

Minutes Friday, August 8, 1997 Lightning Data Center Centura Health St. Anthony
Central Hospital

Quote of the Month:

"The purpose of education is to help students defend themselves against the seductions of eloquence."

Bertrand Russell (in June 1997 *Pediatrics*)

1. Meeting began at 11:30 am and adjourned at 1:15 pm.
2. Members present: Cherington, Clark, Foley, Gustafson, B Johnson, Kamin, Kimberling, Lilly, Peterson, Simmons, Sulzer, Swanson, H Wachtel, T Wachtel, Yarnell. Guest - K Watters of Watters Works Productions.
3. The members of our Administrative Committee are: Keen (Chair), Cherington (Vice Chair), Foley, Gustafson, Holle, Kamin, Kithil, T Wachtel, Yarnell.
4. I brought the following articles to the meeting:

a.) Verd S, Henshaw D, Sharma A. *Childhood cancer in schools with a radioactive lightning rod*. Arch Dis Child 1997;76:479-480.

"Radioactive lightning rods (RLR)...in Spain...have a bolster containing 100 mg Americium 241. This isotope is an alpha emitter...Ingestion of radioactive particles might arise in the event of storms damaging A RLR, when contaminated radioactive material might reach the courtyard of the school where children play. Most alpha radionuclides are bone seeking."

b.) Yamazaki M, Bai H, Tun Z, Ogura Y, Wakasugi C. *An electrocution death of an infant who had received an electric shock from an uncovered oval shaped lamp switch in his mouth while in a hospital*. J Forensic Sci 1997;42:151-4.

"The cause of death in this case may have been that electric current applied to the lips traveled along the laryngopharyngeal mucosa and reached the heart via the esophagus, trachea, and other organs...Myocardial vacuolation is a common finding of electric shock after death."

c.) Romer C, Andell-Riera J, Gracia RM, Fernandex MA, Aguade S, Peracaula R, Soler-Soler J. *Myocardial necrosis by electrocution: evaluation of noninvasive methods*. J Nucl Med 1997;38:250-51.

"The most frequent causes of cardiac damage are the direct currents from arm to arm and from arm to leg...Electrical shock may produce necrotic bands in the nonstriated muscles of the coronary arteries and also arterial thrombosis. The right coronary artery, because it is closest to the thoracic wall, is the most vulnerable to electrocution."

d.) Levine RL, Wayne MA, Miller CC. *End-tidal carbon dioxide and outcome of out-of-hospital cardiac arrest*. NEJM 1997;337:301-6.

"Survival after cardiac arrest occurring outside the hospital averages less than 3 percent...Levels of alveolar carbon dioxide are determined by carbon dioxide

production, alveolar ventilation and pulmonary blood flow...As an indirect measure of cardiac output, end-tidal carbon dioxide represents a potential predictor of survival or death after cardiac arrest...An increasing body of literature suggests that the end-tidal carbon dioxide level can be used to determine when advanced life support can be discontinued."

e. Graham B, Holle RL, Lopez RE. *Lightning detection and data use in the United States*. Fire Management Notes 1997;57:4-9.

This is a fine review on lightning detection. The authors discuss the types of lightning detection sensors in the United States: "direction-finding and time-of-arrival technologies.

