Lightning - The Wrath of Zeus

With the thunderstorm season upon us again, this week's article discusses the potentially fatal lightening that often accompanies these storms.

The first descriptions we have of lightning strikes were by the Greeks. They believed lightning strikes were punishment from Zeus. With over 10,000 thunderstorms with lightning each year in the United States, Zeus would be kept very busy.

Between 75 and 150 people die each year from lightning strikes. According to the lightning research department at the University of Illinois, these deaths and over 700 permanent injuries occur each year. With regards to deaths due to natural phenomena, only floods kill more people each year.

What is lightning? The basic idea is that clouds become ionized—the movement of rain, hail and wind creates a separation of charges within the cloud, the top becomes positively charged and the bottom becomes negatively charged. The negative charge at the bottom creates a positive charge on the ground in a "shadow" of the charges above. A zigzag-type stroke begins downward from the cloud, when it reaches 150-300 feet from the ground, a positive stroke from the ground rises to meet the negative charge that is coming down.

When the two meet, the result is the 100 million to two billion volt charge that travels at 62,000 miles per hour. Incredible heat can be created—up to 25,000 degrees Celsius (the temperature on the surface of the sun is around 6,000 degrees).

There are four different types of strikes that can affect people. First is the direct strike, which is the most dangerous as the full force of the lightning is directed at the person. The second, and most common, is the "splash" or "side-flash" which occurs when the lightning strikes a nearby object and jumps to the person. This can also happen from telephone lines or metal pipes.

The third is "step" or "stride" strike. This happens when the ground is struck near a person, and since the person is a better conductor than the ground, the electricity will travel up one leg and down the other. The fourth strike is blunt trauma. The electricity can create a contraction of the muscles that can throw the body or make it fall to the ground. Also, with the heat created, a major pressure change can occur that can be forceful enough to damage ear drums or slam against the body.

July is the month with the largest number of lightning injuries and deaths. Although you are not statistically very likely to be struck by lightning, people in rural areas are often outdoors at the onset of thunderstorms and are therefore more likely to be affected by lightning than people in urban areas. Even when a thunderstorm is at a distance, lightning can still be a danger as lightning strikes can happen up to ten miles ahead of the storm.

If struck by lightning, there can be a number of symptoms, from feeling a shock to sudden death. Around three-quarters of all lightning victims are unconscious after the strike.

The most common form of death is due to the heart stopping. The heart relies on a complex electrical rhythm that regulates its precise contractions. This electrical system can be off-set by the immense electricity from the lightning.

The brain is also an electrically controlled organ and effects can range from apnea (the brain not directing the body to breath) to seizures that can occur up to months after the strike. Among other possible injuries, bones can be broken and skin can be burned to varying degrees.

The person that immediately survives a lightning strike will usually live. The most common problems that people have after being struck by lightning are psychological, including post-traumatic stress disorder, fear of storms, nightmares and personality changes. The best

treatment is to avoid being struck.

Most buildings are safe from lightning and no contact should be made with objects that connect to the outside of the house, including power lines, telephones or plumbing. A building with a metal roof and non-conducting walls is not safe. An entirely metal building is safe. The best thing to do is crouch low in the center of the building with feet placed together.

If caught outside without any shelter, you can get into a vehicle with a solid metal top while avoiding contact with any metal. Do not stand near tall objects, get out of the water or out of a boat, and obviously, do not stand in an open area.

Justin Newman is originally from Holyoke and is attending medical school at the University Of Chicago Pritzker School Of Medicine.

Justin can be reached by email at Justin.Tyler.Newman@gmail.com with comments or ideas for topics that you may desire to be addressed in this column. The goal of this column is that you find it not only entertaining and informative but also that it creates a desire to take a life-long interest your health and body.