LIGHTNING DATA CENTER
MAY 13, 2005
MINUTES
ST. ANTHONY HOSPITAL, DENVER, CO
www.Stanthonyldc.org

Quote of the Month:

"You stick to chess, I'll stick to medicine."

> Ulvar Thordarson, official doctor of the 1972 Fischer-Spassky match, when challenged by Spassky to a game of chess.
> In the book by David Edmonds and John Eidinow, 2004

1. Meeting began at 11:30 am and adjourned at 1: 20 pm.

2. Members present: Burrows, Cherington, Clark, Collier, Crowley J, Crowley, Flander, Foley, Johnson, Kithil, Langford, Mc Donough, Nibbe, Sellon, Wachtel, Wallace, Yarnell.

3. I distributed copies of NeuroRehabilitation (2005, Volume 20, issue 1) to members present. That issue is dedicated to Lightning and Electrical Injuries.

4. I brought the following articles/reprints (abstracted in part here):

   a. Shmatov ML. Expected spectrum of high-energy photons from ball lightning.
   A.F. Ioffe Physical Technical Institute Russian Academy of Sciences 2004.

   "…ball lightning has a core consisting of clouds of electrons and totally ionized ions which oscillate with respect to each other in the radial directions. Several models of ball lightning yield that it emits the high-energy photons. The high-energy photons undoubtedly generated in the atmosphere during the thunderstorms were also detected. However, the high-energy photons can also be generated in the atmosphere by several other sources."

   b. Gratz J, Church R, Noble E. Safeguarding the spectator. Weatherwise Jan/Feb
   2005.

   "Spectators at large outdoor stadiums face a growing vulnerability to lightning due to an increasing size and frequency of sports events.

The growth is not paralleled in the management of spectator safety. To date, there have been few casualties in the United States from direct lightning strikes to a stadium. However, if no further action is taken, the probability of a tragic event continues to increase. The NCAA should mandate that all schools follow existing lightning safety guidelines and insist that schools execute lightning protection plans for both players and spectators before lightning is within six miles."

c. DePalma RG, et al. Blast injuries. New Engl J Med 2005;352;1335-1342.

"Primary blast injuries are cause by barotraumas—either overpressurization or underpressuriaztion relative to atmospheric pressure. Primary blast injuries most commonly involve air-filled organs and air-fluid interfaces. Rupture of the tympanic membranes, pulmonary damage and air embolization, and rupture of hollow viscera, are the most important primary forms of blast injury."

5. Rich Kithil announced that NLSI has been supporting overseas groups who are developing lightning safety organizations. Dr. Ahmed of Bangladesh will be in Colorado in July 2005. Rich stressed that a major key to lightning safety is education.

6. Bob Wallace told us that St. Anthony Central will be moving to a new site in about 4 years. It will be located in Lakewood near 6th Avenue and Union.

7. Our speaker today was Dr. Al Nibbe. Al is an internist who graduated from Northwestern University Medical School. He gave an outstanding presentation on Low and High Voltage Electrical Burn Injuries. I cannot do justice to his talk here. I will convey what I wrote on my notepad.

   a. Ohm's Law E = I x R E = Voltage I = Current (amperes)
      Health care workers are concerned about damage to tissue from current.
      I = E/R
   b. Tissues with high ion content are good conductors. Such tissues include: nerve, blood, and muscle. Poor conductors are skin, tendon, bone.
   c. Factors to consider regarding electrical burns:
      Voltage AC or DC current Frequency of AC Path
      Duration
   d. Effects of electrical current on the human body.

Milliamps	Effect
1	Perception
6-25	Painful

9 – 30	"Cannot let go" range
50 – 150	Muscle cramps
1000-4500	Ventricular fibrillation
10,000	Cardiac arrest

e. Tesla – High frequency current travels over surface of the body. Faraday effect. Rich Kithil mentioned that the "skin effect" with more current on the surface than interior of conductor occurs with high frequencies. Rich Collier mentioned that with low frequencies current may travel through center as well as surface of conductor.

f. How does electrical current damage tissues? Thermal; lectroporation; changes in nuclei and cytoplasm of cells.

g. Bathtub electrocutions: At autopsy: no burn sites. There may be petechiae over eyelids and conjunctivae.

8. Ken Langford showed the final draft of the LDC Logo for our cover sheet and stationary. Many thanks to Ken, Mike Foley, Allison Hawkes, Sue Wiggins and Cindy Rigot for their work on this project. All present agreed that we accept the LDC logo.

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

Next meeting: Friday, June 10, 2005 at 11:30 am in the Main Auditorium of St. Anthony Central Hospital.

Respectfully submitted,

Michael Cherington, MD