[Editorial]

Concussion Dilemma

Concussion in contact sports continues to weigh heavy on the minds of sports medicine clinicians, parents, and players. With an estimated annual occurrence of between 1.6 and 3.8 million sports concussions,[9] this is a daunting athletic and public health issue. The emergence of chronic traumatic encephalopathy (CTE)[1] as a known clinical entity has brought this issue to the public limelight. People are aware of brain deterioration seen in former National Football League (NFL) players. Until we have definitive answers about the cause of this pathology, concussion fears will continue to influence many parental decisions for athletes. No doubt parents are steering many youngsters away from football toward other sports because of concussion worries, and understandably so!

As for the game of football itself, there is an increased awareness of brain trauma and its consequences at all levels of competition. At the most visible level—the NFL—neurologic specialists have been mandated on the sidelines at every game to help team physicians make appropriate decisions and accurate diagnoses with injured players. This is not an easy road though; the game is dependent on violent physical contact, and injuries are part of the game. It is no secret that many players expect injuries and many will do all they can to stay in the game by ignoring or hiding these injuries. Players know that many others would like to take their positions on the roster, so they often feel that they must not succumb to injury. If you are a star player, you are a little safer taking some time off with an injury. Unfortunately, if you are a marginal player that can be replaced a lot easier, the pressure to stay in the game and deny symptoms can be substantial. To help with this issue, the NFL now positions trained personnel in the press box at every game to help identify those who may be injured but not detected by team physicians, coaches, or referees. These personnel additions on the sidelines and in the press box are just part of the NFL's effort to identify and treat concussions properly.

Alongside these personnel additions, there have been rule changes to help protect players. At the professional and college levels, there is a definite attempt to minimize hits to the head, especially head-to-head impact. These incidents are now met with personal foul penalties, and at the college level, players can be expelled from the game and held out of future games if the violation is flagrant and thought to be targeting another player.[7] Unfortunately, the interpretation of these infractions is subjective and thus subject to interpretations by referees. Although imperfect, these are all attempts to protect players.

Without drastically altering the nature of football, concussions cannot be totally eliminated. That being said, when concussions do occur, there are a few safe, general guidelines for the player, although much more research is needed to define best practices, especially if symptoms do not abate after a week or 2. Aside from the very serious injuries where players are rendered unconscious for an extended period of time or show signs of neurologic impairment requiring acute medical evaluation in an emergency department, most concussions benefit from initial physical and mental rest.[14] While there is very little argument with this approach in the first week or 2, it is not known how long this approach is appropriate with the symptomatic patient. In fact, several recent publications are now questioning this approach after the first week or 2 and suggest that light to moderate physical activity may be a benefit for those who are slow to recover.[14] In fact, the best evidence appears to suggest that complete rest exceeding 3 days is probably not helpful and may be harmful.[16]

During the initial concussion phase when symptoms may be most bothersome, especially in the pediatric populations that do not tolerate symptoms well, pharmacologic adjuvants are often sought. A current review evaluating studies of acetaminophen, nonsteroidal anti-inflammatory agents, melatonin, tricyclic antidepressants, amantadine, and stimulants concluded that there was insufficient evidence to support any of these in the treatment of concussion symptoms.[8] Furthermore, there are no Food and Drug Administration–approved medications for the treatment of concussions, suggesting how little is known in this area of pharmacology.

Because very little is known about best practices for the treatment of concussions, most patients rely on the recommendations of their physicians. Hopefully, these decisions are guided by clinical experience and deserved caution. The perspective of those evaluating concussions is important to examine. In another recent publication,[13] a survey of 572 physicians showed that they recommend physical rest (97.4%) and cognitive rest (93.8%) initially. The majority felt that the risk of second impact syndrome[2] existed until the symptoms resolved. When symptoms persisted past 1 month, most physicians (61.9%) felt that neuroimaging was indicated.[13]

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After symptoms resolve and the concussed athlete begins to resume activity, the obvious questions about future risk begin to arise. Most difficult are the questions regarding contact sports like football, where head trauma can be expected. Some of the greatest fears are tied to the unfortunate occurrence of CTE in deceased NFL players and boxers.[1,4,6] These postmortem pathologic findings have been blamed for many premortem problems, such as depression, bizarre behavior, and suicide.[10,12] However, the definitive causal link between head trauma and CTE is not known. No doubt there are countless football players who have suffered concussions and not demonstrated deteriorating premorbid behavior problems. On the other hand, almost none of these brains has been examined for the postmortem findings that are classic signs of CTE.[11] Clearly, some of the grid iron heroes of the past have suffered from mental deterioration, but that is also widespread in the general population as people advance in age.[5,17-19] One of the most comprehensive evaluations of living former NFL players has shown that they are probably not much different than the general population.[3] While this report has to be considered preliminary because only 45 players were examined, we would do well to continue to follow that group since they were relatively young (age range, 30-60 years). It was a heartening report compared with all the dire descriptions published on the consequences of head trauma in football.

So where do the future advancements in concussion medicine lie? Any time spent in the clinical or research areas of concussion clearly demonstrates the need for better disease markers to identify those at risk, monitor injured individuals with appropriate management of comorbidities, and hopefully intervene in one way or another to alter the course of mental deterioration. Regrettably, from a neuroimaging standpoint, we do not yet have that disease marker. As the review by Shetty et al[15] points out, CTE cannot be diagnosed with current imaging techniques. The only way to diagnose CTE currently is by postmortem autopsy.

While the research efforts continue, caution and prevention should be the guiding principles to head trauma in contact sports. Hopefully, we'll have more answers soon!

—Edward M. Wojtys, MD
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