Trauma Case Reports 26 (2020) 100295

Contents lists available at ScienceDirect

Trauma Case Reports

journal homepage: www.elsevier.com/locate/tcr

Case Report

Acute subdural hematoma in an elite-level rugby union player☆

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ARTICLE INFO

Keywords:
Acute subdural hematoma
Head trauma
Rugby
Athletes

ABSTRACT

Acute subdural hematoma is a rare but potentially fatal medical condition in athletes. This condition has been reported in both contact and non-contact sports. Patients who survive an acute subdural hematoma typically have lifelong deficits and require extensive rehabilitation. Prompt recognition of this condition and access to a hospital with an available neurosurgeon is critical. To our knowledge, this is the first report of a subdural hematoma in an elite-level rugby player.

Introduction

Intracranial hemorrhage is a rare but potentially devastating condition affecting athletes. Although injuries to the upper and lower extremities are most common in sports, head injuries can have devastating neurological consequences and are potentially fatal. Subdural hematomas develop over hours and days following impact and are a leading cause of death and morbidity in athletes [1]. Mortality rates have been reported as high as 90% when not recognized and treated promptly [2].

We present a rare case of subdural hematoma in a 27 year-old elite-level rugby union player who underwent emergent neurosurgical intervention, ultimately leading to full recovery. Prompt recognition of head injuries is vital to prevent devastating outcomes. Orthopaedic surgeons are often the senior medical provider during athletic events and should be aware of the signs of subdural hematoma to ensure prompt recognition and transport in the event of head trauma.

Case report

A 27-year-old elite-level rugby union player was participating in an international test match and sustained a blow to his head from another player's knee. There was no loss of consciousness or memory loss, although immediately after impact the patient reported feeling confused, which resolved over several seconds. He continued playing for an additional 15 min before alerting the head team physician (MRS) and match day doctor (JSA) about vision changes in his right eye and stating his left leg was “not responding properly”. Upon sideline evaluation, his neurologic exam was normal despite the patient's subjective complaints. However, his complaint of neurological deficits prompted immediate application of a cervical collar and transport to the nearest Level 1 trauma center for further evaluation. The decision for transport was based on his subjective neurological symptoms after a direct blow to the head, despite a normal examination.

☆ No funding was obtained for this project.

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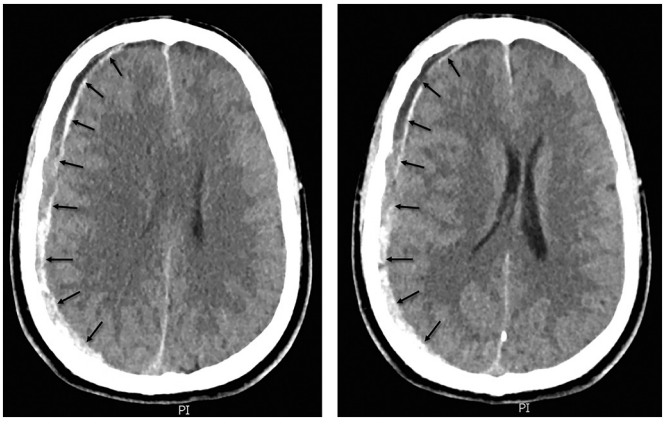
https://doi.org/10.1016/j.tcr.2020.100295
Accepted 19 February 2020
Available online 05 March 2020



Figs. 1 & 2. Pre-operative imaging of our patient upon presentation showing a crescent-shaped extra-axial fluid collection. There is approximately 10 mm of midline shift, cerebral swelling, and effacement of the lateral ventricles.

Upon arrival to the emergency department the player was hemodynamically stable with a Glasgow Coma Scale (GCS) of 15. No other injuries were identified. His medical history included three documented head concussions that all responded to conservative measures with no prolonged symptoms, he had no other known head trauma. Additional history was relevant for minor musculoskeletal trauma, including an acromioclavicular separation, but no other medical conditions or co-morbidities. On exam, the player could accurately recall the event. The neurological motor exam was unremarkable in all four extremities, including his left lower extremity. He had intact sensation to light touch in his upper and lower extremities. Pupils were equal, round, and reactive to light. Extraocular movements and cranial nerves II-XII were intact.

