Disaster Medicine Specialist IPAP

Broadly, a disaster can be defined as any scenario where a trapped victim requires prolonged extrication (often greater than 1 hour), a WMD release, or any manmade or natural event resulting in multiple patients. Examples could be tornado strikes, building collapses, floods and earthquakes that cause a breakdown in the normal operation of both the healthcare system in general as well as the prehospital environment. EMS Providers have to be able to provide care for disaster patients, sometimes for extended periods of time. These situations also increase the risk of some medical conditions not normally encountered in the prehospital environment. These protocols are to be used by Disaster Medicine Specialists (DMS) who have been specifically trained and their competency verified through a Medical Director approved credentialing process. Below are the general protocols for DMS to be applied for all patients encountered on scene of a disaster. DMS is responsible for the health of other operators responding to the scene, victims encountered in the course of the deployment and working canines that are deployed.

In the event of a large number of patients, utilize S.A.L.T.to identify the most critical patients first. Understand that an entrapped patient may be triaged an “immediate” in normal situations, but declared “expectant” due to the prolonged time required to remove them and make them available for transport.

Patients encountered in a disaster are often at increased risk for heat loss and hypothermia. Utilize passive warming with removal from the environment, blankets and/or warm blankets for any patient. For temperatures under 65°F, consider active warming. If a patient is to receive IV fluids, consider using a Thermal Angel to help prevent hypothermia. Thermal Angel is not a treatment of hypothermia.

All patients would benefit from early contact with medical control. For the care of pediatrics, follow treatment protocols and base all drug dosing off Broselow Tape and Special Operations Pediatric Drug Charts.
Crush Syndrome

**Purpose:** Crush syndrome is a potential life threatening condition that can lead to shock, renal failure, and electrolyte-induced arrhythmias and possible cardiac arrest. *Crush syndrome* is the consequence of *crush injury*. Crush syndrome typically occurs following a prolonged entrapment (often hours) that causes tissues to become ischemic resulting in cell lysis and release of intracellular contents as well as metabolic derangements. When the patient is released from entrapment these toxins flood the body, causing acidosis and cardiac dysrhythmias. A high index of suspicion should direct care toward lowering serum potassium levels, promoting kidney function to help the body’s natural mechanisms and facilitating transport to definitive care.

**Sign & Symptoms:**

Any patient entrapped for more than 60 minutes is at risk for crush syndrome with a patient trapped for ≥4 hours being at significant risk. If a patient is in this category, prophylactic treatment of the crush syndrome should be initiated prior to extrication if possible.

Classic signs and symptoms of limb ischemia include the 6 Ps: Pain, Pallor, Paresthesia, Poikilothermia, Pulselessness and Paralysis.

Systemic signs and symptoms following extrication are generally non-specific at first but can include nausea, vomiting, generalized weakness and palpitations. ECG changes indicating hyperkalemia will also be seen for severe cases. Assume hyperkalemia for any compression over 4 hours with absent P-wave, peaked T-wave and/or prolonged QRS on 12 lead ECG.

**Treatment:**

Prior to extrication

Follow IPAP and address any life threats, including hypothermia.

If the patient's medical history indicates kidney dysfunction or cardiac impairment and are therefore unable to receive IV fluids, consider temporarily placing a tourniquet on the entrapped extremities regardless of the need for hemorrhage control.

Early and frequent ECG & 12 lead monitoring with early contact with medical control are necessary to help guide treatment when possible.

Establish two sites of venous access with preference to large bore IVs.
### Normal Saline
Stimulates kidney function and restores circulating volume.

**Potassium containing fluids (LR) are contraindicated**

- 500mL bolus IV/IO unless patient presentation contraindicates.
- Repeat once if possible, prior to extrication.

### Albuterol
Helps to push potassium back into cells.

- 2.5mg/3mL nebulized over 5-10 minutes.
- Repeat continuously until arrival at definitive care.

