

LIGHTNING DATA CENTER
MINUTES
JULY 15, 2005
ST. ANTHONY CENTRAL HOSPITAL, DENVER, CO
www.stanthonyldc.org

Quote of the Month:

“When I was a child I had to boil soap, notwithstanding my father was wealthy, and I had to get up early and study geometry at breakfast, and peddle my own poetry, and do everything just as Franklin did, in the solemn hope that I would be a Franklin some day. And here I am.”

Mark Twain in his essay: The Late Benjamin Franklin

1. Meeting began at 11:30 am and adjourned at 1:20 pm.
2. Members present: Cherington, Clark, Collier, Flanders, Foley, Gift R, Gift Y, Kithil, McDonough, Nitka, Shanks, Stewart, Wachtel, Wells, Yarnell.
3. I brought the following articles (abstracted in part here):

- a. Arnoldo BD, Purdue GF, Kowalske K, et al. Electrical injuries: a 20 year Review. J Burn Care Rehabil 2004;25:279-484.

“review on institution’s experience with electrical injuries 700 electric injury admissions 263 were high voltage (>1000v), 143 were low voltage (<1000 v), 277 were electric arc flash burns, and 17 were lightning injuries. Mortality was highest in the lightning strike (17.6%) compared with the high voltage (5.3%) and low voltage (2.8 %) injuries, and mortality was least in electric arc injuries without passage of current through the patient (1.1%). Complications were most common in the high-voltage group.”

- b. Nunnelee JD. Summer injuries: Lightning Strikes. RN 2005;68:44-50.

“there are two ways in which a person can sustain blunt injuries the almost instantaneous expansion and contraction of air near the lightning creates a shockwave that can throw a victim or cause contusive injuries known as blast injuries. In a direct lightning strike, the victim’s muscle contractions throw him or cause him to fall lightning rarely causes deep burns because of the flashover phenomenon. Feathering burns.aren’t true burns. Electron showers that flow over the body leave a distinct fernlike pattern on the skin.”

- c. Adekoya N, Nolte KB. Struck-by-lightning deaths in the United States. J Environmental Health. 2005;67:45-50.

“The authors analyzed data from CDC’s National Center for Health Statistics (NCHS) multiple-cause-of-death public-use data tapes for the interval from January 1, 1995 through December 31, 2000. These mortality data were compiled from death certificates submitted from the vital-records offices of all 50 states in the United States and the District of Columbia. It was found that a total of 374 struck-by-lightning deaths had occurred during 1995-2000. The majority of deaths (286, 75 percent) were from the South and the Midwest. The numbers of lightning deaths were highest in Florida (49 deaths) and Texas (32 deaths). A total of 129 work-related lightning deaths occurred. Agriculture and construction industries recorded the most fatalities one of every four struck-by-lightning deaths was work related.”

4. Bob Nabours sent an email regarding GFCI that was discussed in LDC minutes. Bob is a forensic electrical engineer in Tucson. He has examined many cases of electrical shock and electrocution via hair dryers and underwater lights submerged in bathtubs, swimming pools and spas. He stated that a “GFCI is only effective if there is a ground fault path from the energized conductor to ground with sufficiently low impedance to provide the 5 mA differential current between energized conductor and neutral (grounded) conductor. In those cases the ground path (independent of neutral) was not sufficiently conductive to allow this differential current to flow.” Reference: Electrical Injuries Engineering, Medical and Legal Aspects 2nd ed. By Robert E. Nabours, Raymond A. Fish, and Paul F. Hill.
5. Greg Stewart reported on the progress of Mountain Safety Committee. Rich Kithil agreed to work with the committee on developing a safety seminar plan.

I shared emails sent by Ron Holle. Ron wrote: “It’s unsafe to be anywhere anyplace in the open, under trees, on the water, in tents, or in small ungrounded shelters. In short, there is nowhere to go outside that makes any difference.” Ron’s email inspired a good deal of discussion. Many agreed but with provisions. Greg and Rich Kithil stated that there are dangers indoors. Rich Collier pointed out that although no place outside is absolutely safe, “some places may be safer than others.”

Greg asked if emergency treatment of lightning victims differed from other out-of-hospital cardiac arrest situations. Ernie Nitka stated that emergency treatment follows the same A,B,C plan (airway, breathing, circulation) employed in other emergency situations.

6. Howard Wachtel just returned from the Bioelectromagnetics Meeting in Dublin, Ireland. He reported on two topics that were discussed: a.) Taser injuries; b.) ‘Subvisible’ lightning that can produce ventricular fibrillation. He said that ambient daylight is a factor as to whether witnesses report seeing lightning. He told us that on a dark night (from his patio), he can see lightning near Pike’s

Peak 100 miles away. A weak lightning channel of 100 to 1000 amps can produce ventricular fibrillation without causing skin burns.

7. Rich Kithil gave a fascinating presentation about Lightning Protection for People and equipment at a Gold Mine Construction company high in the Peruvian Mountains. I cannot do justice to his presentation and dramatic pictures in these minutes. I shall write down here information from my notes.
 - a. Worldwide, there are 10,000 to 25,000 lightning fatalities annually. There is a need for lightning safety information in 3rd world countries.
 - b. A Peruvian Gold Mining company sought Rich's input for lightning safety measures for people and equipment.
 - c. The rule at the construction site: work stops and workers are instructed to go indoors when lightning is detected 7 miles away. But where to go? There are few shelters on the mountain top. Rich suggested they utilize shipping steel containers (10 feet high) as Faraday cage shelters. Workers can be instructed by radio to enter nearby containers during the storms.
 - d. Overhead shield wires are placed to protect equipment and fuel tanks.
8. These minutes do not represent official positions of LDC or its members. They simply reflect the comments made at the meeting.
9. Next meeting: August 12, 2005 at 11:30 am in the Main Auditorium of St. Anthony Central Hospital.

Speaker: Rich Collier

Topic: Mathematic Modeling of Lightning Environments.

Respectfully submitted,

Michael Cherington, MD