Simultaneous Traumatic Brain Injuries During Soccer

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Serious head injuries are common in contact sports. Powell and Barber-Foss reported that of 23,566 injuries in sports over a 3-year period, 5.5% were mild traumatic brain injuries (TBIs). Although TBI accounts for a small percentage of all injuries, brain injuries are the leading cause of sport-related fatalities. Once a head injury occurs, signs and symptoms of TBI might not initially be present. If the athlete resumes play while still symptomatic from that injury, a second blow can produce a condition called second-impact syndrome, which could potentially be fatal.

**Mechanism**

In this case, two TBIs occurred simultaneously. During a high school soccer game, two players on opposing teams went up for a ball and collided skull to skull. Patient 1 appeared to have severe head trauma, but Patient 2 reported being fine and appeared lucid.

**Patient 1 History**

Patient 1 was a 71.8-kg, 174-cm-tall 15-year-old who reported no previous history of head injury. After colliding with the other athlete, he remained standing and was noticeably disoriented. He initially scored 12 of 15 on the Glasgow Coma Scale (GCS). The certified athletic trainer (ATC) on-site helped him to a supine position and stabilized his head. The patient was dis-oriented and making incompressible sounds. He had a large mass on the left side of his head just lateral to the brow line. The ATC called emergency medical services and assessed cranial nerves, dermatomes, and myotomes. All appeared to be within normal limits, and the patient now appeared to be lucid. Baseline vital signs were within normal limits, but the patient’s pupils were dilated and the left one constricted more slowly. His blood pressure was approximately 140/76 mmHg 5 min after the injury and pulse was 104 bpm. His GCS score was now 15. The ambulance arrived in approximately 10 min, and the patient was placed on a spinal board and transported without complication to a primary medical facility.

A computed tomography (CT) scan revealed a 10-mm left frontal-parietal hematoma and a small cerebral contusion (Figure 1). The patient was monitored in the hospital for 2 days and released. One week postinjury, a second CT scan showed no change. The patient was instructed to avoid all physical activity. Five weeks postinjury, he underwent a third CT scan, at which time the hemorrhage was no longer evident, and he was released to unrestricted activity.

**Patient 2 History**

Patient 2 was a 68.2-kg, 168.9-cm-tall 17-year-old who fell to the ground after his collision with Patient 1. He had an approximately 6-mm cut over his right frontal bone but appeared alert and oriented. He walked
unaided to the sideline and put ice on his forehead. The ATC assisted Patient 1 because Patient 2’s injury appeared to be less serious. Approximately 25 min after Patient 1 was prepared for transport, the paramedic on the ambulance team assessed Patient 2 for signs of head trauma and instructed him to go to the hospital if his headache persisted. The ATC further assessed the patient and found vital signs and cranial-nerve function within normal limits. No cerebrospinal fluid or blood was observed from the ears or nose, but photophobia, exquisite scalp tenderness on palpation, and headache were present and the patient described feeling emotional for no apparent reason. The ATC advised his parents to take him to the emergency room, which they did.

A CT scan indicated a skull fracture to the frontal bone and an associated epidural hematoma approximately 12 mm in diameter (Figure 2). The patient was then transported to a major medical facility, where he was monitored for 2 days and then released.

One week postinjury, a second CT scan indicated that the fracture and hematoma remained, but physical exam revealed no other signs or symptoms of TBI. The physician’s orders allowed only light exercise, with no sprinting or weight training until another exam in 1 month. The patient was also instructed to cease physical activity if he had any dizziness or nausea. He lightly jogged 2–5 miles 6 days a week without complication. Five weeks postinjury, a third CT scan still showed a fracture but no hematoma. The patient was released to full participation with no restrictions. He participated for the rest of the season with no complications. Both patients have remained asymptomatic and are active in indoor and outdoor soccer. Figure 3 and Table 1 show the events and symptoms as they occurred.

**Discussion**

The incidence of brain injury in sport has been investigated. Although TBI in soccer is not as frequent as in football or in hockey, brain injuries account for 4–22% of all soccer injuries. Boden et al. found that 28% of concussions in soccer result from contact with an opponent’s head.

In soccer, there are no upper extremity pads or protective headgear, so upper body collisions can be extremely dangerous. ATCs and other members of the sports-medicine team, including administrators, coaches, and players, must be aware that brain injuries