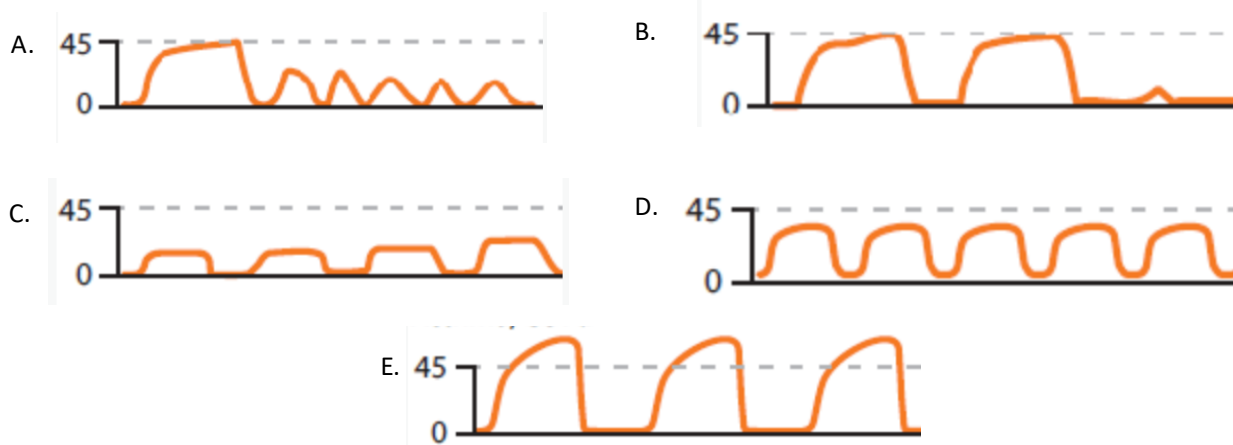


January Viz Quiz

Which of the following capnography waveforms seen post-ROSC would be most concerning for a kinked or dislodged ET tube?



Submit your answers at <https://www.surveymonkey.com/r/DSXN7CP>
for the chance to win a prize!

December Viz Quiz Follow Up

Answer: A. High Voltage Electrical Injury

The amount of current flowing through the body, voltage, tissue resistance, type of current (AC or DC), current pathway, and duration of contact all influence the mechanism and extent of injury.

Injuries due to electricity and lightning can occur by multiple mechanisms:

- **Direct effect of electrical current on body tissues** - This can lead to ventricular dysrhythmia or respiratory arrest.
- **Conversion of electrical energy to thermal energy** - The tissue damage (i.e. electrothermal burn) inflicted by most electrical currents can be primarily attributed to the thermal energy generated by the current when the body becomes part of a circuit. Tissues with higher resistance (e.g. skin, bone, and fat) have a tendency to heat up and coagulate, whereas tissues with lower resistance (e.g. nerves, blood vessels) tend to transmit current. Generally, current follows the path of least resistance, but resistance is affected by area of contact, pressure applied, and the presence of moisture. Skin's resistance changes dramatically when wet, which determines flow of current and amount of heat generated.
- **Creations of pores in cell membranes (i.e. electroporation)** - Electrical current can disrupt cell membranes directly, resulting in cell death without generating heat or causing coagulation.
- **Secondary mechanical trauma** - High-voltage DC tends to cause a single muscle spasm that throws the victim from the source, resulting in a shorter duration of exposure but a higher likelihood of associated trauma. Lightning strikes can cause blunt mechanical injury directly, throw the victim, or create a blast effect.

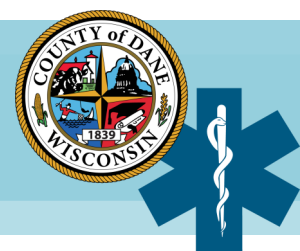
High-voltage injury is more likely to cause deep tissue and internal organ injury compared with low-voltage injury or lightning strike. The degree of external skin injury **cannot** be used to determine the extent of internal damage since the current flows through variable paths depending on tissue resistance encountered, surface area, and volume of tissue exposed. Patients with any full-thickness skin burn, those complaining of persistent deep ache or pain, and those who have pain with passive range of motion of joints should be presumed to have deep muscle or bone injury.

Patients should be monitored for the development of acute compartment syndrome of the extremities and rhabdomyolysis. Perform frequent examinations for tense, painful muscle compartments, pain with passive stretch of muscles, paresthesias, pallor, or diminished sensation, especially in a patient who complains of persistent deep ache, burning pain, or pain out of proportion to the external signs of injury.



