

Electrical injuries caused by the action of an electric current on the human body can range from benign small skin burns to life-threatening internal organ damage. Most injuries are sustained through contact with low voltage domestic circuits, and will not need extensive treatment. However, cardiac monitoring is important in selected patients due to risk of cardiac arrhythmias.

A shock to the system

Assessing people with electrical injuries



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1 Early management

Turn off electrical source (if safe to do so)

Perform basic life support if needed

Immobilise head and neck (in severe injury)

Admit to burns unit

Specialised surgical care, such as skin grafts

Admit to obstetrics

Fetal cardiac monitoring

2 Clinical assessment

Check clinical signs to assess effects of the electrical current on the patient's body

Extensive burns

Pregnant women

Loss of consciousness

Admit to hospital

Patients with initial loss of consciousness, cardiac anomalies, or high-voltage injury require continuous ECG monitoring

Manage organ failure

Echocardiography

With or without:

Cardiac MRI

Coronary angiography

Depending on clinical findings



Monitor ECG for at least 24 hours

Explain to patient the occasional risk of delayed cardiac arrhythmias (which can very rarely lead to sudden death)



Arrhythmia-free for at least 24 hours

3 Discharge

If there is no cause for concern, consider prompt discharge

Intravenous hydration
May be needed to prevent renal failure

Resuscitation
A prolonged resuscitation attempt is warranted

Potential injuries

- Cardiovascular**
 - Arrhythmias (most common)
 - Heart muscle injury
 - Bradycardia
 - Clotting in blood vessels
- Respiratory arrest**
 - Diaphragm paralysis
 - Tetanic contraction
 - Inhibition of control in brain
- Skin burns**
 - Infection
 - Dehydration
- Neurological**
 - Loss of consciousness
 - Impaired recall
 - Spinal cord injury
 - Paralysis
 - Loss of sensations in limbs
- Kidney failure**
 - Myoglobin tubular precipitation
 - Generalized hypotension
- Musculoskeletal**
 - Fractures/luxations
 - Muscle damage
 - Rhabdomyolysis
 - Compartment syndrome

Determine path of current through body

Electricity usually flows from an electrical source, through the body to the ground. Locating entry and exit points can help to determine which organs could be damaged

Determine voltage of accident

Low voltage

Mines

960 V

Subway rails

750 V

Workshops

380 V

Domestic

110 V (US)
220 V (EU)

High voltage

High voltage line

45 000–
400 000 V

Rail network

25 000 V

Overhead line

1 500 V

ECG and blood tests

ECG anomaly

Arrhythmias

Troponin rise