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Case Report

The use of ultrasonography in a patient with blunt eye trauma

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Introduction

Eye trauma is the second leading cause of monocular blindness in the world[1]. Globally, more than 500 000 eye injuries occur every year and approximately 1.6 million people are blind as a result of ocular trauma[1]. Unfortunately these injuries are a major unrecognized cause of disabling ocular morbidity. They account for most eye-related hospital admissions in the world[2]. Their importance in public health cannot be underestimated as they pose a serious burden on the socio-economic status of the affected individuals and many consequently become dependent on governments' social care systems.

Serious eye trauma can result in a wide spectrum of tissue lesions of the globe, adnexa and optic nerve, ranging from relatively superficial to vision threatening[3]. The involvement of the posterior segment has been reported to occur frequently in eye injuries[4]. Unfortunately eye injuries are usually followed by swelling of the adnexa[4]. This therefore poses a serious challenge of examining the posterior segment of the eye. As a result, the use of direct ophthalmoscopy may be restricted due to associated factors of blunt eye trauma such as swelling and ecchymosis. Imaging techniques such as x-ray, computed tomography, magnetic resonance imaging and conventional ultrasonography may therefore be useful in such cases[5].

According to Miller[6], the use of imaging techniques such as ultrasonography is rapidly growing in emergency departments. Ultrasonography is a low to high frequency ultrasound technique (10-50 MHz) that permits the imaging of subsurface ocular structures in the posterior segment at microscopic resolution[7]. It is used extensively in the evaluation of both the globe and orbit for broad range of conditions, including severe ocular injuries[7]. This technique may therefore be useful for primary eye care providers such as optometrists who usually receive eye trauma cases from time to time in their different settings.

According to Puodziuviene *et al*[3], although eyes represent only 1% of the total body surface and only 0.27% of the anterior body surface, their significance to individuals and society is disproportionally higher: most information reaches humans through vision. Therefore, those affected often have to face loss of career opportunities, major lifestyle changes, and occasionally, permanent physical disfigurement. In view of these effects of eye trauma and the importance of ultrasonography in the examination of the posterior segment, especially in blunt eye trauma cases, we present a typical case from Mamelodi Hospital for educational purposes.

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Case Report

A 52-year-old male presented at the Mamelodi Hospital Eye Clinic with an eye injury, the patient was seen by both authors. The patient was attacked and injured in the left eye by unknown persons in his community. The patient presented with a swollen left eye that could not open following the injury incurred during the attack. He also complained of severe pain in the same eye. Means to determine the visual acuity (VA) of the affected eye were initiated on arrival. The VA was recorded to be No Light Perception (NLP). Since the interior of the eye could not be visualised using ordinary direct ophthalmoscopy which is conventionally used for routine examination due to eye lid closure and the blood clots around the eye, an option to utilize the ultrasound scan was presented. The scan revealed vitreous haemorrhage and blood clot formation following a choroidal rupture as shown in Figure 1.

Figure 1: Showing vitreous haemorrhage and endophthalmitis in the left eye. Visual acuity was NLP.

Further eye examinations were done and it was found that the Intraocular Pressure (IOP) in the affected eye was 46 mmHg. In the other unaffected eye, the IOP was 28 mmHg. Oral treatment for lowering the IOP was immediately initiated using Diamox (Acetazolamide) (3x daily for five days) and topical treatment using Lumigan 0.03% (Bimatoprost ophthalmic solution), once at night for five days in both eyes. Follow up examination was done after three months. The swelling in the left eye had now subsided and the vitreous haemorrhage had cleared. However, VA was still NLP in the left eye and this was largely due to corneal scarring in the affected eye. IOPs had lowered to 16 mmHg and 17 mmHg in the right and left eye respectively.

Discussion

The use of ultrasonography is widely used in ophthalmology[8] and to a lesser extent in optometry. The value of using this technique is revealed in Figure 1 where vitreous haemorrhage and the choroidal detachment were seen even when the eye was completely closed. Ultrasonography produces images of the interior of the eye in real time and its images are reliable and also give detailed information about the ocular and orbital structures[3]. According to Blaivas[9], ultrasound technology enables clinicians to evaluate the small structures of eye. Consequently, subtle processes such as retinal detachments, haemorrhages and lens displacements can be easily elicited.

Although the patient lost vision in the affected eye and was eventually diagnosed with glaucoma and put on medication, the use of ultrasonography represent a good example of how useful this equipment can be even in optometry. Ultrasonography is a reliable method in localizing choroidal and scleral rupture sites as well as radio-opaque and radio-lucent intraocular and orbital foreign bodies[3]. Where necessary the equipment is easily transportable, making it one of the most efficient and rapid means of diagnostic imaging in many different settings[3] which may include optometric private practices.

Conclusion

With modern diagnostic courses that are currently being undertaken by optometrists, it is therefore important that the use of this useful diagnostic method (ultrasonography) be fully incorporated into the curriculum. This will further place optometry in the ideal situation to operate within the confines of its scope and definition and to further meet the objectives of the primary health care system as envisaged in the proposed National Health Insurance green paper.

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