ELECTRICAL INJURIES

RISK STRATIFICATION OF ELECTRICAL INJURIES

Low Voltage
Less than 600V

High Voltage
Greater than 600V

ALTERNATING CURRENT
causes prolonged contraction preventing full release from electrical source and hence longer duration of contact and more tissue damage compared to DIRECT CURRENT

LIGHTNING STRIKES
1. Direct Current
2. Brief Contact

High survival rates of 70-90%, but up to 80% of survivors sustain long-term morbidity

RHABDOMYOLYSIS AND AKI

CK elevation correlates to the extent of muscle injury, but is not directly related to the probability of developing AKI

Urine myoglobin has poor sensitivity

CARDIAC COMPLICATIONS

Serious cardiac complications from electrical injury relatively uncommon

- Bundle Branch Blocks
- AV Blocks
- QT prolongation
- ST changes
- Atrial Fibrillation

COMMON, NON-FATAL, SELF-RESOLVING

- Ventricular Fibrillation

FATAL ARHYTHMIAS

- Asystole

- Respiratory arrest from medullary paralysis can take longer to resolve and patients may develop a secondary hypoxic arrest.

Emergency Sequelae and Complications of Electrical Injuries

- Burns
- Bleeding

Injury to the corner of the mouth in children is not uncommon after chewing on an electrical cord

VENTRICAL FIBRILLATION

- Look for any tongue and palate burns. Delayed massive bleeding from the labial artery can present 5–14 days when the eschar separates

Management Principles of Electrical Injuries

Fluid Resuscitation

- Continuous Infusion > Bolus
- Minimizes tissue edema that could worsen tissue damage

Cardiac Monitoring

- Our experts recommend 6-8 hours of cardiac monitoring for high voltage injuries

- In patients with a low voltage exposure in the absence of chest pain or syncope, the literature does not support need for cardiac monitoring

Disposition

- Asymptomatic low voltage injured patients can be discharged safely after a normal ECG

For high voltage injuries, the literature suggests observing the patient for 12 hours even if they are asymptomatic, with a referral to a burn center

Finally, discharge instructions are very important as there are delayed complications from electrical injuries. Counsel regarding delayed symptoms including psychological, neurological, limb ischemia and for kids who bite on an electrical cable, delayed bleeding

ELECTRICAL CORD BITE INJURY

Indirect Muscle Injury

- Direct Muscle Injury

- Compartment Syndrome

- Regularly assess limbs for:
  - Significant Pain on Passive Extension
  - Rigid Compartments
  - Signs of Poor Perfusion

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