

TerranearPMC Safety Share

Week of April 13, 2015 – Acute Compartment Syndrome

Last year, CNN news correspondent, Miles O'Brien experienced what one would normally consider to be a minor incident. While on assignment, he was packing his equipment on top of his vehicle when a Pelican Case fell from the top of the car and landed on his upper left arm. While the initial impact did hurt, he didn't think it was anything serious; just another bang that might cause a bruise. However, after a few days the pain did not fade and even became more intense to the point of being excruciating. So he sought medical attention.

The doctor told O'Brien he may be experiencing *acute compartment syndrome*. Acute Compartment Syndrome?! According to the National Institutes of Health, this is a condition that involves increased pressure in a muscle compartment. Muscles in the arms and legs are separated from each other by thick layers of tissue called fascia, and each fascia has space in it, called a compartment, with muscle tissue, nerves and blood vessels. When there is swelling in a compartment, pressure in that area will increase and press on the muscles, blood vessels and nerves. If the pressure is substantial, blood flow to the compartment will be blocked and can lead to permanent injury to the muscle and nerves. If the pressure lasts long enough, the muscles may die and the arm or leg will no longer function.

Symptoms of severe cases of compartment syndrome include skin paleness, numbness, tingling, decreased sensation, weakness and severe pain that continue to intensify. Patients showing these symptoms need immediate surgery, which involves making long cuts through the muscle tissue to relieve pressure. O'Brien's doctor recommended this procedure, known as a fasciotomy. After surgery, O'Brien woke up to learn that his blood pressure had dropped during the procedure. To save him, the doctor had made the decision to amputate just above the elbow.

In an interview, O'Brien expressed his feeling of devastation and how hard it was for him to reach acceptance. He never heard of Acute Compartment Syndrome and now his life was about to take a radical change due to his circumstance. Through research, he found out that he was not alone in his bout with acute compartment syndrome. As it turns out, about three-quarters of the time, this condition is caused by a broken leg or arm and develops rapidly over days and even hours. Typical symptoms include:

- A new and persistent deep ache in an arm or leg
- Pain that seems greater than expected for the severity of the injury
- Numbness, pins-and-needles, or electricity-like pain in the limb
- Swelling, tightness and bruising

Compartment syndrome can develop from the fracture itself, due to pressure from bleeding or may occur later, as a result of treatment for the fracture (such as surgery or casting). Acute compartment syndrome can also occur after injuries without bone fractures, including:

- Crush injuries
- Burns
- Overly tight bandaging
- Prolonged compression of a limb during a period of unconsciousness



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- Surgery to blood vessels of an arm or leg
- A blood clot in a blood vessel in an arm or leg
- Extremely vigorous exercise, especially eccentric movements (extension under pressure)

Aside from affecting extremities, this condition can also cause adverse reactions to the stomach, referred to as abdominal compartment syndrome and almost always develops after a severe injury, surgery, or during critical illness. Some conditions associated with abdominal compartment syndrome include:

- Trauma, especially when it results in shock
- Abdominal surgery, particularly liver transplant
- Burns
- Sepsis (an infection causing inflammation throughout the body)
- Severe ascites (fluid fills the stomach lining) or abdominal bleeding
- Pelvic fracture
- Vigorous eccentric abdominal exercises (i.e. situps on a back extension machine in weight rooms)

As the pressure in the abdominal compartment increases, the blood flow within the organs that surround the abdomen is reduced. The liver, intestines, kidneys, and other organs may be injured or permanently damaged.

Abdominal compartment syndrome treatments include life support measures like mechanical ventilation, medicines to support blood pressure (vasopressors), and kidney replacement therapies (such as dialysis). Surgery to open the abdomen in order to reduce the compartment syndrome pressures may be necessary. The best time to perform surgery in people with abdominal compartment syndrome is not often clear. Surgery for abdominal compartment syndrome may be lifesaving, but can also cause complications.

As its name implies, not only does this condition occur almost immediately after a short time period, it has a counterpart condition that takes place over an extended period, known as chronic compartment syndrome. Chronic compartment syndrome can first be treated by avoiding the activity that caused it and with stretching and physical therapy exercises. Surgery is not as urgent in chronic as with acute compartment syndrome, but it may be required to relieve pressure.

Experts say that early diagnosis and treatment are key for a good recovery. This is true for all types of incidents. Could the severity of the case of Miles O'Brien been reduced if he had considered his condition a little differently and sought immediate medical treatment? As it is said, "hindsight is always 20/20." While no one can say with 100% certainty that O'Brien's incident would have been less severe, early diagnosis is always key for better control of a medical problem. This is the main reason why professionals within the field of Occupational Safety and Health always explain the importance of reporting ALL injuries, no matter how slight. As in many instances, small scrapes can get infected, while non-treatment of knee and joint injuries can get exacerbated resulting in torn ligaments, tendons and cartilage. Through immediate attention, the severity of an accident can be controlled from permanent damage to a mere first aid case.

Wherever the art of medicine is loved, there is also a love of humanity

Hippocrates