### Normal Saline
Maintains kidney function and restore circulating volume.

**Potassium containing fluids (LR) are contraindicated**

- Maintenance dose of 500mL/Hr IV/IO unless patient presentation contraindicates.
- With a MaxiDrip (125gtts/min or approximately 2gtts/sec)

### Pain Management and Shock protocols

In a coordinated effort with the treatment above finishing just prior to extrication, have technical rescue crews slowly remove patient from entrapment. Have advanced airway and cardiac resuscitative equipment on hand.

Following extrication, treat systemic signs and symptoms of hyperkalemia.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calcium Gluconate</strong></td>
<td>1G 10% solution (10cc) IV/IO over 5 min. Repeat after 5 min if ECG changes not resolved. 10mL of 10% solution in 50mL NS at 3gtts/sec</td>
</tr>
<tr>
<td><strong>Calcium Chloride</strong></td>
<td>An irritating vesicant. A second line therapy. Ensure a patent IV. 500mg 10% solution (5mL) IV/IO over 5 min. Repeat after 5 min if ECG changes not resolved. 5mL of 10% solution in 50mL NS at &lt;3gtts/sec</td>
</tr>
<tr>
<td><strong>Sodium Bicarbonate</strong></td>
<td>1mEq/kg IV/IO over 5 minutes</td>
</tr>
</tbody>
</table>

**Rationale:** The major life threat from crush syndrome comes from electrolyte imbalance and cardiac dysrhythmia. Prophylactic treatment addresses these threats prior to extrication. If a
patient is unable to receive prophylactic treatment due to preexisting condition consider temporary application of a tourniquet in attempt to minimize release of intracellular contents from the affected extremity into the circulation. Careful monitoring and treatment for systemic signs and symptoms of hyperkalemia is necessary in these patients. Contact with medical control should be made prior to extrication for these patients.

**Sources:**

CDC “After an Earthquake: Management of Crush Injuries & Crush Syndrome”

“4 Things EMS Providers Must Know About Crush Syndrome” EMS1.com


Expanded Pain Management

**Purpose:** Under normal operational conditions, the standard pain management protocol is appropriate for relatively short scene and transport times. In those instances where additional medication is needed, communication with online medical control to request further dosing is reliable. However, in the context of a disaster or confined space rescue, traumatic injuries tend to be more severe and scene/transport times can be significantly prolonged. Communication with online medical control may be interrupted and unreliable when a disaster occurs. **THIS PROTOCOL ONLY APPLIES FOR INSTANCES WHEN ONLINE MEDICAL CONTROL CANNOT BE CONTACTED.** Expanded pain management capabilities allow for more effective, timely patient care when online medical control is unable to be contacted.

Relative contraindications for expanded pain management:

- Inability to establish an advanced airway if necessary

**Caution:**

- Inability to fully assess & monitor patient's respiratory status, including SpO2, ETCO2 and ECG
- Inability to establish an IV/IO

**General Principles of Care/Preparation:**

- Monitor the patient closely for respiratory depression and changes in vital signs.
- Naloxone, BVM & advanced airway options should be at patient’s side prior to administration of analgesia.

**Adult Dosing:**

- Administer up to 500 mcg IV/IO/IM/IN total dose titrated to relief of patient’s pain, not to exceed 100mcg/dose with repeat additional doses in 10 min.
**Pediatric Dosing:**
- Administer 1mcg/kg IV/IO/IM (not to exceed 100mcg/dose), repeat in 10 minutes PRN to max total dose of 500mcg titrated to pain relief.
- Administer 1.5mcg/kg Intranasal (not to exceed 100mcg/dose), repeat in 10 minutes PRN to max total dose of 500mcg titrated to pain relief.

**Rationale:** IV fentanyl has a rapid onset that will allow the dose to be titrated to patient’s pain level. Pre-existing medical conditions should be fully considered when following this protocol. This dosing scheme is meant to keep the patient's pain controlled without leading to respiratory or cardiovascular depression while providing for 3 hours of care in a limited resource environment. However, expect wide variation between individual patient’s response to fentanyl and close monitoring and tailoring the dosing for each patient is required depending on the scenario.

Sources:

http://www.mayomedicallaboratories.com/test-catalog/Clinical+and+Interpretive/89655