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Compartment Syndrome

On my recent orthopedics rotation, there were times when the senior residents were in the OR all night, and I was instructed to see the consults and discuss them when the resident got a break between cases. The only exception to this was “if there is an open fracture or a compartment syndrome” I was to come find them immediately. I figured I can tell if a bone is protruding from the body or not, but not wanting to pull the resident out of a surgery, I felt I should learn some more about compartment syndrome. Here’s a summary of the most common forms in the leg and arm.

Compartment syndrome is a condition in which the **osseofascial compartment pressure rises to a level that eventually decreases perfusion**. This can **occur in any area that skeletal muscle is surrounded by fascia**. It is most commonly caused by **trauma** such as fractures but can also be caused by crush injuries, tight casts, burns, or even extravasation of IV fluids. In general, **local trauma and soft tissue destruction lead to bleeding and edema of tissue with associated increased interstitial pressures, which leads to vascular occlusion and ultimately myoneural ischemia**.

In medical school we learned about the “P’s” of compartment syndrome, but there is more to it than just listing off all of those “P’s”. **Pain out of proportion** to the clinical situation is usually the first symptom but it is important to note that this may be absent when there is nerve damage and is harder to assess in sedated patients as well as in children. On physical exam, **pain with passive stretch** is the most sensitive finding when seen before the onset of ischemia. Paresthesia/hypoesthesia and palpable swelling may also be seen. Paralysis is a late finding in the progression and if found, full recovery of the affected area is rare. Additionally, loss of peripheral pulses is a late finding, and if encountered, amputation of the extremity is usually needed at that point. With all of this information in mind, the diagnosis of compartment syndrome is made **clinically**. It should be noted, however, that compartment pressure measurements can be used to aid the diagnosis. They are especially helpful in **trauma patients, altered mental status, and if your physical exam is inconclusive**. Normal pressure within a compartment is less than 10mmHg but it is thought that pressure exceeding 30mmHg are needed to cause ischemic damage. A more commonly used measurement, delta pressure, is the difference between diastolic pressure and the measured tissue pressure. A **compartment pressure within 30 mm Hg of diastolic blood pressure is concerning for compartment syndrome**.

Initial, immediate management of these patients includes removing restrictive casts or dressings and placing the affected limb **at the level of the heart**. Definitive management requires getting our surgical colleagues involved and **surgical fasciotomy** is performed to reduce intracompartmental pressures. The wounds are general left open and further debridement and possible closure are usually performed 2-3 days later.

References:

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