Dermatological manifestation of lightning injury: A Case report

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Abstract
Lightning is one of the most common naturally occurring global phenomena. Among various types of lightning, cloud to ground discharges possesses the most destructive effects. Lightning injuries are more common in rural or exposed environments than in urban areas. In the present article, a case of Lightning injury causing cutaneous manifestation in the form of superficial burns resembling miniature fern tree (Lichtenberg Figures) is reported.

Key Words: Lightning injury, Lichtenberg Figures, fern tree lesions

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Introduction

Lightning is one of the most common naturally occurring global phenomena. About 50,000 thunderstorms and 8 million lightning flashes occur worldwide every year [1]. Lightning is a sudden high voltage discharge of electricity in the sky from the positively charged upper part of a cloud to the negatively charged lower part. The lightning can be categorized into intra-cloud, inter-cloud and ground to ground discharges with the cloud-ground type possessing the most destructive effects [2]. Lightning injuries are more common in rural or exposed environments than in urban areas. More than 2000 lightning related deaths occur every year in India and historical data of fatality figures of five major natural disasters for the period 1967 to 2012 give clinching evidence that lightning is the most damaging natural disaster in India [3,4]. Lightning strike causes damage to the body as a result of electrical current passing through the body on the way to the ground. The enormous energy of a lightning bolt may cause injury by direct effect of the current, by the thermal energy or by the expanded air resulting in blast like injuries, often there is multisystem involvement with widely variable severity. The immediate effects of lighting injury may include cardiac arrest, confusion, seizures, amnesia, contusion from shock wave, chest pain, muscle aches, headache, dizziness, deafness, tympanic membrane rupture and post concussion syndrome. The delayed effects include neuropsychological changes, memory deficits, distractibility, irritability, personality changes, chronic pain and seizures. Cutaneous manifestations are also observed in lightning injury secondary to burns [5].

In the present paper, we report a case of lightning injury with the characteristic cutaneous manifestation which is rarely seen in clinical practice of medicine.

Case report

A 36 year old male was brought to the hospital with history of loss of consciousness after being struck by lightning during a thunderstorm in an open agricultural field. One hour later he regained consciousness and complained of pain in the neck, chest and abdomen along with complaints of severe body aches and myalgias. The neck pain was localized to the posterior aspect and the chest pain was diffuse with radiation to the back. There was no history of dyspnea or palpitations. The abdominal pain was also diffuse with no associated vomiting. There was no history of headache or neurologic deficits. On examination his pulse rate was 68 per minute with regular rhythm, blood pressure of 120/80 mmHg, respiratory rate of 16/minute and temperature of 98.4°F. An erythematous rash was noted over the anterior abdomen and thighs.

Figure-1: Miniature fern tree lesions on abdomen

Figure-2: Miniature fern tree lesions on right thigh

Systemic examination revealed normal respiratory, cardiovascular, gastrointestinal and central nervous system. Baseline laboratory investigations included complete blood counts, serum electrolytes, random blood sugar, blood urea, serum creatinine and the results were found to be normal. ECG was normal with sinus rhythm and 2D-Echocardiogram showed no abnormality. CT Brain was also normal with no skull or brain injury.

The patient was given maintenance IV fluids with normal saline and analgesics for pain control. He was shifted to ICU for observation and monitoring. On the second day of admission, discrete, hyperkeratotic, elevated dry papular lesions were observed over the...
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anterior aspect of abdomen and thighs (Figures-1, 2 & 3). Dermatology consult was taken and on examination under magnifying lens, hyperkeratotic lesions were found to have an appearance of miniature fern trees. A Moisturizing lotion was applied over the lesions and the lesions disappeared over the next 3-4 days. Subsequently the patient was discharged. On follow up after 2 weeks he reported no further complaints.

Figure-3: Miniature fern tree lesions on left thigh

Discussion
Lightning may reach its victims by any of the following routes and cause injuries [6,7] : 1. Direct strike (most dangerous): when the major current flows directly through the victim and is facilitated by metal objects. 2. Splash (most common): where lightning strikes an object first and then arcs through the path of least resistance. 3. Contact: the bolt strikes an object the victim is in contact with i.e. electrocution while telephonic conversation. 4. Ground current: here the lightning travels along the surface towards the victim after striking the ground. 5. Blast injury: from shock wave. The vast majority of lightning injuries are first- and second-degree burns to the skin. Burns associated with lightning appear in several forms: feathering, linear, punctuate, thermal (from ignition of clothing), contact (from metal objects such as jewellery or zippers) and flash [8].

It is observed in the present case report that the subject probably sustained injury by the second mechanism mentioned; lightning passed through the nearby tree and through the ground resulting in mild lightning injury. He had an initial erythematous rash over the anterior abdomen and thighs which later evolved into discrete hyperkeratotic papular lesions with miniature fern tree appearance under magnification. These feathering burns are pathognomonic of lightning and are known by such names as Lichtenberg's flowers, filigree burns, arborescent burns, and ferning and keraunographic markings [5]. These are not true burns and may represent blood cells forcefully extravasated into the superficial layers of the skin from contracting capillaries [5]. They are usually not prominent on admission and may evolve over the first several hours. He had a transient loss of consciousness for a brief period and regained consciousness without any intervention. Lightning paralysis or keraunoparalysis is a transient paralysis associated with extreme vasoconstriction. He responded well to the supportive treatment and the skin lesions have disappeared with the application of moisturizing lotion.

References
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