

LIGHTNING DATA CENTER
MEETING MINUTES
April 8, 2005
St. Anthony Hospital, Denver, CO
www.stanthonyldc.org

April 15, 2005 – U.S. tax day.

Members Present:

Philip Yarnell, MD; Rich Kithil; Fr. Denis Wermuth; Steve Clark; Greg Stewart; Ken Langford; Al Nibbe, MD; Karen Wells; Dan Breed; Rich Collier; Robert Gift; Youging Cui-Gift; Sheryl Olson, RN; Larry Moore, MD; Richard Keen, Ph.D.; Noel Mullen; John Gartling, RPA; David Gahagan; Howard Wachtel, Ph.D.

The meeting began with two articles presented for interest; one, “An Investigation of Electrical Deaths,” a report of 220 fatalities by Wright and Davis. Journal of Forensic Science, volume 25, July 1980, pages 514-521. The ratio of high- to low-voltage electrocution fatalities was found to be 1:1. In the low-voltage deaths, electrical burns were absent in 40% of the cases. In investigation of possible electrocution equipment, “autopsy” of equipment was indicated. Then an article on bathtub-related electrocutions in the United States, 1979 to 1982, from the Journal of the American Medical Association, August 17, 1984, volume 252, #7, pages 918 to 920, hair dryers were responsible for 60% of the deaths. It is felt that appliances should be disconnected when not in use and not used in wet bathtubs and kept away from children.

A patient was kind enough to come to discuss his history of five lightning-related events leaving him with predictive symptoms of lightning, of becoming nauseated with hand tingling, of burning in various extremity parts and total body spasms. This gentleman noted that he had these symptoms before a lightning detector of a storm up to 40 miles away was triggered.

Ken Langford presented his ideas for the Lightning Data Center logo, and this was passed around the group for their input.

We discussed an e-mail from Chris Anderson regarding a lady with an implanted pacemaker/automatic defibrillator combination who had the defibrillator triggered repeatedly while touching the tap in the shower as long as she was grasping the tap. This ceased when the husband forced a separation from the tap, and he received no shock when doing so. Rich Kithil felt that this may be a case of multiple-point groundings rather than a single point to ground, i.e., so-called floating potentials. Sheryl Olson and Dr. Larry Moore noted that it is extremely rare for the defibrillator to be triggered by an external source, i.e., surrounding electric fields, x-ray equipment, the vibration electromagnetic fields in flying helicopters, etc. It was suggested by cardiologist, that this might be a case of equipment failure, and the defibrillator should be investigated. Dr. Nibbe noted that the implantable ventricular defibrillator is becoming more common and is felt in some cases to be necessary when the ejection fraction is less than 25%. Rich Kithil and Dr. Howard Wachtel both pointed

out there might be different grounding issues, though apparently this was not found in the case submitted. Howard noted that cases of farm animals not drinking from an electrified water trough because of grounding failure causing shocks leading to dehydration.

A further e-mail was submitted from the Lightning Strike Survivor Association asking if we were acquainted with individuals with a history of being struck by lightning, then having markedly increased life-long energy. The group was not able to respond in their knowledge of such an event.

Our speaker was Daniel Breed, an atmospheric scientist from NCAR who talked on lightning detection with three-dimensional lightning mapping. One cannot do justice to the details of Dan's presentation. It involved discussing the LMA (lightning mapping arrays) using various VHF detectors which showed how the use of multiple detectors can help give us a three-dimensional survey of the lightning events over specific areas. He first started out with some physical explanation of how lightning evolves and then showing a charge diagram of clouds, discussing that some of the Sprite and elves emerge from the top of the clouds. He noted that the steps in the cloud-to-ground discharge involve charge separation and distribution, preliminary breakdown, a step leader, an attachment process-ground streamer, dart leaders and subsequent return strokes. There are many lightning flashes, much greater than just a single one attachment to the ground. He noted that the total lightning involves both IC, i.e., inter-cloud, and CG, cloud-to-ground, lightning. The simplest form of lightning detection is a flash to bang with five-second intervals going one mile away from where the lightning occurred. Use of various lightning detection devices could involve optical imaging, acoustical imaging, measuring electrical fields of 1000 hertz, (having an AM radio pick up) lightning static and lastly the V.H.F. (very high field – T.V. frequency detectors).

He ended by discussing the applications of LMA: 1) That total lightning includes both IC and CG strokes; 2) that this measurement is a better indicator of the developing severity of the storm than just cloud-to-ground strokes; 3) that the detection gives details of the position and horizontal extent of the storm and may lead one for check for further cloud-to-ground events; 4) that the total lightning events are related to precipitation development both temporally and spatially; 5) that detection of very high-field radiation sources, the measure of total lightning events, provide information on storm structure and development for predictive behaviors; 6) that the IC events proceed the CG lightning strikes; 7) that lightning is related to up-draft velocity and ice particle phenomenon. Dan showed us a map of the world showing lightning distributions over time which evolved great interest.

These minutes do not represent official positions of LDC or its members. They simply reflect comments made during the meeting.

Next meeting: Friday, May 13, 2005 at 11:30 am in the Main Auditorium of St. Anthony Central Hospital. Dr. Al Nibbe will be presenting a talk on "High Voltage and Low Voltage Electrical Burns".

Philip R. Yarnell, M.D.

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