

**LIGHTNING DATA CENTER  
MINUTES  
October 14, 2005  
St. Anthony Hospital, Denver, CO  
[www.stanthonyldc@centura.org](http://www.stanthonyldc@centura.org)**

Quote of the Month:

“Franklin was intrigued by the odd unpredictability of lightning, how it might kill a cow instantaneously yet leave a milkmaid unscathed, why a boy sitting between two men struck by lightning felt no effect even as one of the men fell dead.”

Philip Dray in *Stealing God's Thunder*, 2005 Random House

1. Meeting began at 11:30 am and adjourned at 1:40 pm.
2. Members present: Barron, Cherington, Clark, Davis, Flanders, Foley, R Gift, Y Gift, Langford, Madayag, McDonough, Nibbe, Rossie, Sellon, Stewart, Wachtel, Wells, Yarnell.
3. I brought the following articles (abstracted in part here):
  - a. Hahn I-H et al. Cellular phone interference as a cause of acute epinephrine poisoning. *Ann Emerg Med* 2005;46:298-9.

“Electromagnetic interference typically occurs only when an electromagnetic field of sufficient signal strength and proximity overrides the internal signaling of a corruptible device and the field matches or is a harmonic of the programmed medical device frequency. In this circumstance, the transmitted signal is interpreted by the medical device circuitry as instructions. An 18-year old man with septic shock was admitted to the pediatric intensive care unit. An epinephrine infusion was initiated. The patient developed pulmonary edema, ECG changes, and myocardial damage. The hospital investigation team found that the epinephrine infusion bag contained only 12 ml although it should have contained 36 ml suggesting that the patient acutely received an excess of 24 ml of epinephrine.  
The staff noted that a family member received a phone call on a personal cellular phone just before the patient's acute episode. The engineering department retrieved the pump. Several personal cell phones were held at varying distance. It was concluded that electromagnetic interference from a cellular phone triggered the infusion pump to malfunction and deliver excess epinephrine.”
  - b. Hendler N. Overlooked diagnoses in chronic pain: analysis of survivors of electric shock and lightning strike. *J Occup Environ Med* 2005;47:796-805.

“Patients who survive lightning strikes are rarely seen in clinical practice and patients with electrical injury are seen infrequently. This article reports the most commonly overlooked diagnoses so that physicians can improve their evaluations.”

4. I read parts of an email from Dr. Mary Ann Cooper. She commented on several topics mentioned in the August LDC meeting.
  - a.) She wrote: “flashover occurs much more readily to wet people...than to dry. So the best advice we can give people is stay away from trees, get soaking wet, stay low and not isolated! Better yet, follow the real lightning safety rules.”
  - b.) “Standing close to inside steel girders – unlikely they will flash to the person – for many reasons including the faraday cage analogy.” This subject still evokes much discussion. Today Ken Langford, Greg Stewart, and Steve Clark spoke on the dangers, if any, of receiving induced electrical current by leaning against the wall near an inside steel girder during an electrical storm. The consensus: chances are remote, but not zero.
5. Dr. James Barron is a physician who works with the Police Department. He gave a brief presentation on TASERs. He showed one (50,000 volts; 3 milliamps). Jim and members of the Police Department are scheduled to speak to LDC at a future meeting.
6. Phil Yarnell presented a patient who suffered an electrical shock and burn. The patient was holding an aluminum pole that made contact with overhead wires (c. 7000 volts). He suffered a cardiac arrest, received CPR, defibrillation and was taken to the hospital. He now has memory problems and a burn on his left foot.
7. Mike Foley gave an excellent presentation entitled: High and Low Voltage Injuries – an Electro-Forensic Engineering Perspective.

I cannot do justice to Mike’s talk here. I will transcribe notes taken.

- a.) Safety procedures in the work place: remove hazards; primary protection (warning devices; guards); secondary protection (wear gloves, don’t wear jewelry).
- b.) Workplace regulations: OSHA regulations; Industry regulations.
- c.) “Contact points” complete the circuit. Preferable terminology to “entrance and exit points.” Contact points are located at energized source and ground. They are (nearly) simultaneous.
- d.) Dry skin resistance – 10,000 ohms
- e.) Electrical burns – 2 components: Thermal burns and contact burns.
- f.) Types of electrical hazards: shock, blast, arc Heat of arc is extremely high and the cause of thermal burns. Arc can melt steel at 2800 C.

8. Dr. Rob Madayag told us about a large burn study from Parkland Hospital, Dallas. 7% of burns are electrical burns. Most are high voltage (>1000 v) burns. Cases requiring amputation have necrosis of tissues because of compromised blood supply.
9. These minutes do not represent official positions of LDC or its members. They simply reflect comments made by those present.
10. Next meeting: November 11, 2005 at 11:30 A.M. in the Main Auditorium of St. Anthony Central Hospital. Greg Stewart will speak on Lightning Safety Matters.

Respectfully submitted,

Michael Cherington, MD