



Pathology Biology Section – 2011

G38 A Peculiar Fatal Lightning Strike Inside a Cottage

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After attending this presentation, attendees will learn about a case of instantaneous death due to a peculiar form of lightning storm.

This presentation will impact the forensic science community by stressing the importance of crime scene investigation in order to assess real causes and means of death.

Lightning strike is a fascinating and unpredictable natural phenomenon with potentially devastating effects and represents one of the most common causes of deaths from environmental phenomena. The incidence of fatalities had been estimated in the United States to be around 150-300 cases/year (Duclos PJ et al, 1990), representing a third of all lightning strikes (Sheela SR et al, 2000).

Benjamin Franklin first demonstrated 200 years ago that lightning consists of a gigantic electrical discharge. The physical processes that take place in and around a thundercloud occur at the micro-particle level and at a much larger scale that involves the entire Earth as an electrical circuit. Lightning happens when the difference in voltage between a cloud and the ground or another object exceeds 2 million V/m. Afterwards, an arc occurs and there is the release of a great amount of electrical energy that can cause severe damage to organs, also resulting in high mortality (Copper MA et al, 2001).

The most vulnerable subjects for lightning strike are individuals who work in open fields such as farmers or swimmers; additionally, it is more rare for lightning to strike inside a building as in the case hereby presented.

The risk of being struck by lightning is also a function of population density and it comprises terrain features that may protect or not occupants of an area (Ritenour AE et al, 2008).

According to literature review, data appears to be significantly affected by underreporting when comparing Meteorological Offices to medical and death-certificate databases (Cherington M et al, 1999).

Five most common mechanism of injury were described: direct strike, ground current, flash discharge, contact strike, and blunt trauma.

A 53-year-old man started to renovate his own cottage after lunch. In the evening, receiving no answer from him, the family called the police. When they arrived, with the forensic pathologist, the scene investigation revealed the man lifeless lying on his right side between two metal sawhorses. The body was covered by burnt pieces of his working clothes. The man presented diffuse second, third, and fourth degree burns in several areas of the body but especially in the abdominal region, in the root of the thighs, and on his genitals.

There was complete carbonization of beard and hairs all over the body and the scalp. The surrounding environment showed no signs of burning. His working tools were scattered around and there was a generator that had been set up to perform the work. However, the firefighter technical assistant found no damage to the generator or electrical malfunction.

The Meteorological Office reported that in the same area, few hours before, there had been a thunderstorm. Moreover, another person had been simultaneously injured by a lightning strike while crossing a bridge in the same village.

The cottage presented a rudimentary system of walls containment with steel beams pointing from outside to the center of the premises through the roof. The beams might have played a decisive role in the conduction of an electrical atmospheric discharge. This was further facilitated in the room by the presence of metal working tools directed toward the ceiling.

All investigation data suggested that a lightning had entered into the cottage through the beams creating an arc in the point where the victim was working.

Necropsy and histological findings confirmed the suspicion of lightning strike.

In conclusion, a detailed analysis of crime scene investigation, environmental, and autopsy data led to the correct determination of the real nature of the suspicious death which could be related to other different causes which may also be not accidental.

Lightning Strike, Fatal Injury, Crime Scene Investigation