

# Pediatric Electrocution

For any electrocution injury

**History**

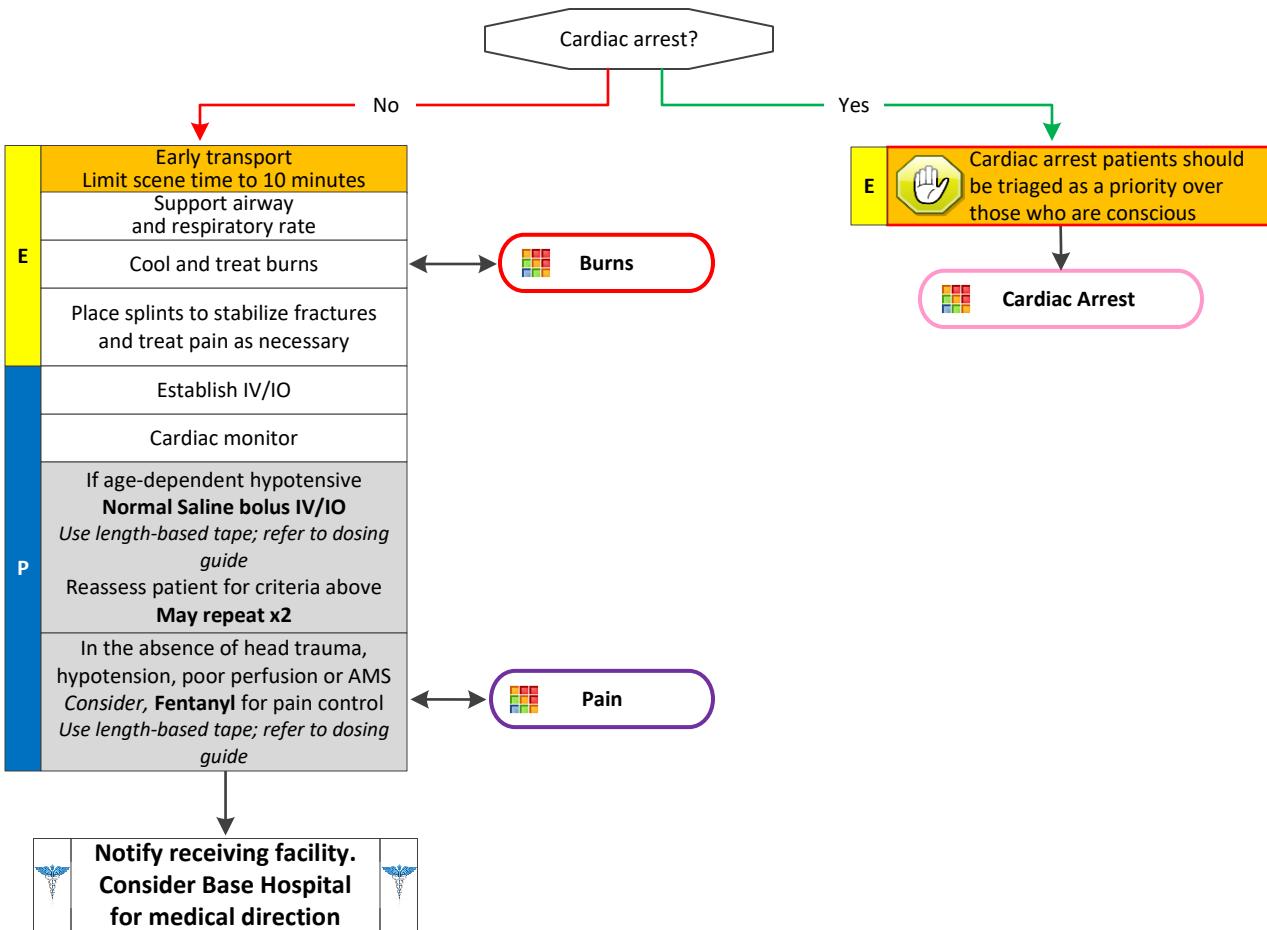
- Type and time of injury
- Mechanism (electrical shock, electrocution, or lightning strike)
- Entrance and exit wounds
- Past medical history
- Medications

**Signs and Symptoms**

- Evidence of trauma or burn
- Pain, swelling, deformity, or bleeding
- Altered sensation or motor function
- Airway compromise or respiratory distress
- Altered mental status
- Loss of consciousness
- Cardiac arrest

**Differential**

- Abrasion
- Contusion
- Laceration
- Thermal injury
- Blast injury



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The scene of an electrical injury may present many hazards for rescue personnel, so extra consideration must be taken to ensure scene safety. High-voltage power lines are almost never insulated but may appear insulated from atmospheric contaminants deposited on the lines over time. A rescuer standing on the ground touching any part of a vehicle that is in contact with a power line is likely to be killed or seriously injured. In fact, electrocution can occur from ground current simply by walking too close to a downed power line. A common error is establishing a safety perimeter that is too small.

Consider SMR after the primary survey is completed. Prehospital providers should assume that victims of electrical trauma have multiple traumatic injuries. A large percentage of high-voltage electrical trauma patients have either fallen from a height or been thrown by the force of the electric current. Falls, being thrown from the electrical source by an intense muscular contraction, or blast effect from explosive forces that may occur with electric flashes can cause significant secondary blunt trauma. In addition, fractures and joint dislocations can be caused by forceful muscle contractions.

There are five basic mechanisms of injury that occur with lightning strikes:

1. Direct strike: A direct strike is more likely to hit a person who is in the open and unable to find shelter. This type of lightning strike is usually fatal.
2. Splash injury: This occurs when lightning strikes an object (such as a tree or building) or another person, and the current “splashes” to a victim standing nearby. Current can also splash to a victim indoors via plumbing or telephone wires.
3. Contact injury: This occurs when the victim is in physical contact with an object or a person directly struck or splashed by lightning.
4. Step voltage/ground current injury: When lightning hits the ground, the current spreads outward in a radial pattern. Because the human body offers less resistance to electrical current than does the ground, the current will preferentially travel through the body (e.g., up one leg and down the other) between the body's two points of ground contact.
5. Blunt trauma: Victims of lightning strike may be thrown by the concussive forces of the shockwave created by the lightning. A lightning strike can also cause significant opisthotonic muscle contractions, which may lead to fractures or other trauma.

**Electrical/ lightning burn images**



Electrical burn



Electrical burn



Electrical burn



Lightning strike

## Pearls

- Never enter an unsafe scene of an electrical injury.
- In multi-casualty incidents involving electrocution, cardiac arrest patients should be triaged as priority over conscious patients to facilitate early defibrillation. Electrocution patients rarely die as a result of electrical injuries and may have a favorable outcome despite prolonged asystole.
- Be prepared to treat cardiac arrhythmias.
- Patients with a combination of trauma and burns should be transported to a trauma center.



**SAN MATEO COUNTY HEALTH  
EMERGENCY  
MEDICAL SERVICES**

**Treatment Protocol PE01**