

# HIGHLIGHTS OF A SPECIAL EXTENDED TRAINING WEEKEND, 10-12 JANUARY 2020

## ***BACKGROUND***

*Cryonics UK normally holds a training weekend every three months at which volunteers can practise the procedures used during call-outs, when patients are prepared for cryopreservation on death, using techniques designed to minimise damage to body tissues and hence improve the possibility of reanimation at some time in the future. Training sessions provide the knowledge, skills and familiarity with equipment that should enable volunteers to function as useful team members on actual call-outs.*

*In addition, training weekends allow members to discuss procedures and possible improvements, along with other related topics. These weekends also allow anybody who is considering cryopreservation for themselves or a loved one to learn about cryonics and meet cryonicists.*

## **THE JANUARY MEETING**

The January meeting was special in that, in addition to regular members and visitors, we also had a number of experts visit Cryonics UK to discuss possible improvements in techniques and equipment. These comprised:

- Aschwin de Wolf, CEO of Advanced Neural Biosciences, a US-based neural cryobiology and ischemia research company, and author of many cryonics technical and procedural documents;
- Christine Gaspar, a contractor to the Biomedical Research and Longevity Society who provides professional call-out services and advice on improving call-out readiness for Suspended Animation and International Cryomedicine Experts;
- David Gifford, a UK clinical perfusionist who perfuses donor organs prior to transplant operations, to restore them and maximise the chances of successful transplantation;
- Michiel Spoor, a funeral director specialising in cryonics and a member of the Dutch Cryonics Organisation; and
- Jacob Hoekstra, a director of the Netherlands-based Biostasis Sciences Foundation and US-based Suspended Animation

## **FRIDAY 10 JANUARY**

Four members of Cryonics UK, all experienced in cryonics call-outs, met the visiting experts to discuss methods suitable for field-based whole body perfusion. The meeting began in the afternoon and continued through the evening, over dinner. A number of topics were discussed as indicated below.

### *Limitations of field call-out teams*

Ideally, all initial cooling and perfusion procedures should be carried out in a controlled environment with medical professionals who can perform surgical procedures needed to

maximise the effectiveness of the perfusate. However, an overriding consideration is that the patient should be cooled as quickly as possible after death, to minimise deterioration, especially in the brain, hence the need for a call-out team that can operate wherever the patient dies unless he or she has made prior arrangements to relocate to a suitable medically-equipped facility.

Discussions centred around the most effective and practicable procedures suitable for field call-out teams, made up of individuals who are trained in cryonics call-out procedures but are not usually medically qualified. For instance, Cryonics UK currently perfuses the head via the carotid arteries rather than via the aortic arch (the main artery supplying blood from the heart to the body) to avoid having to perform chest surgery which would require a suitably trained medical professional. However, there are advantages in perfusing via the aortic arch, including enabling the whole body to be perfused. Discussions included the possibility of a having suitably qualified individual on hand to carry out the necessary surgery.

### *Improvements in the rate of cooling*

Rapid cooling is paramount for minimising deterioration of body tissues after death. Current cooling consists of immersing the patient in an ice bath, with ice and water. Circulation of the blood by means of a chest compression device helps cool the interior of the body but the process is still quite slow, especially as blood vessels near the surface tend to constrict as cooling proceeds. Methods of improving the cooling rate, especially of the brain, were discussed.

### *Other topics*

A number of other topics were briefly discussed, including: problems of tissue shrinkage due to dehydration as perfusion takes place; oedema in ischemic patients (swelling of tissues which have suffered from lack of blood flow and consequently oxygen); and the effects of the blood-brain barrier.

Concern for the exposure of call-out team members to infectious diseases was also raised by Christine Gaspar. Cryonics UK has safety protocols to protect team members but it was emphasised that these should be rigidly adhered to even when working under pressure.

## **SATURDAY 11 JANUARY**

The day was used to demonstrate Cryonics UK's procedures to the visiting experts, and was also attended by Cryonics UK members as well as a prospective member and a university researcher specialising in the cryopreservation of human organs. The session concentrated mainly on perfusion methods.

### *Perfusion methods*

Cryonics UK's perfusion equipment and procedures were demonstrated and attendees were invited to participate.

There was discussion about Cryonics UK's recently improved method of cooling the perfusate as it is delivered to the patient, including our use of ethylene glycol (antifreeze) to lower the temperature of the cooling fluid in the heat exchanger circuit, how perfusate temperature is controlled and optimum perfusate temperatures.

## **SUNDAY 12 JANUARY**

Demonstrations of equipment and procedures continued, with emphasis on the stabilisation (pre-perfusion) phase of the call-out process, including cardiac support, ventilation and the delivery of medications.

### *CombiTube insertion*

A modification to the procedure for insertion of a Combitube was recommended by Christine Gaspar. The Combitube is a dual tube airway that allows simultaneous esophageal and tracheal access.

### *Medications*

The range of medications was discussed, including recent revisions to Alcor's recommended list of medications and the relative importance of the various chemicals in terms of maintenance of body condition. The complications involved in obtaining some medications for non-Alcor patients were also discussed.

### *Medications delivery methods*

In a hospital setting, intravenous access is used to deliver medications that need to be administered directly into the blood stream. This comprises a catheter inserted into a convenient vein, attached to an injection port or giving set (also known as a drip or IV set). Where a patient has had an IV line attached, Cryonics UK usually ask that it be left in place for administering cryonics medication.

Locating a suitable vein and inserting a needle requires skill and experience; and can be especially difficult even for a medical professional in older people or after death so, in the absence of an IV line, Cryonics UK uses an intraosseous needle to deliver meds directly into the bone marrow.

We normally use an intraosseous device that inserts a needle directly into the upper part of the sternum. This has generally worked well but it has to be inserted close to where the suction cup of the chest compression device is placed, also on the sternum. We have previously tried a bone injection gun that inserts a needle below the knee but this gave reduced flow rates for medications. A second alternative is a device that drills a needle into the upper humerus (shoulder). This option was discussed and will be trialled as a back-up to the sternal intraosseous device, replacing the bone injection gun.

The possibility of administering certain medications with the perfusate was also discussed.

## **RESULTS OF THE MEETINGS**

This weekend will allow Cryonics UK to assess current procedures and consider where improvements might suitably be developed in the short and medium term. In addition, it provided information on Cryonics UK's methods and concerns for Aschwin de Wolf, who is reviewing recommended call-out procedures for Alcor, one of the two main cryonics storage providers in the United States.