

Cryopreservation of David Hayes (A-1712)

By Aschwin de Wolf (ex-colleague of David Hayes)

Case Summary

Alcor patient David Hayes (A-1712) suffered unexpected cardiopulmonary arrest Sunday, February 14, 2010. Due to conditions surrounding the case, the patient was moved to the medical examiner's office. The medical examiner agreed to exempt the head from an autopsy on condition of an "agreed order" from the court and a CT scan of the head. The patient meanwhile was packed in gel ice packs under his head and neck. After the court order was issued and the CT results were verified, the medical examiner authorized separation of the cephalon, this being late afternoon, Wednesday, February 17. The patient's head was cooled to dry ice temperature and shipped to the Alcor facility on Thursday, February 18. Cooldown to -196 degrees Celsius was initiated on February 18 and completed Tuesday, February 23. Later that day the patient was placed into long term care.

Due to the unexpected legal death of the patient, Alcor only became involved after the organization was notified, and was not present in the area during the events that ensued. Most information about time of events (Eastern Time for local events) and logistical aspects in this case have been reconstructed from third party statements and documents.

Biographical Information

David Hayes was born July 26, 1963. He joined the Alcor Life Extension Foundation as a neuropreservation member September 29, 1997. From 2002 to 2004 Hayes worked at the Florida cryonics company Suspended Animation. During his employment he worked on the development of standby and stabilization technologies for cryonics members of all cryonics organizations. Despite living close to the Suspended Animation facility the patient received little benefit of Suspended Animation's stabilization capabilities himself as a consequence of suffering cardiopulmonary arrest at age 46 under circumstances that generally require an autopsy.

Cardiopulmonary Arrest

On February 14, 2010, at approximately 10:30, the patient's girlfriend observed him to be having a seizure, and called 911. The patient was found in cardiac arrest by Fire Rescue on duty, CPR was initiated, and the patient was transported to Delray Medical Center (a 15-25 minute drive from the Suspended Animation facility). Advanced life saving measures were then performed without success, and the patient was pronounced legally dead at 11:12. There was no suspicion of foul play or sign of trauma on the patient's body. After receiving and printing the patient's paperwork, SA's general manager drove to the medical center around 15:30 to make sure he was in ice. En route Alcor informed her that the patient might be moved. She arrived at 16:10 and the patient had just transferred to the Medical Examiner's office. She then drove to the medical examiner's office and found it closed and no one answering the phone or doors at 17:00.

Request for Waiving Autopsy

Alcor notified the hospital that the patient had made cryonics arrangements and, after a number of attempts to stress the importance of cooling, the patient's head was cooled. Subsequently Alcor's attorney contacted the Palm Beach County Medical Examiner's Office (PBCMEO) to inform the forensic investigator in charge of the body that the patient had cryopreservation arrangements with Alcor and a request was made to waive autopsy to limit ischemic exposure and injury to the brain. Alcor's attorney was informed that given the decedent's medical history and the circumstances surrounding his death, an autopsy was required pending

review of the PBCMEO's medical examiner. Alcor's attorney then informed the forensic investigator of a precedent in which a toxicology report, a CT scan of the head, and limited autopsy, exempting the brain, was obtained by court order and suggested that the patient's head could be transported to Alcor while the body was autopsied. The forensic investigator agreed to discuss the case with the PBCMEO Medical Examiner and requested information about the patient's cryonics arrangements.