Emergent CT scan without contrast identified a crescent shaped extra-axial fluid collection consistent with a subdural hematoma and 10 mm midline shift (Figs. 1 & 2). The posterior and temporal horn of the right ventricle were nearly completely effaced. The posterior aspect of the hematoma was hyperdense, consistent with an acute bleed, while the anterior half appeared isodense with the cerebral cortex. The heterogeneous density likely represents unclotted blood anteriorly, but could also reflect acute on chronic bleeding or cerebrospinal fluid extravasation into the subarachnoid space due to an arachnoid laceration. There were no additional lesions noted. The hospital's neurosurgeon was immediately contacted and the player underwent an emergent right frontoparietal craniotomy and hematoma evacuation. The patient's rehabilitation course included inpatient and outpatient physical therapy, ultimately making a full recovery without any neurological or cognitive deficits. He subsequently retired from competitive rugby and has become a coach for a professional rugby club.

Discussion

Rugby is one of the most popular sports globally and is gaining popularity in the United States. ASDH are rare in athletics, however they can lead to long term disability or death if not promptly recognized and treated. Subdural hematomas are the most common intracranial hemorrhage in American football, while epidural hematomas are reportedly more frequent in un-helmeted sports [3]. Significant disability can result despite early recognition and expedited evacuation. In a review of brain injury-related fatalities in American football from 1945 to 1990, ASDH was associated with 429 of 497 (86%) of deaths [1]. In addition to American football, ASDH has been identified as a leading cause of morbidity and mortality in other sports prone to head injury such as judo, boxing, and snowboarding [4].

Cantu [5] reviewed four types of intracranial hemorrhage that should be considered when evaluating an athlete after head trauma. The four types are epidural, subdural, intracerebral, and intracranial. All may be fatal and should prompt a thorough assessment and follow-up. Patient's with an epidural hematoma may experience a lucid interval prior to progressive deterioration due to the rapidly expanding hematoma after injury to the middle meningeal artery. Intracerebral hematomas usually arise from a torn artery and are typically not associated with a lucid interval. Death from intracerebral bleeding may occur before the athlete arrives at the hospital. Intracranial hemorrhaging is subarachnoid and is the result of injury to vessels on the brain surface. This type of hemorrhage can typically be treated conservatively without surgery unless a vascular anomaly is present.

Studies of injury patterns in rugby union players have demonstrated that head and neck injuries represent 12% to 33% of all injuries, second to lower limb injuries which account for 41 to 55% of injuries followed by injuries of the upper limb (15–24%) [6–8]. Despite the high incidence of injuries affecting the head, actual intracranial injuries such as concussion and intracranial bleeding has been reported as being much lower. In a study encompassing 91 matches, Bathgate et al. [8] reported the head as the most commonly injured region, accounting for 25% (36 of 143) of injuries. Brooks et al. [7] recorded only 3 concussions out of 145 total injuries over 63 weeks in a prospective study of the 2003 England Rugby World Cup squad. These studies reflect the relatively low incidence of intracranial injuries. Therefore, training coaches, staff, and athletes to recognize concerning signs and symptoms should remain a priority for any athletic program with a goal to achieve the best possible recovery from these potentially devastating injuries.

Symptoms that should raise concern for acute subdural hematoma include loss of consciousness, headache, confusion, vomiting,

dizziness, and convulsive seizures [4,9]. Focal signs may occur, but clinical manifestations are most often nonlocalizing and present as slowly progressive neurologic deterioration, typically beginning within 48 h of injury [10]. These neurological signs result from pressure exerted on the brain. In the absence of significant brain injury, symptoms may develop over days or weeks due to a slowly enlarging hematoma [5]. CT scan should be obtained if a headache persists after head trauma [4]. Due to the often non-focal exam findings early in the course of ASDH, it is paramount to listen to the athlete's symptomatology and consider advanced imaging if worrisome signs are exhibited.

Conclusion

We present a rare case of subdural hematoma in a 27 year-old elite-level rugby union player who underwent emergent neurosurgical intervention followed by a full recovery. Prompt recognition of head injuries is vital to prevent devastating outcomes. We recommend team medical staff remain vigilant for signs and symptoms and develop a plan that includes expedient transport to a medical facility with neurosurgical support, regardless of the level of competition. History and subjective symptoms should be carefully assessed and transport should be considered even in the absence of concerning physical exam findings.

Disclosure

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of Defense or the US Government.

CRediT authorship contribution statement

Taylor J. Bates:Writing - original draft, Conceptualization, Investigation.**Paul Lee**:Writing - original draft, Investigation.**Tayt M. Ellison**:Writing - review & editing.**Jason S. Ahuero**:Writing - review & editing.**Matthew R. Schmitz**:Conceptualization, Investigation, Writing - review & editing, Supervision.

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