5. I read a letter from Phil Krider. Phil refers to two entries from *Niles Register* where ice water was applied to persons injured by lightning, "apparently with success." One of the entries (October 6, 1832) describes a lightning strike to the home of Chief Justice John Marshall. Members of the LDC suggested that the role of cold or ice water was that of a stimulant.
6. Kevin Watters presented a case of a man who was struck by lightning 15 to 20 years ago. Since then he has avoided alternating current because he experiences the "feeling of lightning" traveling in his body. No one in the group could recall a similar case, nor could they give a plausible physiologic explanation. However, many believed that the symptom deserved further consideration. Carl Swanson wondered about the similarity to "RSD" where patients might have hyperpathic responses to minimal tactile stimulation.
Several in the group suggested a possible diagnostic procedure would utilize a Faraday cage, if the patient wanted to pursue this. In a blinded study, neither the patient nor the examiner would know when the current was turned on and off. Tom Wachtel stated that a Faraday cage was located in Fort Rucker, Alabama. Phil Yarnell reminded us that it would be difficult, if not impossible, to make any conclusions without actually seeing and examining the patient.
7. Phil Yarnell presented the history of two patients who suffered telephone related lightning injuries. One of the patients was presented at an earlier meeting. She had mild facial nerve weakness. A facial nerve palsy was documented by electrophysiologic studies. Phil also presented the history of a boy scout who was admitted to the Hospital after a recent lightning strike. He had lost consciousness but recovered. He was sitting on a wood bench inside a tent when the lightning struck. The flash-to-bang time was less than 1 second. Warren Simmons suggested that the patient's symptoms may have been second to blast effects rather than due to electric current. Mike Foley stated that the soil resistance in the vicinity was high and therefore a poor conductor of current.
8. Warren Simmons reported on the recent tragedy where 2 golfers were struck, one fatally, when they sought shelter under a tree. Just prior to that event, other golfers in a cart had invited the two to drive into the club house. Al Sulzer, Phil Yarnell, and Tom Wachtel discussed the availability of "smart defibrillators." Should they be accessible to those on golf courses. Al warned of the dangers of defibrillators being used injudiciously by non-medical persons in situations where they may not be indicated. Warren brought a poster prepared by the Golf Association that does not caution against the use of metal cleats in shoes. Tom Wachtel told of seeing cases where the burns on the feet of lightning casualties corresponded to the cleats on the shoes. Many of us suggested that non-metal shoes might be preferable.

Warren distributed a brochure of the CGA with a lead article entitled: "Don't get fried, get inside." He also brought a "Weather Wire" from the "Skyview Weather Meteorological Services" that addresses the subject of thunderstorm ingredients. These ingredients include: moisture, instability, and lift.

9. Peggy Gustafson told us that on September 16 she will receive the results of a survey of community schools. She believes that many will want programs on lightning safety.
10. Alan Sulzer reported that early studies on the use of CPR were done at the University of Pittsburgh. CPR was applied to people who suffered electrical trauma after working on telephone lines. He stressed the importance of supporting the circulation because of the effects of acidosis and increasing levels of lactic acid. Because of these metabolic abnormalities, it is important to provide defibrillation to those in need as quickly as possible.
11. Jim Peterson, a new member, is an accident investigator for the U.S. E.P.A. One of his earliest tasks was to investigate a lightning strike to a cold storage facility. He and others were concerned about the release of ammonia.
12. Mike Foley distributed 3 articles: a.) lightning risk analysis; b.) Notes on Benjamin Franklin's experiments; c.) recent article from Scientific American on lightning and lasers. The authors suggest that with laser technology, a specific channel can be ionized and lightning might be directed.

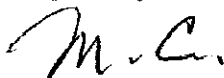
Mike will provide some suggestions on revising our mission statement. We invited all members to do the same. Hopefully, we shall write a new mission statement in the near future.

Mike and Steve Clark spoke about a new Forecast System Laboratory at NOAA in Boulder. Perhaps, we can plan for a field trip there in the near future.

13. Julie Kimberling reported that data collection continues on our ongoing study about the numbers of lightning casualties in Colorado. Steve Clark is helping to obtain data from news clippings.
14. Howard Wachtel asked the question: Can magnetic field changes induced by lightning be enough to cause a cardiac arrest? Al Sulzer commented that the T wave was the vulnerable period (of repolarization) in ischemic hearts.
15. Tom Wachtel announced that the American Burn Association will be meeting on March 18 to 21, 1998 in Chicago. Deadline for abstracts is September 15, 1997.
16. Carl Swanson showed us some remarkable slides and videotape of lightning strikes. Part of Carl's show is a question and answer format in asking the group to identify photographic phenomena such as possible upward streamers.
17. Several of our members will be presenting papers at the meeting of the American Association of Physics Teachers on Thursday, August 14, 1997 at the University of Denver. The Morning of Lightning Topics will commence at 8:30 am. Many of our members will be gathering for an informal dinner meeting at Bella Ristorante in the Park Meadow Mall on Wednesday, August 13, 1997. All LDC members are welcome to join us there. The cost is \$19.95 per person (not including beverages).

18. Next meeting of the LDC is on Friday, September 12, 1997 at 11:30 am in the Main Auditorium of Centura Health St. Anthony Central Hospital.

Respectfully submitted,



Michael Cherington, MD
Chairman, Scientific Committee LDC