Commentary

Bhargava and colleagues present an interesting and rare case of lightning-strike induced brachial plexopathy.[1] They cite the literature suggesting that nerve damage is rare in lightning strike as compared to other types of electrical injury, because in the latter cases, contact with the electrical source is of greater duration, resulting in severe burns which bring about nerve damage.[2] Although less frequent than in other types of electrical injury,[3] burns can occur in lightning injury; the current author helped to evaluate the case wherein a man was struck by lightning and after regaining consciousness the first thing he saw was his shoe on fire.[4] Various theories exist as to what path lightning is likely to take in the body, based partly upon where the strike occurs and based partly on the resistance of various types of tissues, perhaps with vascular structures being the best conductors.[5] The extreme power generated by a lightning strike, however, suggests that the impact is not going to be a precise application of an electrical stimulus with highly predictable results; the literature suggests that damage occurs in quite a number of ways.[2] The potential for multiple mechanisms and sites of damage is exactly the reason why the authors' finding of a case of a rare brachial plexus injury is an important contribution, along with their medical recommendations for assessing such nerve damage.

The authors of this article mentioned electroporation as one of the potential mechanism for damage in cases of lightning injury. Briefly summarizing the literature on this hypothesized mechanism, an electrical stimulus may create a greater number of pores in the cell membrane, especially in the neuron, which is larger and has more surface area than other types of cells.[6,7] With a moderate increase in size and number of the pores, the function of the cell (neuron) may become impaired but the cell does not die[7] and recovery may ensue; but if a critical amount of electroporation occurs within the cell membrane, the membrane ruptures and the cell then dies.[6] This may help explain why, after lightning injury, there is often no structural brain change noted in the imaging techniques (no cell death), despite the changes in cognitive and neurological function, but at other times, however, structural damage is noted.[3] With a massive electrical overstimulation, a change in function, cognitive or physical, may be related to such a change in the brain cell membrane physiology, even if gross damage to the brain or spinal cord cannot be found. This may help explain some of the divergent courses in the cases of lightning or electrical injury, which may involve the damage being immediate, temporary and reversible versus immediate and permanent.[2] Other possible courses and mechanisms have been suggested for damage in the cases of lightning and electrical injury,[2] including the possible explanations for delayed neurological damage.[8]

Although theories exist as to what path in the body the electricity will take when struck by lightning, with such massive amounts of electrical energy being transmitted, it is in no way surprising that nerves are sometimes damaged by a variety of mechanisms. The finding of a rare brachial plexus injury caused by lightning is a reminder of this. The authors of the current JNRP article correctly point out that in a given clinical case the possibility of nerve or plexus damage should not be overlooked.

Andrew D. Reisner

Forensic Diagnostic Center of District Nine, Byesville, Ohio, USA

Address for correspondence:
Dr. Andrew D. Reisner,
Forensic Diagnostic Center of District Nine, PO Box 126, Byesville, Ohio 43723-0126, USA.
E-mail: forensicd9@gmail.com

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