Essentials of Sports Injury Prevention & Rehabilitation

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Lecture – 18

Management of Sports Concussion

Good morning ladies and gentlemen, welcome to lecture 4 of week 4, of course on Sports Injury Prevention and Rehabilitation. In the last lecture, we discussed sports concussion; however, we could not cover a very important topic, that is the management of sports concussion, which we will be covering in this lecture today. I will be covering this topic under the following headlines: On field management, sideline assessment, urgent referrals, neuropsychological assessment charts and techniques, CRT 6, return to play and conclusion.

Management: If you suspect a concussion, please remove the player from the playing environment, and with cervical spine precautions, please get him evaluated and take him to the medical room. If the diagnosis of concussion is obvious, that means,there is loss of consciousness, confusion, the patient should be medically assessed, and must be monitored regularly for signs of deterioration or other warning signs of brain injury. If the diagnosis is uncertain, a standard protocol for assessment should be followed. When in doubt, assume that the worst disorder, you will never go wrong. Any player with symptoms of loss of consciousness, balance disturbance, disorientation or cognitive deficit should be considered to have a concussive injury. Once you medically diagnose a concussion, the player should be removed from the game, and should not return to play on that day, or any other day, till medical clearance is given.

At the sidelines, what can you do? You can do three things. Assess the mental status of the athlete: Is the athlete oriented to person, place or time? Assess the mental control of the athlete: Ask the athlete to repeat short digit strings forward and backward, count forward and backward, and to recite the months forward and backward. Assess the memory: Ask the athlete to recall three words after a few minutes interval; test call of details of the game or prominent, current news events. Do a brief neurological examination: Detect asymmetry of sensory and motor function and balance. He is should be having balance and other equal on both sides. Visual field are tests by finger or hand movement with the subject facing the examiner are compared with the examiner's visual fields. Having the athlete extend the arms forwards with eyes closed assesses the joint senses and arm strength. Balance and lower limb strength and sensation may be evaluated by having the athlete hop a few times on either foot.

Some conditions, you will pick up the athlete and run to the hospital. These are the conditions that need urgent referral. Any player who has, or develops the following: A fracture of the skull, penetrating skull trauma, deterioration in conscious state after the injury, focal neurological signs, confusion or impairment of consciousness more than 30 minutes, loss of consciousness for more than 5 minutes, persistent vomiting or increasing headache post injury, any convulsive movements, more than one episode off concussive injury in match or training session, if you cannot assess the patient properly, if the patient is intoxicated, or you cannot assess, or he is a child. All children with head injury, please refer. High risk patients of hemophilia, anticoagulant use etc. If there is nobody to supervise the patient after the injury, please refer. Any high risk injury mechanisms, that is high velocity impacts and missile injury. Please refer such patients.

Neuroimaging: CT or MRI is always done for patient with persistent symptoms: if the have focal deficits, seizures, or persistent clinical or cognitive symptoms. CT scans are excellent for detecting structural lesions in acute head injury, like hematomas, bleeds etc. You can pick it up very well in a CT. MR imagine can pick up smaller bleeds. Large bleeds, you can pick up by CT scans, and smaller bleeds by MRI. MRI will also pick up rare effects of trauma, like subdural hematoma, cerebral atrophy or infracts. If you want ot pickup more detail in brain matter, you do a MRI, if you want to pickup bigger details, you do a CT scan. The advantage is, CT scan is much quicker than MRI, and CT scan is much shorter in procedure time.

Next, we come to something called, neuropsychological assessments. These are something, wherein, you use these tools to check whether the person or patient has got a concussion or not. SCAT 6/CRT 6 (Sports Concussion Assessment Tool/Concussion Recognition Tool). SCAT 6 is used by medical personnel, and CRT 6 is used by non-medical personnel. We will be discussing CRT 6 in a bit more detail. There are several other tools which are available. But, the most commonly used are SCAT 6 and CRT 6. Certain specialized conditions may warrant the use of these other specialized tools, but generally, you can do very well with SCAT 6 or CRT 6.

Concussion Recognition Tool 6: It provides a recognize and remove tool for the layperson. You use this tool, any of the questions are positive, it is very easy to take a decision that he has got a concussion, and he has to be removed from the field of play. It helps to identify suspected sports related concussion at all ages and levels of activity. Can be used across a broad range of athletes across different sports, not sport specific, can be sued for para athletes, can be used for patients with different cultural, linguistic and educational backgrounds. It is designed to be very simple, and it is a multilingual tool. Even if it is not available in the multilingual fashion, you can use a translator to get through your patients. The CRT 6 was designed to be easy to use, and was written and intended for the general audience with no clinical training. Generally, a layperson with use the CRT and a medical personnel will use the SCAT.

So, how does it look like? When you look at the CRT 6, first thing you will see is something called a red flag, or Call an Ambulance. If any of the following sings are observed, or complaints are reported after an impact to the head or body, the athlete should be immediately removed from the play/game/activity and transported for urgent medical care by a healthcare professional. What are these signs? Neck pain or tenderness, seizure, fits or convulsions. Loss of vision, or double vision. Loss of consciousness. Increased confusion or deteriorating conscious state, that means he is becoming less responsive and more drowsy. Weakness or numbness/tingling in more than one arm or leg. Repeated vomiting. Severe or increasing headache. Increasingly restless, agitated or combative. Visible deformity of the skull. If you see any of these signs while administering the CRT, make sure you call an Ambulance and transfer the patient to a hospital.

Next, we will look for visible clues for suspected concussion. They are: Loss consciousness or responsiveness, lying motionless on the playing field. Falling unprotected to the playing surface. Disorientation or confusion, staring or limited responsiveness, or an inability to respond appropriately to questions. Dazed, blank or vacant look. Seizures, fits or convulsions. Slow to get up after a direct or indirect hit ot the head. Unsteady on feet/balance problems or falling over/poor coordination/wobbly gait. Facial injury. If you find any of these, you can be sure that the person has got a concussion.

