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Alcor News Bulletin-----
Number 28: July 18, 2004
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Whole-Body Vitrification Experiment

While there is considerable interest in whole-body perfusion with the latest cryoprotectant, we are presently unable to provide this service because (among other reasons), our perfusion equipment is inadequate to the task. The current vitrification protocol requires that the second step of perfusion be carried out at -4 degrees C. Since the perfusion tubing is strung between the pump set and the operating table, and the patient is also uninsulated, most of the available cooling power is going to go to cooling the room. Even the current setup with the neuro box requires that liquid nitrogen be added to the heater-cooler to perfuse at the lower temperatures. Furthermore, our consultants suggest that future developments in cryoprotectants may require even lower perfusion temperatures, as low as -40 degrees C.

To deal with this problem without investing in major refrigeration, Hugh Hixon proposed that cold nitrogen gas from liquid nitrogen be used to cool the patient and the perfusion equipment, enclosed within an insulated container. To retain open access to the patient for the surgeons, the container should be open (lidless), providing an

environmental system similar to supermarket coffin freezers you reach down into without having to open a lid. These containers work by circulating a laminar layer of cold air over the freezer contents, and depend on the fact that cold air sinks down into the container and covers the contents rather than rising. They typically run below -30 degrees C.

An initial prototype was constructed to test the stratification system. (The next issue of Cryonics magazine contains an article on intermediate temperature storage development, and discusses stratification problems. See it for more information.)

The location of the temperature sensor has a lot of effect on the box's interior temperature, which was no surprise. With the sensor in the inlet to the box and the controller set for -4 degrees C, the inlet temperature swung in the interval -5 to -7, and the outlet temperature varied from +0.3 to -0.7 degrees C. With the sensor at the box outlet (involving a longer-delay feedback loop), the inlet swung from -10 to -20 degrees C, and the outlet temperature was from -5 to -10. (Note: most of the cooling of the patient will be done through the extracorporeal circuit rather than the cold gas in the box.)

A manually triggered injection of liquid nitrogen took the inlet temperature below -100 degrees C, and the outlet temperature below -44. Liquid nitrogen was on continuously for the period in question (~15 minutes). A few minutes after the nitrogen injection was shut off, the system equilibrated to about -35 degrees C. A rod of ice set upright in the box melted down to the level of the edge of the box after about 4 hours, and after 30 hours, only melted less than an additional inch.

The prototype shows that a low-temperature perfusion environment can be maintained while providing full surgical access to the patient in a shirtsleeve outside environment; and if pushed, it can get to much lower temperatures. With a suitable adapter, it may also be capable of replacing the dry-ice cooling box. [HH]

Personnel Improvements

Alcor has entered into a new three year agreement with Emergency Educational Institute, Inc (EEI) to provide standby and transport response teams for the east coast. Each standby and transport operation will be staffed with at least any two of the following: a licensed EMT, licensed Paramedic, or a licensed nurse. Furthermore, two additional team members will be certified medical professionals, for a minimum of four participants. Alcor will dispatch one or more individuals from Alcor Central or from one of the Regional field teams to observe and assist in the transport. Therefore, a five- to six-person team will staff each remote case.

We are also happy to report that Todd Huffman has executed a one-year agreement with Alcor to continue providing his expertise in assembling all the necessary data and compiling

it into a well-documented case report for past cases that have not been previously published. In addition, we are in serious discussions with the appropriate officials from Arizona State University to engage several of their graduate students in relevant research departments to assist in wiping out our backlog of case reports. Gaining the assistance of a major state university will enhance our credibility with academic, scientific, and political groups. [JW]

Legislative Initiative

Meetings have been tentatively set up with relevant stakeholders in preparation for the next legislative session. Our objective is to attempt to obtain consensus on the need or lack of need for regulation and establish support among the stakeholders for the consensus position. We believe that entering the next legislative session with support in place with "reasonable" solutions to the issues expressed in the previous session will strengthen our ability to ensure harmful legislation is not passed by the Arizona legislature. [JW]

Membership Statistics

On June 30, 2004 Alcor had 667 members on its Emergency Responsibility List. (Alcor members, as a condition of membership, execute funding contracts for cryopreservation and thus are covered by Alcor's emergency response system.) Seven (7) memberships were approved during this month, zero (0) memberships were reinstated or cancelled and zero (0) members were cryopreserved. Overall, there was a net gain of seven (7) members this month. Alcor had 121 applicants for membership. With a month-end total of 124 the previous month, there was a net loss of three (3) applicants. [JC]

Next Board Meeting

The next Board meeting is scheduled for Saturday, August 7, 2004 at 11:00 AM (PST), also 11:00 AM local Arizona time.

Board meetings are held on the first Saturday of the month at the Alcor facility (7895 East Acoma Drive in Scottsdale, AZ). Members (and the general public) are encouraged to attend.

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End of Alcor News bulletin #28 dated July 18, 2004.
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