Case: Pediatric Concussions: Case Reviews

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Pre-Hospital:

EMS was dispatched to a two vehicle head on motor vehicle collision at highway speeds with confirmed entrapment of bystanders and one person declared dead on scene. Unknown child care restraint. EMS found a 5 year old female laying supine on the ground unconscious (GCS 7) with an unknown extrication method; possibly police department. The patient was placed in full spinal precautions. Airway patent, placed on 100% NRB (RR 18), breathing non-labored with equal rise and fall of the chest, clear lung sounds, hemodynamically stable with sinus tachycardia (HR 102). Abdomen soft, no seat belt sign. Estimated weight 20kg. Swelling and bleeding to the back of the head-bleeding controlled. 18g IV placed with a 400cc bolus. Blood sugar 110. Equal round and reactive pupils with symmetrical facial structures. Patient transported code 3 to the local combined ACS verified level I adult and level I pediatric trauma center as a pre-hospital trauma team activation (TTA). 18 minute scene time.

ER Course:

The patient arrived hemodynamically stable; BP 150/90, HR 116, RR 24, Temp 96.4, O2 sats on 99% NRB, low GCS 6 (E1, V2, M3), and blue on the pediatric length based resuscitation tape. Trauma resuscitation as follows; 2131 arrived as a TTA. 30 second EMS trauma time out. Warming lights turned on. Primary survey with set up for RSI and second IV started. Intubated with 5.0 cuffed tube secured 15cm at teeth. OG tube placed. Secondary survey, FAST (-), CXR, PXR (-). Remained hemodynamically. To CT at 2210. At 2240, the patient was admitted to the PICU with TBI (without bleed) and pulmonary contusions. It was noted in the ED that the patient began moving all extremities and reaching for the ETT prior to ongoing sedation and transport to the PICU.

PICU Course:

In the PICU, the patient remained hemodynamically stable. She was moving all extremities when sedation was weaned but not following commands or opening her eyes. She continued on the ventilator while closely monitoring her pulmonary contusions. The patient's neurological status continued to improve. She was able to be weaned from the ventilator hospital day two and was transferred to the neurotrauma unit. She experienced ongoing balance issues. She worked with both physical and occupational therapy on a daily basis while she recovered from her significant concussion. Unfortunately, the patient experienced ongoing balance issues. She was also evaluated by the Physical Medicine and Rehabilitation (PM&R) service. They recommended outpatient neurotrauma follow-up after discharge. The patient was also evaluated and treated by child psychology due to the devastating events surrounding the motor vehicle crash. She had 2 other sibling in the car who sustained minor injuries, her mother sustained significant orthopedic injuries, and her father was deceased on scene.

Life after discharge:

The patient was discharged after spending 4 days in the hospital. She had ongoing outpatient visits with the pediatric minor neurotrauma clinic. These visits involved a multidisciplinary team approach to rehabilitation. This team consisted of physical/occupation/speech therapists, child left specialists, child psychology, neurology, PM&R, nursing, therapeutic recreation, and social work. She experienced ongoing headaches, balance issues, and mild dizziness requiring vestibular evaluation/screening. The patient continued her outpatient visits with therapies for several months while recovering from her concussion. Fortunately, the patient did return to baseline and was able to start kindergarten as scheduled.

Topic review: Pediatric Concussions

Traumatic Brain Injuries (TBIs) are the most common type of acquired brain injury. They cause a wide variety of symptoms, including damage to blood vessels, cells, and nerves in the brain. TBI symptoms range in severity based on which part of the brain is affected and the extent of the damage. There can be physical symptoms such as dizziness, trouble with balance, headaches, sensitivity to light/noise, nausea and/or vomiting. Cognitive issues can include difficulty concentrating or remembering, changes in school or work performance, feeling foggy or confused about recent events, and forgetfulness. TBIs can also have emotional effects including drowsiness, fatigue, sleeping more or less than usual, irritability, sadness, less interest in favorite activities, and even feeling more emotional than usual. [1]

The best treatment for a concussion is reducing physical and mental activity. Children seen at hospitals/clinics or their doctor's office can usually be monitored at home. School attendance and work can be to be modified with tests and projects postponed in collaboration with teachers and families. Students should be excused from gym class or recess activities to facilitate healing. Light physical exertion may be recommended to improve recovery. Any progressive worsening of concussion symptoms or changes in behavior should be immediately reported to your doctor.[2]

Recovery time from concussion is variable with each injury. Athletes who continue to play immediately after their concussion may experience a longer recovery. Given the unpredictable period for recovery, formal sports activity should be suspended until symptoms have completely resolved at rest. An athlete may feel better and want to return to play before their brain has completely recovered. A slower return to physical activity can begin once the athlete has been cleared from their provider. Athletic trainers involved in concussion monitoring can be extremely beneficial since many athletic trainers have had additional training in TBI recovery. Paying close attention to worsening symptoms (like increasing headache, nausea, or dizziness) while completing the activity progression is important. TBI/concussion related symptoms that return with exertion are a clear indicator that the concussion has not healed.[2]

Not all concussions can be prevented, but some may be avoided. Helmets should be worn for many activities (horseback, all-terrain vehicle, motorbike, bike, skateboard, or skiing/snowboarding) or contact sports (like football, hockey, or lacrosse). Helmets should fit appropriately and be in good condition. Athletes should be taught safe playing techniques and to follow the rules of the game. Most

importantly, every athlete needs to know how crucial it is to let their coach, athletic trainer, or parent know if they have hit their head or have symptoms of a head injury. Best practice is to never ignore a head injury, no matter how minor.[2]

Resources:

1. https://www.gillettechildrens.org/conditions-care/brain-injury
2. https://www.healthychildren.org/English/health-issues/injuries-emergencies/sports-injuries/Pages/Concussions.aspx; Adapted from Care of the Young Athlete Patient Education Handouts (Copyright © 2010 American Academy of Pediatrics)