Sources: https://www.uptodate.com/contents/electrical-injuries-and-lightning-strikes-evaluation-and-management?search=high%20voltage%20injury&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1 <https://www.emedicine.medscape.com/article/770179-overview>

Congratulations to Courtney from DeerGrove for winning the December Viz Quiz!



Case Study

Case: You are paged for a 9E, 62-year-old male, witnessed arrest by his coworker after he complained of chest pain while walking. Coworker was able to initiate CPR with assistance of the telecommunicator. Upon EMS arrival to scene, crew found him to be in ventricular fibrillation. High performance CPR was initiated and the patient was shocked twice before ROSC was obtained.

Prioritize preventing further neurologic injury and re-arrest.

- Optimize oxygenation and ventilation: Spo2 goal 93-98%; EtCO2 goal 35-45 has been demonstrated to have better outcomes than lower EtCO2. Hyperventilation in standard post-ROSC scenarios is no longer recommended; consider advanced airway management if it has not already occurred
- Optimize hemodynamics and cardiac rhythm: Prevent hypotension with a goal of SBP above 90-100 and MAP above 65
 - Consider additional vascular access if needed
 - Consider early preparation and administration of vasopressor
 - While the association between hypotension and adverse outcomes is established, the question of potential benefit from targeting a MAP higher than 65 mmHg has so far not received a clear answer.
 - In addition, there is theoretical harm in sustained hypertension post-ROSC and it may worsen ongoing myocardial ischemia
- Antiarrhythmic drugs should be reserved for patients with recurrent or ongoing unstable arrhythmias. No data supports the routine or prophylactic use of antiarrhythmic drugs post ROSC, even if such medications were employed during the resuscitation. Determining and correcting the underlying cause of the arrhythmia (e.g. electrolyte disturbance, acute myocardial ischemia, toxin ingestion) is the best intervention -> This is a good time to obtain a blood glucose and manage as indicated
- Acquire 12-lead EKG, consider transport to PCI capable facility. Acute myocardial infarction, cardiomyopathy, and primary arrhythmia are the most common causes for adult cardiac arrest. Based on current literature, resuscitated patients who had a shockable rhythm or post ROSC STEMI on EKG should be transported to a 24/7 PCI capable facility, if reasonable to do so.
- Neuro protection: Perform and document a neurologic exam, repeat as needed if neurologic status changes. The American Association no longer support routine prehospital hypothermia induction for all out of hospital cardiac arrests. Rather, the goal should be prevent hyperthermia with goal of maintaining normothermia. Consider elevating head of bed about 30 degrees if possible.
- Sedation/Analgesia: Monitor for signs of discomfort or clinical signs of agitation. Ensure adequate administration of sedation and analgesia
- Patient movement: Ensure patient is stabilized with adequate airway management, hemodynamic optimization, and other time-sensitive interventions or assessments prior to patient movement/transportation. If mechanical compression device is available, consider placing (or maintaining), for quickly restarting compressions if pulses are lost.

References: [https://www.resuscitationjournal.com/article/S0300-9572\(23\)100199-5/fulltext](https://www.resuscitationjournal.com/article/S0300-9572(23)100199-5/fulltext); https://www.ilcor.org/data/Post-cardiac_arrest_syndrome.pdf; <https://www.erc.edu/assets/documents/RESUS-8905-Post-Resus-Care.pdf>

Active Threat Integrated Response Scholarship Opportunity

The South Central Regional Trauma Advisory Council (SCRTAC) is excited to announce a special funded training opportunity for you and your colleagues. They are funding 10 scholarships to attend the Active Threat Integrated Response Conference! The goal of the conference is to promote improved integration in response to active threats among all public safety entities. The conference will be held February 21-23 at the Grand Geneva Resort & Spa in Lake Geneva. For more information on the conference and how to apply for the scholarship, you can go to [SCRTAC Scholarship Offer](#).

Upcoming Events and Training

1/17, 6pm - UW Health SEPSIS Training with Dr. Bryce Taylor
Register at this [link](#)

1/22, 5:30pm - DCEMS CEVO Lecture, Virtual
Register at this [link](#)

2/1, 6pm-8pm - SSM Health Training: Volume Overload
Register to attend [In Person](#) or [Virtual](#)

2/21 - 2/23, All day - Active Threat Integrated Response Conference
Register at this [link](#)