Ultrasound in Emergency Medicine

TRAUMA-INDUCED BILATERAL ECTOPIA LENTIS DIAGNOSED WITH POINT-OF-CARE ULTRASOUND

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Abstract—Background: Ocular trauma and acute loss of vision are high-yield patient presentations that may benefit from the use of bedside ultrasound to aid in the diagnosis of a variety of vision-threatening problems. Case Report: We present a case of bilateral lens dislocation in which the diagnosis of lens dislocation was missed on initial computed tomography of the orbits but detected on bedside ultrasound. Why Should an Emergency Physician Be Aware of This?: Point-of-care ultrasound can rapidly identify ocular pathology and expedite specialist consultation, and if necessary, transfer to a specialty center for further management. © 2015 Elsevier Inc.

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INTRODUCTION

Ocular trauma represents about 3% of all emergency department (ED) visits (1). Rapid diagnosis of ocular trauma can prevent further damage to the eye and expedite ophthalmology consultation, potentially preserving the vision of the injured patient. Ectopia lentis (lens dislocation) represents an even smaller percentage of ED visits. The most common cause of a dislocated lens is traumatic injury to the eye. Lens dislocation as a result of injury usually affects one eye only and results after a substantial blow to the eye. In the absence of a significant trauma or when there is ectopia lentis in both eyes, one must look for other causes, such as Marfan syndrome (2). Over the past two decades, airbag deployment has become an increasingly frequent cause of lens dislocations (3,4).

Ultrasound has been utilized for the diagnosis of ocular pathology in the ED, and is a core ultrasound application for emergency medicine as denoted in the American College of Emergency Physician’s “Emergency Ultrasound Guidelines” (5). The use of ultrasound to diagnose unilateral lens dislocation has been described in case reports (6,7). We present a unique case of bilateral traumatic lens dislocation diagnosed by point-of-care ultrasound in the ED after computed tomography (CT) of the orbit was initially read as negative.

CASE REPORT

A 64-year-old man was brought into a community ED after a physical altercation with his roommate. The patient had been assaulted multiple times in the recent months, the first incident occurring 2 months prior to arrival, and most recently, a week prior to presentation. The patient had been experiencing blurry vision in the left eye that started 2 months prior at the time of the first assault, and blurry vision in the right eye that began a week prior at the time of the latest assault. He denied any nausea, vomiting, change in mental status, or other complaints relating to head trauma. He did not have any past medical history, medications, or allergies. He had no history of ocular pathology, nor was there a family history of
hereditary conditions, including Marfan syndrome. On examination, he was alert, with healing abrasions to his forehead and bilateral lower extremities, and ecchymosis to the right ear. Bilateral periorbital ecchymoses were present in various stages of resolution.

On ocular examination, bilateral subconjunctival hemorrhages were noted. Extraocular movements were intact and pupils were equal and reactive to light. His visual acuity was visualization of hand motion only with the right eye and light perception only with the left eye. Slit lamp evaluation demonstrated no anterior chamber hyphema. His left eye intraocular pressure was 13 mm Hg, and his right eye pressure was variably measured between 30 and 62 mm Hg.

The patient had a normal head CT scan. The orbital CT scan reported “an old appearing fracture of the left orbit” with no ocular pathology identified.

As no clear etiology had been determined for his marked loss of vision, a point-of-care ocular ultrasound was performed on each eye using a Zonare Ultra with a 14-5 MHz linear transducer (Zonare, Mountain View, CA). The ultrasound demonstrated bilateral lens dislocations (Figures 1 and 2; Video 1, available online). An image of a normal eye with lens in correct position is included for comparison (Figure 3). Review of CT images with the radiologist subsequently confirmed bilateral lens dislocations (Figures 1 and 2; Video 1, available online). The ultrasound demonstrated bilateral lens dislocations (Figures 1 and 2; Video 1, available online).

Figure 1. Right ocular ultrasound. In this longitudinal image of the right eye, the operator applied a generous amount of ultrasound gel to the closed eyelid. The posterior segment of a normal eye is anechoic (black). The dislocated lens is the oval structure with the hyperechoic rim seen at the 4 o’clock position, indicated by the arrow.

Figure 2. Left ocular ultrasound. In this longitudinal image of the left eye, the posterior segment has hyperechoic densities in the vitreous, with linear white bands representing retinal and vitreal detachment. The dislocated lens is the anechoic oval structure with the hyperechoic rim seen at the 7 o’clock position, indicated by the arrow.

Figure 3. Normal ocular ultrasound for comparison (not of our patient), demonstrating a normal location of the lens, indicated by the arrow.

Figure 4. Orbital computed tomography (CT) scan. In this axial CT image of the orbits, the hyperdense dislocated lenses can be seen dependently in the posterior globes bilaterally.

Figure 5. Orbital computed tomography (CT) scan. In this axial CT image of the orbits, the hyperdense dislocated lenses can be seen dependently in the posterior globes bilaterally.
evaluation and social work intervention. We assume that the two lens dislocations happened as the result of two separate injuries, given the duration of visual symptoms in each eye.

**DISCUSSION**

Ocular trauma and acute vision loss are high-yield indications for the use of point-of-care ocular ultrasound. Blaivas et al. described the use of ocular ultrasound in a series of 61 patients meeting these indications, in which 26 patients were found to have intraocular pathology including retinal detachment, lens dislocation, and vitreous hemorrhage and detachment (8).

The most common cause of a subluxed or dislocated lens is injury to the eye. This can disrupt some of the zonule fibers in the eye that hold the lens in place (9). Blunt trauma to the eye can result in equatorial deformation of the globe, which leads to increased stress on the zonular fibers and potential disruption (10). The lens can subluxate anteriorly or posteriorly while remaining partially attached, or can be completely dislocated. Trauma-induced lens subluxation and dislocation typically affects only one eye and results after a substantial blow to the eye. A dislocated lens presents with vision loss, whereas lens subluxation can present with monocular diplopia. An anterior dislocation can obstruct the outflow of aqueous humor, leading to acute angle closure glaucoma. Treatment ranges from observation to operative therapy, and is dictated by the location of the dislocated lens and any associated eye injury (11).

Point-of-care ultrasound has become an accurate, inexpensive, rapid, and noninvasive method to evaluate the eye for lens dislocation, foreign bodies, and retinal detachment in patients presenting to the ED with ocular trauma or acute loss of vision (12). Lens dislocation is a relatively straightforward diagnosis with the use of point-of-care ultrasound.

**WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?**

The diagnosis of lens dislocation in this case was initially missed on CT. Ultrasound can expedite the diagnosis of lens dislocation in the patient with ocular trauma and loss of vision, shortening the time to ophthalmology consultation and definitive treatment, potentially preserving the patient’s vision.

**SUPPLEMENTARY DATA**

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jemermed.2015.01.004.

**REFERENCES**