

Lightning Data Center
Minutes
December 14, 2001
St. Anthony Central Hospital

Quote of the Month:

"As a flash of lightning in the night shows up in an instant every detail of a wild landscape, so at one glance I seemed to see every possible result of such an action..."

Dr. Watson (Sir Arthur Conan Doyle) in *The Adventure of Charles Augustus Milverton*)

1. Meeting began at 11:30 am and adjourned at 1:45 pm.
2. Members present: Cherington, Collier, Gartner, Glancy, Foley, Hislop, Hodanish, Lammertse, Langford, Larson, Lines, McDonald, McDonough, Olson, Paton, Russon, Wachtel.
3. I brought the following articles from the literature (abstracted in part here):

a.) Aslar AK, Soran A, Yildiz Y, Isik Y. Epidemiology, morbidity, mortality and treatment of lightning injuries in Turkish burns units. *Int J Clin Pract* 2001;55:502-504.

"22 lightning burns were treated...The mean age of the patients was 32.9...The most common clinical symptoms were confusion, amnesia (5 patient), neurological dysfunction (2 patients), cystitis (4 patients), and cardiac arrhythmias (1 patient). There were no deaths...The most common long-term complication was chronic pain."

b.) Muehlberger T, Vogt PM, Munster AM. The long-term consequences of lightning injuries. *Burns* 2001;27:829-833.

"12 patients were treated within a period of 12 years...none of the patients suffered from any deficits or long-term problems."

c.) Cohen MA. Struck by lightning. *Acad Emer Med* 2001;8:893-931

"A 42 year old male carpenter was inside a house...waiting for an electrical storm to pass...a 'ball of fire' suddenly emerged from a light switch...and struck him on the right shoulder...Although apparently initially uninjured, survivors of lightning strike can experience significant cognitive and neuropsychologic sequelae."

4. Dan Lammertse, MD, Medical Director of Craig Hospital gave an outstanding presentation. His topic: Update on Catastrophic Injury: SCI & TBI due to Lightning & Electricity. {SCI = Spinal Cord Injury; TBI = Traumatic Brain Injury}

I cannot do justice to his talk by trying to write a summary here. I shall transcribe my notes that were taken during Dan's presentation:

a. History of Craig Hospital. Founded in 1907 by Frank Craig. He was here for TB treatment. In 1956, Craig became a Rehabilitation Hospital. John Young, MD was the first medical director. In 1974, Craig became a Model SCI System Center. One of 16 such systems established by the Federal Government. In 1998, Craig became a Model TBI System Center.

b. Average length of stay of patients in Craig Hospital TBI - 55 days; Paraplegia patients - 55 days; Tetraplegia patients - 85 days.

c. Case 1 26 year old woman and her friend sought shelter under tree on a golf course during thunderstorm in July 1997. She suffered a cardiac arrest. CPR was administered. Her friend was killed by the lightning. She was hospitalized with a devastating neurologic problem: severe hypoxic-ischemic brain injury. This condition is common. It is not due to direct effect of lightning on the brain, but secondary to impaired blood flow to the brain. If blood flow to the brain is not re-established within 4 to 5 minutes, damage to brain cells begins. She also suffered myocardial injury and ruptured ear drum. Months later she still had severe short term memory impairment, a hallmark of hypoxic encephalopathy.

d. Case 2. 27 year old amateur rocket enthusiast attempted to retrieve his rocket from a power line. He received a shock, causing him to fall from a ladder. He landed on his back and fractured a vertebrae (T - 6), resulting in paralysis of his lower limbs (paraplegia). Other complications: heterotopic ossification of the hip (commonly seen in spinal cord injured patients); deep vein thrombosis. Serum CPK was elevated suggesting muscle involvement. In the setting of severe paraplegia, it may be difficult to diagnose muscle disease. In answer to a question, Dan stated that he has not seen myopathy as a complication of lightning.

Dan pointed out that in many cases there are multiple factors: e.g. direct lightning strike; cardiac arrest; falls and secondary injuries.

e. Case 3 23 year old man was struck by lightning while standing on an outside balcony. He did have a cardiac arrhythmia. Treated by paramedics. He had ferning patterns on the skin.

f. Case 4. 51 year old man who suffered a direct strike to his head by lightning on a clear day (bolt from the blue). He sustained a cardiac arrest and hypoxic encephalopathy with severe neurologic impairment. This case has been reported in the past: *Neurol*;1997;48:683-6.

Ron Larson stated that he had read that ferning patterns are associated with positive lightning flashes. Steve Hodanish stated that, if he were called within 30 minutes of lightning strike, he can ascertain the polarity of the strike. Sheryl Olson, flight nurse, is the LDC member who is most likely to be on the scene shortly after a lightning incident. Sheryl and Steve may be able to work on this project in the future to determine the validity of Ron's assertion.

5. Joe Molen sent by email the following article to the Lightning Data Center:

Where Lightning Strikes. <http://science.nasa.gov/headlinesy2001>.

6. These minutes do not represent official positions of LDC. They reflect the comments of members present at the meeting.

7. Next meeting: January 11, 2002 in the Main Auditorium of St. Anthony Hospital.

Guest Speaker: Bruce Paton, MD

Topic: Wilderness Medicine

Happy Holidays, everyone.

Michael Cherington, MD