

Lightning Data Center  
Minutes  
April 19, 2002  
St. Anthony Hospital  
Denver, CO

Quote of the Month:

"Knowledge comes but wisdom lingers."

Alfred, Lord Tennyson

1. Meeting began at 11:30 am and adjourned at 1:15 pm.
2. Members present: Arendt, Berger, Bradley, Burrows, Cherington, Foley, Keen, Lines, Madayag, Mains, McDonough, Offner, Resler, Russon, Stewart, Swanson, Thornburg, Wachtel, Wallace, Wilbourn, Woodward, Yarnell.
3. I brought the following articles from the literature (abstracted in part here):
  - a. Cherington M, Yarnell PR, Lane J, Anderson L, Lines G. Lightning-induced injury on an airplane: coronal discharge and ball lightning. J Trauma 2002;52:579-581.

"We present a flight attendant who suffered prolonged neurologic sequelae from lightning-induced CD during flight...This electrical accident occurred immediately after the plane was struck by lightning. CD and BI are real but poorly understood phenomena. Lightning-related disasters on airplanes are uncommon."
  - b. Williams ER. Sprites, elves, and glow discharge tubes. Physics Today November 2001:41-47.

"In the summer of 1993...Sentman and Lyons found two broad classes of flash: sprites... and elves...These short-lived luminous shapes...are associated with large thunderstorms called mesoscale convective systems....Lightning, the auroras, glow discharges, and sprites are all luminous plasmas characterized by intermediate concentrations of free electrons."
  - c. Weiss P. Anatomy of a lightning ball. Sci News 2002;161:87-89.

"Of the many scientific theories of ball lightning, most depict the phenomenon as some kind of plasma, or hot gas of electrons and positively charged atomic or molecular ions. That's a reasonable expectation since ball lightning generally has been reported to occur along with thunderstorms whose ordinary lightning bolts ionize the air, creating columns of plasma along their paths."
4. Phil Yarnell provided a clinical follow-up of the ball lightning/coronal discharge patient. His symptoms (insomnia, difficulty concentrating, etc.) persist. His symptoms are disabling and the patient is unable to return to work. Phil commented that the neurobehavioral syndrome is common to many patients after being struck by lightning. Asa Wilbourn asked

what is the usual duration of this syndrome. Phil answered that the duration is typically long-term and often permanent.

5. Our guest speaker today was Professor Gerard Berger of France. Gerard has a degree in Electrical Engineering and received his Doctor of Sciences from Paris University. He is the Research Director at the Laboratory of Physics of Gases and Plasmas. In 1988, Gerard founded and is President of the International Workshop on Physics and Lightning (IWPL). His topic: New Knowledge on Lightning Detection and Protection.

Gerard provided us with an excellent presentation that evoked much discussion from many present. I shall not attempt to summarize his lecture here. However, I shall replicate the scattered writings from my note pad.

- a. Lightning Warning Systems -- Advantages and Disadvantages. Field Mill; Thunderstorm sensors
- b. Satellites  
Low observation type -- clear, but only 3 minute period for observations  
Global satellite -- Longer time to explore, but too far a distance to detect many lightning flashes.
- c. Lightning clouds  
Continental clouds -- contains dust and other particles  
Maritime clouds -- If the water droplets are large and heavy, they might not reach a freezing zone, and therefore, not much lightning. Small droplets in the clouds consistent with more lightning.
- d. Electric current can exist in some lightning flash situations where the plasma channel does not reach high temperatures and intensity.

Howard Wachtel, Charles Mains, and others joined in the discussion about the clinical implications of this assertion. Howard asked Gerard about the concept of "invisible lightning" - a channel of current with amperage too small to heat a plasma channel. Howard suggested that this may explain the phenomenon of lightning injuries in individuals without skin burns. Charles mentioned that defibrillators work by applying current without accompanying burns to the patient. We agreed that this topic will be revisited here again in the near future.

Gerard, thank you for your outstanding lecture. Merci beaucoup!!

6. These minutes do not represent official positions of LDC. They reflect the comments of member present.
7. Next meeting: 11:30 am, Friday, May 10, 2002 in the Main Auditorium of St. Anthony Central Hospital.  
Speaker: Maury Miller, Larimer County Coroner  
Topic: Lightning and Forensic Science

Respectfully submitted,

Michael Cherington, MD