Court Order

During the morning of February 15, Alcor's attorney was informed that the requested limited autopsy could proceed if a court order was requested to waive a full autopsy, provided the rest of the body would be left for autopsy, a toxicological examination would be conducted and a portable CT scan of the head would be arranged and paid for by Alcor. Due to holidays (President's Day) the court filing was delayed until the next day, February 16. A CT scan also could not be conducted because the Medical Examiner's office closed early due to the holidays. During the morning of February 16 a Motion for Emergency Injunctive Relief was filed by Alcor's attorney. But because of a trial and jury selection issue the judge was not able to issue a court order until the next day, February 17. A CT scan was scheduled for that day around noon, and the Medical Examiner's office was advised to keep the patient's head on ice before, during and after the scan. On February 17 at approximately 11:25 a copy of the court order was submitted to the Palm Beach County Medical Examiner's Office. After determining that the portable CT scanner would arrive too late to perform the scan during working hours, the general manager of Suspended Animation was authorized to drive the patient to Columbia Hospital to carry out the procedure. During the drive to the hospital the head and the body were packed in ice. The CT scan was conducted around 15:23 and took just 5 minutes with a total time of about 7 minutes in which there was no ice on the patient. After the radiologist reviewed the scan and submitted the results to the PBCMEO, Suspended Animation staff members under Alcor contract were allowed to perform cephalic isolation so the patient's head could be transferred to Alcor for neuropreservation.

Autopsy and CT Scan

Fluid samples for the toxicology screen were drawn on February 15. The CT scan of the head looked normal. The rest of the body was autopsied on the morning of February 18. The autopsy report notes moderate rigor mortis in the extremities and fixed livor mortis on the back of the patient. The report also notes the Alcor emergency bracelet. The cause of death was pharmacological, with atherosclerotic cardiovascular disease as a contributing condition. The mode of death was accidental.

Cephalic isolation and transport

Cephalic isolation took about 60 seconds and was completed at 15:50. After placing the patient in dry ice, SA wheeled the trunk back to the ME as they closed at 16:00. The body was signed over to the Medical Examiner at 16:04. The head was packed in dry ice inside a large, heavy duty Styrofoam cooler unit designed for shipping. The dry ice in the unit was replenished periodically overnight. Around noon February 18 the head temperature was about -64 degrees Celsius. The patient was shipped in the early evening to Alcor and received at 21:53 (Arizona time) with a temperature of -78.5 degrees Celsius.

Cooldown and Long Term Care

Cooling of the patient to liquid nitrogen temperature resumed at 22:14 by placing the head in a small dewar and circulating cold nitrogen vapor. At 08:34 February 23 liquid nitrogen temperature was reached and at 14:41 the patient was transferred to a "neurovault" cryogenic container for long term care. The trunk of the patient was cremated and the ashes shipped to a relative in Texas.

Discussion

This case was a textbook example of the time-sensitive nature of cryonics versus existing legal requirements concerning (accidental) legal death under unusual circumstances. A good understanding of (legal) alternatives spared the patient's brain from invasive procedures but warm and cold ischemic exposure time were significant, resulting in a straight freeze (cryopreservation without cryoprotection). A detailed study of the case details and review of the debriefing recordings suggests a number of improvements for future cases of this nature:

An Alcor representative or staff member of another cryonics organization should be dispatched *as soon as possible* to the hospital where the patient is pronounced dead to ensure adequate cooling of the patient during storage and transport, and to facilitate rapid release of the patient to Alcor or an intermediate facility. During the debriefing session there was much uncertainty about if and how much ice was actually used for cooling the patient's head. It should also be emphasized that *head cooling does not mean just a few bags of ice but completely surrounding the patient's head with ice.*

Contrary to Alcor's requirements, Alcor was not the owner of David Hayes's life insurance policy. This produced a lot of uncertainty and could have delayed deployment and stabilization under different circumstances. Alcor could benefit from reviewing the life insurance policies of its members, in particular of its older members who may need our assistance soon.

Alcor should make detailed information available to its members about options to prevent an autopsy such as religious objections to autopsy.

Alcor should produce a written limited autopsy preference document with documentation of legal precedents that can be sent to medical examiners to inform them of Alcor's preferences in case an autopsy cannot be avoided.

A draft letter specifying the legal request for a limited autopsy (with CT scan option) should be maintained by Alcor and its legal representatives so future cases of this nature can proceed more quickly.

