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Ultrasound in Emergency Medicine

RETINAL DETACHMENT DUE TO FACIAL GUNSHOT WOUND: THE UTILITY OF ULTRASONOGRAPHY IN A MEDICALLY AUSTERE ENVIRONMENT

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☐ **Abstract—Background: Retinal detachment is one complication of ocular trauma. Retinal detachments resulting from gunshot wounds are typically associated with significant facial trauma, orbital trauma, or globe penetration. Ultrasonography has been shown to be of diagnostic utility in the evaluation of retinal detachments. Objectives: In this case, an atypical mechanism for retinal detachment is described. The aim is to describe the successful use of ultrasound as an aid for accurate diagnosis and disposition of a retinal detachment in practice environments with limited medical resources. Case Report: We present a case of a low-velocity gunshot wound resulting in retinal detachment from pressure wave forces. A 21-year-old patient sustained a facial gunshot wound injury from a ricocheting AK-47 round, resulting in a closed globe retinal detachment. Portable ultrasonography was utilized as an accurate diagnostic modality in the management and disposition of this patient, allowing prompt confirmation of the diagnosis in a medically austere environment. Conclusion: Ultrasonography can be a valuable diagnostic tool in the evaluation of ocular trauma in medically austere environments. Published by Elsevier Inc.**

☐ **Keywords—retinal detachment; gunshot wound; orbital trauma; ultrasonography; ocular injury**

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INTRODUCTION

Trauma accounts for 10% of retinal detachments in the general population (1,2). Although symptoms can be of immediate or insidious onset, recognition of the diagnosis is paramount for the emergency physician (3). A traumatic retinal detachment is considered an ocular emergency that requires emergent specialty consultation for definitive management. In settings where ophthalmologic consultation is not readily available, the challenge to the emergency physician is even more apparent, as decisions regarding disposition are frequently made with limited diagnostic information. A shock trauma platoon (STP) is a small mobile emergency medical unit with limited laboratory, radiographic, and ancillary testing capability. This case was encountered at an STP in Fallujah, Iraq during Operation Iraqi Freedom.

CASE REPORT

A 21-year-old male Iraqi police officer presented to the STP 5 days after sustaining a gunshot wound, due to accidental fire, from an AK-47 rifle. By history, the bullet initially projected through the abdomen of a bystander, ricocheted off the ground, and then entered the face of the victim, just inferior to the right medial canthus. On the day of injury, the patient presented to a local physician. A lower lid laceration was repaired and the patient received a dose of dexamethasone, ciprofloxacin eye

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drops, and cephalexin oral antibiotic therapy. He presented to the STP with a chief complaint of partial vision loss in the right eye that was persistent and unchanged since the time of injury.

On physical examination, a repaired skin laceration inferior to the medial canthus was noted. Visual acuity was intact to finger counting only in the right eye. Significant lateral vision loss was present in the right eye. His globe was intact with no external ocular injuries identified on visual inspection. Pupillary examination demonstrated equally reactive pupils with a sluggish afferent pupillary response on the right. Extraocular movements were intact in all planes. Fundoscopic examination was not recorded as it was limited due to the inability to dilate the pupil with available resources. The remainder of the physical examination was unremarkable.

Given limited radiographic capabilities, a plain film skull series was obtained, which revealed a projectile round lodged in the right ethmoid sinus (Figures 1, 2). A portable ultrasound was available and ocular ultrasound demonstrated a large inferoposterior retinal detachment (Figure 3), confirming the diagnosis. The patient was evacuated to the nearest Combat Support Hospital, where ophthalmologic consultation was available. Due to delay in presentation and the extent of the detachment, no additional therapeutic options were available to repair vision loss.

