



- i. Calcium chloride – 1 gm IV/IO over 5 minutes, ensure IV patency and do not exceed 1 mL per minute (Pediatric: 10% 20 mg/kg, max 1 g, IV/IO over 5 minutes.
OR
- ii. Calcium gluconate – 3 gm IV/IO over 5 minutes with constant cardiac monitoring (Pediatric: 10% 50 mg/kg (0.5 mL/kg), max 2 gram, IV over 5 minutes
- c. If not already administered, for significant crush injuries with EKG suggestive of hyperkalemia, administer sodium bicarbonate 1 mEq/kg (max dose of 50 mEq) IV bolus over 5 minutes
- d. If EKG suggestive of hyperkalemia, consider albuterol 5 mg via small volume nebulizer (can be repeated if no response is seen)

Patient Safety Considerations

Scene safety for both rescuers and patients are of paramount importance.

Notes/Educational Pearls

1. Causes of mortality in untreated crush syndrome:
 - a. Immediate
 - i. Severe head injury
 - ii. Traumatic asphyxia
 - iii. Torso injury with damage to intrathoracic or intra-abdominal organs
 - b. Early
 - i. Sudden release of a crushed extremity may result in reperfusion syndrome (acute hypovolemia, electrolyte abnormalities, and subsequent lethal arrhythmia)
 - ii. Hyperkalemia (potassium is released from injured muscle cells)
 - iii. Hypovolemia/shock
 - c. Late
 - i. Acute kidney injury (from release of toxins from injured muscle cells)
 - ii. Coagulopathy and hemorrhage
 - iii. Sepsis

Key Considerations

1. Rapid extrication and evacuation to a definitive care facility (trauma center preferred)
2. A patient with a crush injury may initially present with very few signs and symptoms. Maintain a high index of suspicion for any patient with a compressive mechanism of injury
3. A fatal medical complication of crush syndrome is hyperkalemia. Suspect hyperkalemia if T-waves become peaked, QRS becomes prolonged (greater than 0.12 seconds), absent P wave, prolonged QTc, or sine wave. Continue fluid resuscitation through extrication and transfer to hospital

Pertinent Assessment Findings

1. Mental status/[Glasgow Coma Scale](#) (GCS)
2. Evaluation for fractures and potential compartment syndrome development (neurovascular status of injured extremity)
3. Examination of spine
4. Evidence of additional trauma, potentially masked by with other painful injuries