



**REGION 11
CHICAGO EMS SYSTEM
PROTOCOL**

Title: Lightning Strike Injuries – BLS/ALS
Section: Toxins and Environmental
Approved: EMS Medical Directors Consortium
Effective: July 10, 2024

LIGHTNING STRIKE INJURIES – BLS/ALS

I. PATIENT CARE GOALS

1. Identify patient(s) with lightning strike injuries.
2. Move to safe area.
3. Initiate immediate resuscitation of cardiac arrest patient(s), also known as "reverse triage".
4. For ALS: Cardiac monitoring during transport.
5. Treat associated traumatic injuries.

II. PATIENT PRESENTATION

- A. Lightning strikes may happen in a variety of environmental conditions. Most commonly they occur in outdoor or wilderness circumstances. However, golf courses, exposed mountains or ledges, and farms/fields all present conditions that increase the risk of a lightning strike when hazardous meteorological conditions exist.
- B. Lacking bystander observations or history, it is not always immediately apparent that the patient has been injured by a lightning strike. Subtle findings, such as injury patterns, might suggest a lightning injury.
- C. Inclusion Criteria
Patients of all ages who have been injured by a lightning strike.
- D. Exclusion Criteria
None

III. PATIENT MANAGEMENT

A. Assessment

1. Respiratory
 - a. Apnea
 - b. Agonal respirations
 - c. Respiratory paralysis
2. Cardiovascular



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- a. Dysrhythmias
 - b. Transient hypertension
3. Neurologic
- a. Seizures
 - b. Confusion
 - c. Paralysis
 - d. Paraplegia
 - e. Vertigo/dizziness
 - f. Paresthesia
 - g. Amnesia
 - h. Memory deficits
 - i. Anxiety
 - j. Fixed/dilated pupils possible (autonomic dysfunction)
4. Skin
- a. Ferning or fern-like superficial skin burn ("Lichtenberg figures")
 - b. Vascular instability may result in cool, mottled extremities
 - c. Frequent first and/or second-degree burns
 - d. Third degree burns less common
5. Patient may be in cardiac arrest or have only respiratory arrest, as injury is a result of DC current.
6. May have stroke-like findings as a result of neurologic system effects.
7. May have secondary traumatic injury as a result of over pressurization, blast, or missile injury.
8. Fixed/dilated pupils may be a sign of neurologic system effects rather than a sign of death or impending death. Apply a cardiac monitor and initiate resuscitation in this patient population.

B. Treatment and Interventions

- 1. Assure patent airway. If in respiratory arrest, manage airway as appropriate.
- 2. If in cardiac arrest, treat per Cardiac Arrest Management Protocol.
- 3. For ALS: Consider IV initiation; avoid initiation through burned skin.
- 4. For ALS: Monitor ECG. Be alert for potential arrhythmias. Perform 12-lead ECG.
- 5. For ALS: Consider early pain management for burns or associated traumatic injury.



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C. Patient Safety Considerations

1. Recognize that repeat strike is a risk. Patient and rescuer safety is paramount.
2. Patients do not carry or discharge a current, so the patient is safe to touch and treat.

IV. NOTES/EDUCATIONAL PEARLS

A. Key Considerations

1. Lightning strike cardiac arrest patients have a high rate of successful resuscitation, if initiated early.
2. There may be multiple patients.
3. If multiple patients, cardiac arrest patients whose injury was witnessed or thought to be recent should be treated first and aggressively (reverse from traditional triage practices).
 - a. Patients with cardiac arrest from lightning strike initially have a combined cardiac and respiratory arrest.
 - b. Return of spontaneous circulation may precede resolution of respiratory arrest.
 - c. Patients may be successfully resuscitated if provided proper cardiac and respiratory support, highlighting the value of "reverse triage".
 - d. It may not be immediately apparent that the patient has been injured by lightning strike.
 - e. Injury pattern and secondary physical exam findings may be key in identifying the patient as injured by lightning strike.
 - f. Lightning strike is a result of very high voltage, very short duration DC current exposure.

B. Pertinent Assessment Findings

1. Presence of thermal or non-thermal burns.
2. Evidence of trauma.
3. Evidence of focal neurologic deficits.