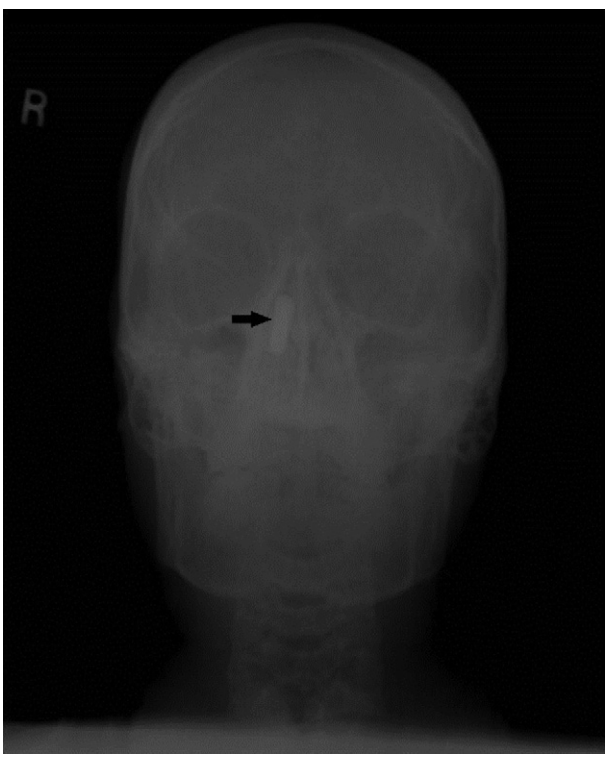

Figure 1. Anterior-posterior view radiograph demonstrating an AK-47 projectile round lodged in the ethmoid sinus.

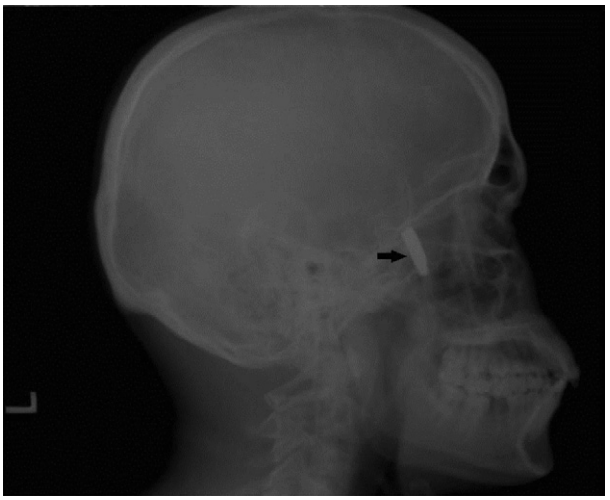

Figure 2. Lateral view radiograph demonstrating an AK-47 projectile round lodged in the ethmoid sinus.

DISCUSSION

Traumatic retinal detachments occur by a variety of mechanisms. In open globe injuries, the retina may be avulsed directly by a penetrating force. In addition, detachments frequently occur after a delayed fibrovascular healing response to the open globe. In these cases, the resultant fibrovascular membrane contracts, resulting in traction, and a subsequent detachment as the retinal pulls away from the choroid. Retinal detachments in closed globe injury may occur after a direct contusion. The contacting force transmits through the globe, resulting in immediate impact dehiscence of the retina. Detachments can also occur indirectly when blunt force transmits as a shearing force absorbed by the globe. This leads to separation of vitreous gel, predisposing to an ensuing retinal detachment (1).

The majority of traumatic retinal detachments are characterized by an "insidious progression of the

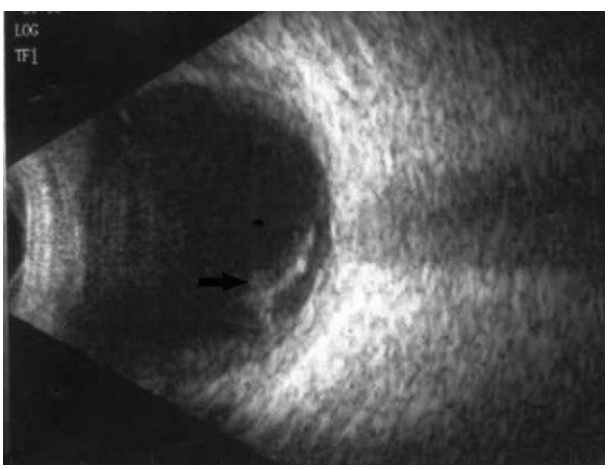

Figure 3. Inferoposterior retinal detachment demonstrated by portable ocular ultrasonography.