Step2: Symptoms: Look for these symptoms: Physical symptoms like headache, pressure in the head, balance problems, nausea or vomiting, drowsiness, dizziness, blurred vision, more sensitive to light, more sensitive to noise, fatigue or low energy, don't feel right in any manner, neck pain. Change in emotions, such as more emotional, more irritable, sadness, nervous or anxious. Change in thinking, difficulty concentrating, difficulty remembering, feeling slowed down, feeling like in a fog. Please remember symptoms may develop over minutes or hours following a head injury. Step 3, awareness.

You can modify each question appropriately for each sport and age of the athlete. If you, if the athlete is unable to answer any of these questions correctly, it may suggest there is a concussion. Where are we today? What event were you doing? Who scored last in this game? What team did you play last week, last game? Did your team win the last game? So you have to tailor make your questions from immediate to a bit more recent past. Okay. So you have done all the CRT steps and the athlete is not shown any positive signs or symptoms but you still suspect that the athlete has got a concussion or there is a strong suspicion by you or by the medical team.

In that case, you may do something called exertional provocative tests. Five push-ups, five sit-ups, five knee bends and if any of these symptoms are positive, then don't do the sprint but if they are not positive, then do the 40-meter sprint. Some athletes who are at rest and they are asymptomatic at rest, even with a concussion, if you do this test, they will get headache, unsteadiness and cognitive dysfunction after the physical exertion. Why does this happen?

When you do exercise, cerebral blood flow increases, systemic blood pressure increases, and that is why these symptoms will develop when the patient does exercise.

So let us talk about return to play. The most important criteria for safe RTP is complete return of normal brain function as assessed by examination. No RTP till cognitive function is normal and all symptoms, headache, unsteadiness, cognitive dysfunction at rest and after exertion are gone. Only then will return to play be even considered. After the grade one concussion, a player can return to the contest, if after 15 minutes he or she is completely symptom-free. After a grade two concussion, the player is withdrawn from the contest, may play if well after one week after passing an exertional provocative test.

A patient with a grade three brief loss of consciousness is suspended from play for one week, but may then play if completely well at rest and after exertion. If the loss of consciousness is lasting minutes, that means grade three B, the athlete must be out for two weeks and pass the exertion test. After more than one or a series of concussions, athlete would be returned to play in the following circumstances only. Neurological examination is normal, sustained a small number of concussions over more time and severity is low and each time he has had complete recovery. The length of time to complete recovery is short. The neuropsychological evaluation shows no cognitive deficits and the CT or MRI is normal.

There are some cases in which an athlete may suffer one or a series of concussions and would never be allowed to return to play; that is in case of these symptoms: Any neurological deficits or symptoms which are persisting. Multiple concussions over a short period of time of higher severity. Recovery was prolonged over several weeks or months. Neuropsychological evaluation revealed cognitive deficits and MRI and CT showed the presence of brain lesions. If any of these are present, please advise the athlete not to return to play ever.

There is something called a graduated return to play which is a structured graduated and supervised rehabilitation model for optimal recovery and safe RTP. It has these particular steps. Initially no activity and complete rest. When you become asymptomatic, proceed to step two. Light aerobic exercises like walking or stationary cycling. Next step, sport specific training. Next step, non-contract training drills. Next step, full contract training after medical clearance.

And last, game play. Each step should take a minimum of one day. Athlete will move to the next stage only if asymptomatic at any step. If the symptoms reoccur, the athlete will drop back one step for one day. There are several risks of premature return to play. There is a risk of further injury.

There is a risk of developing convulsions. There is a risk of prolongation of the symptoms. You may develop something called chronic traumatic encephalopathy. You will definitely develop

mental health issues if you have premature return to play. There is also a syndrome called second impact syndrome. If the individual gets a second concussive blow to the head before he has recovered from the symptoms of a previous concussion, there will be loss of cerebrovascular autoregulation which causes the brain to swell up due to increased cerebral blood flow. Please note, if the individual has got a concussion, he gets a second concussion before the symptoms of the first have resolved. He will develop something called second impact syndrome. The problem with this condition is the mortality is almost 100%. That is why, we have to be very careful in returning these people to sport after a first concussion.

Prevention: Education of all the participants and general public about prevention of head injuries in sport and recreational sport is essential. Treatment and rehabilitation of major head injuries or concussion is poor. So we must emphasize on prevention. Improved education about the detection of concussion, clinical features, assessment techniques, and the principles of safe return to play are mandatory at all levels of sport, whether he is a sportsman, administrator, coach, or doctor. Prevention should be the concern of all those involved in sport.

Please teach the players about respect for the opponent and more importantly, respect for the opponent's wrong-term health. It should be part of the psychological training in competitive sport. In some sports, you may reduce the concussions by eliminating fighting or improving the safeguards or the safety mechanisms which are there in the sport. Athletes should be ambassadors and supporters of brain injury prevention programs.

Take home message: A concussion can be diagnosed and managed on field and definitely off the field. You must do a quick neurological examination and use diagnostic tools such as CRT-6. If you are in doubt, use the exertional provocative test because it causes the athlete to exert in a safe and controlled manner. And if there are hidden signs and symptoms of concussion, it can be picked up. Return to play protocol should be started only after full medical clearance.

And make sure you follow a graduated return to play protocol. There are several protocols available. Focus on prevention of head injuries and concussion rather than treatment and management. These are the references which I strongly urge you to go through. I thank you for your time, your patient listening, and your attention.

We will be glad to respond to any queries or questions or comments. Thank you so much for listening, ladies and gentlemen and Jai Hind.