High-Voltage Electrical Brain Injury

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Electrical injury is arbitrarily divided into high voltage (≥1000 V), low voltage (<1000 V), lightning strikes, and electric arc in which no passage of current through the patient is noted. In Taiwan, the majority of electrical injuries in adults are occupation related. High-voltage burns cause localized injuries over entrance and exit sites and cause extensive arcing, flame, and flash burns; even more dangerous, massive necrosis of the underlying muscles, bone, and nervous tissue on the pathway of the current through the body. Loss of consciousness, confusion, and poor recall immediately after high-voltage injury is common. Nearly half of all patients have loss of consciousness at the scene. These patients may also have the most associated injuries such as traumatic brain injury, various orthopedic, and significant soft tissue injuries. The severity of the injury depends on the intensity of the electrical current, the pathway it follows through the victim’s body, and the duration of the contact with the source of the current. Immediate death may occur either from current-induced ventricular fibrillation or asystole or from respiratory arrest secondary to paralysis of respiratory center or respiratory muscles. We report a case of massive brain injury resulting from high-voltage electrical injury because of the unusual presentation and discuss the possible mechanisms and the importance of neurologic management.

CASE REPORT

A 50-year-old male electrician accidentally touched the high-tension electric wire (69,000 V). The current entered the right parieto-occipital portion of his head (Fig. 1) and exited through lower extremities. He was found in a condition of unconsciousness by his co-workers; he had not fallen from height. He was conscious but disoriented and confused when sent to emergency room 1 hour later. Four hours after admission into the burn unit for critical care, he experienced a seizure attack. Brain computed tomography documented severe subarachnoid hemorrhage, subdural hematoma, cerebral

Submitter for publication February 2, 2005. Accepted for publication June 13, 2005.
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DOI: 10.1097/01.ta.0000234739.14621.3e

J Trauma. 2006;61:...