EMS Subspecialty Certification Review Course

1.2 INJURY
1.2.1 Trauma
1.2.1.7 Management of Crush Injuries

2025

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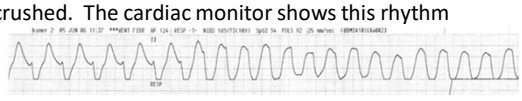
Question

Your victim is being extricated from a trench after being trapped for hours where his lower extremities were crushed. The cardiac monitor shows this rhythm



What is the most appropriate treatment?

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Answers

1. Lidocaine
2. Amiodarone
3. Epinephrine
4. Sodium Bicarbonate and Calcium

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Learning Objectives

Upon the completion of this program participants will be able to:

- Describe the prehospital identification and treatment of crush injuries and compartment syndrome.

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Crush Injuries

- Crush injuries are relatively uncommon.
  - They cause acute traumatic peripheral ischemia.
- Often found in disaster situations:
  - Earthquakes
  - Bombings
  - Tornadoes/cyclones
  - Hurricanes/typhoons

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Crush Injuries

- Crush injuries can also occur in non-disaster situations:
  - Axial injuries:
    - Traumatic asphyxia
    - Suffocation
  - Appendicular injuries:
    - Crush syndrome
    - Compartment syndrome

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Crush Injuries

- Crush injury and compartment syndrome are different processes with a common pathophysiology
- Crush injury occurs in 2 phases
  - Mechanical cell disruption
  - Ischemia
- Crush syndrome associated with increased external pressure to a body part or region
- Compartment syndrome results from increased internal pressure within a muscle compartment

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Crush Injuries

- Mechanism of injury:
  - Ischemia and hypoxia at injury site
  - Gradient of injury
  - Self-perpetuation of injury
- Compartment pressures:
  - < 10 mmHg normal
  - 10-20 mmHg may be tolerated without significant damage
  - 30-50 mmHg can cause tissue toxicity over a few hours
  - Difference between measured compartment pressure and diastolic pressure may be a better determinant of irreversible damage

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Crush Injuries

- **Pathophysiology:**
  - Release of muscle toxins and hypovolemia:
    - Hyperkalemia
    - Hypocalcemia
    - Acidosis (local and systemic)
    - DIC (thromboplastin release)
    - Renal failure:
      - Myoglobinuria

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Crush Injuries

- Signs and symptoms:
  - Crush injury obvious
  - Compartment syndrome:
    - Pain
    - Paresthesia
    - Passive stretch
    - Pressure
    - Pulselessness
  - Myoglobinuria

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Crush Injuries

- **Treatment:**
  - Supplemental oxygen
  - Analgesia
  - Fasciotomy
  - Rhabdomyolysis:
    - Fluids
    - $NaHCO_3$?
  - Transport destination important:
    - Surgical capabilities
    - Hemodialysis
    - HBO

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Take-Home Points

- Crush injuries and compartment syndrome have the same pathophysiology
- Prehospital care involves recognition, treatment and transport
- Fluid resuscitation in the field is often important in preventing complications associated with rhabdomyolysis
- Bicarb/Calcium/Albuterol more controversial.. Read carefully

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Answers

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