhage, mild conjunctival chemosis, and an irregular linear laceration extending from seven to one o'clock (Crisp & Taylor, 2008). The internal examination was done with an ophthalmoscope to inspect the inner structures of the left eye (Crisp & Taylor, 2008). It revealed the left eye's iris had prolapsed through the corneal laceration and hyphema. There was presence of necrotic iris tissue and blood that obscured the visualization of the lens. On the other hand, the external and internal examination of the anterior and exterior parts of the patient's right eye showed that it was normal and was free of signs of trauma.

The last diagnostic test done to the patient was a Computerized Tomography or CT scan of the patient's eyes. This is special procedure performed to the eye to determine eye abnormalities such as foreign bodies (Funnel, Koutoukidis, & Lawrence, 2004). Indeed, the results of the scan to the patient showed a small round foreign body present at the level of the patient's left iris plane.

### Nursing Management

For care for the paediatric patient with eye trauma, nurses must always remember to maintain safe and calm environment for the patient by providing adequate room lighting, a description of layout of room to the patient, keeping furniture and belongings in the same place, and keeping doors fully open or closed and never leaving them partly opened or closed (Funnel, Koutoukidis, & Lawrence, 2004).

Nurses must never forget to obtain an informed consent to the parents or legal guardian of the patient whenever medical or diagnostic procedures will be performed to the client (Funnel, Koutoukidis, & Lawrence, 2004).

When giving eye examinations and eye care to the patient, nurses must always: maintain aseptic technique, explain the procedures to the client, ensure that client is sitting or lying with their head well supported, maintain adequate lighting but never allow the lights to be shined directly to client's eyes, avoid sudden movements, use gentle unhurried movements and avoid from exerting pressure on the eye and touching the cornea with fingers and equipment to prevent further eye damage (Funnel, Koutoukidis, & Lawrence, 2004).

For the management of eye pain, nurses must: administer the correct dose of analgesic prescribed to the patient, keeping eyelids closed by applying eyepads to protect from bright light, instructing the patient to move his eyes as little as possible and allowing the patient to express his pain could help the patient relieve pain (Funnel, Koutoukidis, & Lawrence, 2004).

Managing the patient after the eye operation requires the nurse to provide local eye care, apply clean eye pads, instillation of prescribed medicine drops and ointment, maintain a sterile technique when caring for the patient's eyes, advise the patient not to put pressure on the eyes by minimizing movement, coughing and sneezing (Funnel, Koutoukidis, & Lawrence, 2004).

### Recent Studies

A five year (2001-2006) study in a hospital in United Kingdom was performed to improve nurses techniques in triage, diagnosis and management of emergency eye care (Buchan et. al, 2009). The study's setting was in a hospital where nurse were given advanced training in ophthalmic nursing to treat patients in the emergency area (Buchan et. al, 2009). For the first evaluation of the five year study period, no incident of any patient having been treated and discharged by the specialist nurses returning to the department due to incorrect diagnosis or mismanagement (Buchan et. al, 2009). On the succeeding evaluation five years later, three patients were identified who returned to the department due to possible misdiagnosis or sub-optimal management (Buchan et. al, 2009). The authors suggestion for optimal results is continuing professional development and commitment to ongoing education for the specialty nurses are required (Buchan et. al, 2009). It also must be reinforced by a system of monitoring and critical incident reporting to smoothen the progress of skill maintenance and the constant learning development (Buchan et. al, 2009).

### Discharge Plans

Before patient discharge, nurses must review specific dangers in the home with the client and the family such as assesment of furniture arrangement, the maintainance of the living space the client has been familiar with (Funnell, Koutoukidis, & Lawrence, 2004).

Nurses must also discuss with the client and the family the need to seek support from external agencies (Funnell, Koutoukidis, Lawrence, 2005). These agencies include: Vision Australia which is an organization in partnership between people who are blind, sighted or have low vision (Vision Australia, 2010) and Centre for Eye Research Australia which is an institute currently performing researches for eye prostheses such as the "bionic eye" (Centre for Eye Vision Australia, 2012).

## References

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