CORRESPONDENCE

Lightning Strike – Mechanisms of Energy Transfer, Cause of Death, Types of Injury

by Dr. med. Fred Zack, Prof. Dr. med. Markus A. Rothschild,
Prof. Dr. med. Rudolf Wegener, in volume 51–52/2007

Effects on the Nervous System

We thank Zack et al. for their comprehensive review of the mechanisms and sequelae of lightning injuries. The effects of lightning strike on the nervous system, however, require some clarification and additional information, since injuries to the nervous system are the most common and momentous cause of long-term problems in survivors (1).

When the resistance of the skin is broken during lightning strike, the body is exposed to a short pulse of direct current; tissues with low electrical resistance such as the vascular and nervous system are particularly affected. Acute lesions are not always detectable, even when modern imaging techniques are used. In contrast to injuries caused by alternating current, internal burns are extremely rare (1). In principle, all parts of the nervous system can be affected - not only the cranial nerves and the peripheral nervous system (2). Apart from transient, qualitative and quantitative impairment of consciousness and the pathognomonic keraunoparalysis (lightning paralysis) - a paresis and impaired sensitivity of the extremities of unclear etiology that usually lasts less than an hour - structural lesions may be found in the CNS, e.g. the visual cortex (3) or the myelon (1, 2).

The consequences of lightning injuries to the peripheral nervous system are less well documented. However, the multitude of autonomous disorders that have been described in case reports together with pathophysiological considerations of a particular vulnerability of non-myelinated nerve fibers suggests an involvement of the peripheral nervous system.

The etiology of the common subacute neurological and psychiatric deficits is not clear. These range from non-specific complaints, such as chronic fatigue and disrupted sleep, to clearly defined disorders like depression, post-traumatic stress disorder and cognitive deficits, which restrict the patient's quality of life (2, 3).

The conclusion is that all survivors of lightning strikes should be given neurological-psychiatric aftercare and eventually rehabilitation. A systematic study of the neurological, neurophysiological, and neuropsychological sequelae of lightning injuries is currently being conducted at the Department of Neurology, University of Regensburg.

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In Reply:

Owing to the complexity of the topic it was not possible to present all clinical details in our article. We therefore thank the correspondents for this additional information from a neurological perspective, and particularly for their recommendation of neuro-psychiatric aftercare for all lightning victims.

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Conflict of interest statement

The authors of both articles declare that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

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