

SAN FRANCISCO EMERGENCY MEDICAL SERVICES AGENCY

Effective: 09/01/09

Protocol: P-101

CRUSH SYNDROME

SUBJECTIVE FINDINGS

- Patient entrapped at the scene for > 2 hours.
- 1 or more full extremities trapped by crushing object, such as building rubble.
- History of previous heart or renal disease, dialysis treatment.

OBJECTIVE FINDINGS

- Confirm entrapment of 1 or more extremities.
- Complete trauma assessment to evaluate patient for other injuries and treat.
- Check extremity for decreased sensation, motor function, skin color changes and diminished pulses.

BLS Treatment	ALS Treatment
<ul style="list-style-type: none">• Routine Medical Care• See PRECAUTIONS AND COMMENTS for Use of Tourniquets• Extrication	<p>PRE-EXTRICATION</p> <ul style="list-style-type: none">• Establish IV of NS. Give 2 liters of Normal Saline bolus, followed by 500 ml/hr (limit fluid bolus for pediatric patients and patients with history of cardiac or renal dysfunction).• Pain control per pain control protocol.• Establish cardiac monitoring. <p>IMMEDIATELY PRIOR TO EXTRICATION</p> <ul style="list-style-type: none">• Give Sodium Bicarbonate 1 mEq/kg up to 100 mEq IVP.• Extrication. <p>POST-EXTRICATION</p> <ul style="list-style-type: none">• Suspected hyperkalemia if T waves become peaked, QRS becomes prolonged (> 0.12 seconds), hypotension develops.• Calcium chloride 1 gram slow IVP (over 5 minutes) if dysrhythmias continue.• Give standard dose of Albuterol via nebulizer if nebulizer if dysrhythmia continue.
BASE HOSPITAL CONTACT CRITERIA	
Contact BHP for amount of fluid bolus in pediatric patient, or patients with history of cardiac or renal dysfunction.	

DOCUMENTATION

- Pulses, if present. Tourniquet applied.
- Amount of IV fluids and medications given (including pain medications).

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HOSPITAL TREATMENT FOR SPECIAL CIRCUMSTANCES

- Foley catheter to monitor urine output (target diuresis of 300 ml/hr)
- Frequent serum potassium levels; if > 5.5, use:
 - 50 ml of 50% Dextrose IV
 - 10 units regular insulin IV
 - continuous albuterol nebulizer
 - Mannitol or other diuretic
 - Kayexalate via NG or enema
- Sodium bicarbonate if dysrhythmias develop; 100 mEq IV push, followed by an infusion of 100 mEq in 1 liter D5W, titrate to effect
- Calcium Chloride 1 to 2 grams q 10" for wide complex arrhythmia
- Peritoneal or Hemodialysis
 - Insertion of wick catheter to check compartment pressures if compartment syndrome is suspected

PRECAUTIONS AND COMMENTS

- See Protocol P-022 Extremity Trauma for use of tourniquets.
- If exposure to a hazardous material or weapon of mass destruction release is a possibility, evaluate patient for signs and symptoms of these agents and triage and treat appropriately.
- Crush syndrome patients once released from entrapment are likely to exhibit agitation, severe pain, muscle malfunction, swelling and other systemic symptoms.
- If entrapment is endangering the patient's or rescuer's life, field amputation should be considered. Consult with the incident commander on potential environmental threats to the rescue, and contact the Base Hospital Physician to assemble a surgical team to the scene for amputation.