

Traumatic Rhabdomyolysis / Crush Injury

Crush Injury

- Compression of extremities or other major muscle groups causing muscle swelling and/or neurological impairment.
- Physical findings are similar to the six Ps of compartment syndrome¹
- Patients may initially present with very few signs & symptoms. Have a high index of suspicion based on MOI.

Crush Syndrome

- Systemic manifestations of crush injury due to traumatic rhabdomyolysis and the release of potentially toxic cell components (ex. myoglobin) and electrolytes (ex. potassium) into the circulation. Early treatment improves survival.
- May lead to altered mental status, hypotension, lethal dysrhythmias, hyperkalemia, hypocalcemia, renal failure, or death.
- More likely with multiple crushed limbs.

¹Compartment Syndrome Signs & Symptoms:

- Pain
- Paresthesia
- Pallor
- Paralysis
- Pulselessness
- Poikilothermia (cool skin)

Routine Trauma Care including

- Apply cardiac monitor
- Give high flow oxygen

- Provide **Hemorrhage Control** as per protocol
- Consider polytrauma – look for other potential injuries

Remove rings, bracelets, or constricting items

Obtain EKG

Establish 2 large bore IVs (may insert IO in unaffected limbs)
Give **NaCl bolus** 2L IV/IO with 50mEq of **Sodium Bicarbonate** added per liter of NaCl¹

Following bolus, give **NaCl infusion** IV/IO at a rate of 500ml/hour
Provide **Traumatic Pain Management** as per protocol

Monitor for hyperkalemia:

- peaked T waves
- flattened P waves
- prolonged PR interval (>0.2 sec)
- widened QRS (>0.12 sec)
- sine wave
- ventricular fibrillation

If signs of hyperkalemia are present on EKG:

Calcium Chloride 500mg IV/IO over 2 minutes

Bolus **Sodium Bicarbonate** 100mEq IV/IO

Albuterol Sulfate 20mg nebulized

TOURNIQUETS FOR MANAGEMENT OF CRUSH

Tourniquets may delay the life-threatening complications of a reperfusion injury.

Consider tourniquet placement for crush injury before extrication if the length of entrapment exceeds 2 hours

Apply two tourniquets side by side and proximal to the injury immediately before extrication.

PEARL

Traumatic rhabdomyolysis is secondary to a mechanical force injury such as a crush injury or prolonged immobilization.

Nontraumatic rhabdomyolysis may be secondary to exertional causes such as seizures or non-exertional causes such as electrolyte abnormalities.

¹**Avoid Lactated Ringers** - it contains potassium!

Contact Medical Control for further orders or consultation

¹ Monitor the patient closely during extrication. Administer IV fluid before releasing the crushed part. Start with NaCl bolus without sodium bicarbonate if preparing the solution will delay initiation of treatment.

- Patients frequently develop hyperkalemia and shock soon after the external pressure is released. Rapid clinical deterioration is expected. Repeat EKGs frequently.
- Monitor the air quality for confined space rescue.