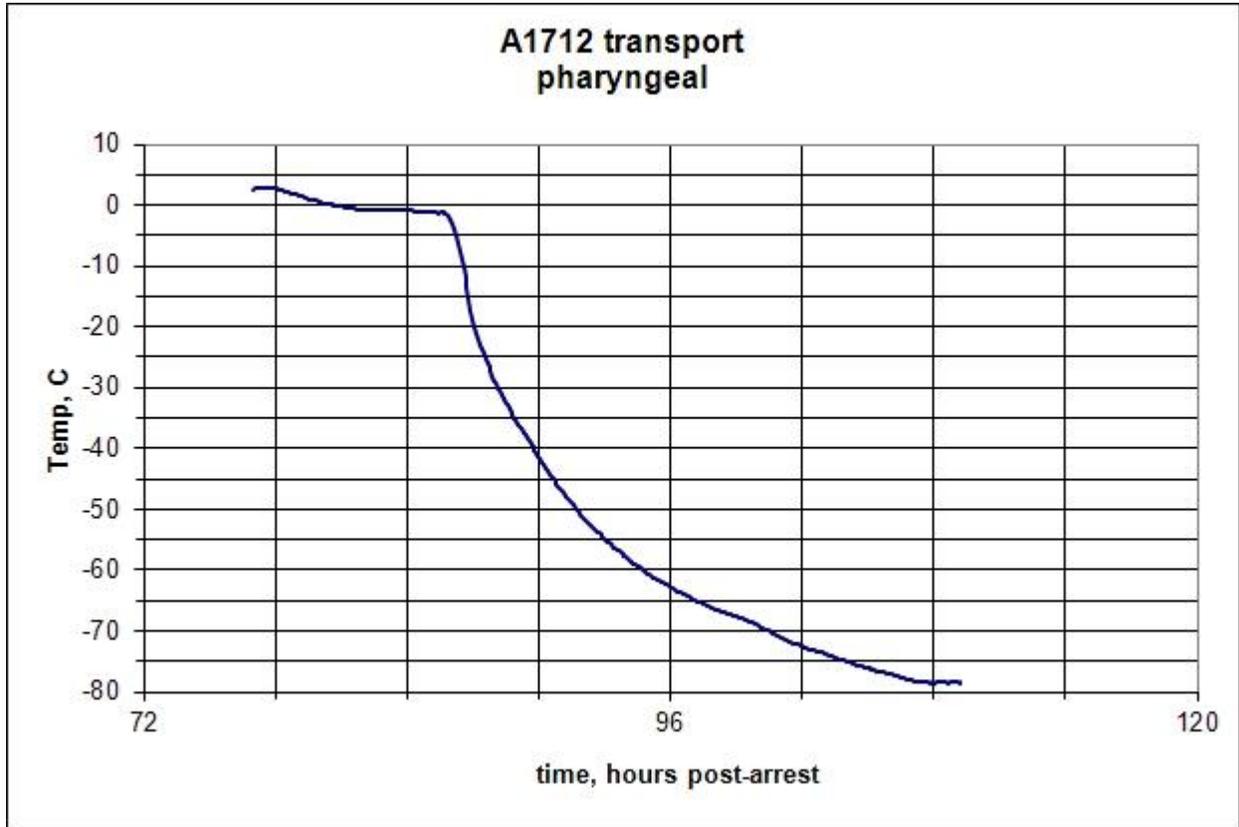
The decision to straight freeze this patient was relatively non-controversial but Alcor would benefit from a document specifying the cooling protocols for various warm and/or cold ischemic times, corroborated by experimental investigations. An alternative option in this case would have been to request arterial fixation of the patient pending request for a court order.

Alcor should make efforts to ensure that temperature data of the patient are collected without interruption as soon as possible after pronouncement of legal death.

The optimal design for dry ice shippers for neuropatients should be documented for future deployment decisions.

Each dry ice case presents challenges as a consequence of different regulations being in place for different airlines. To make things worse, these rules are not always consistently applied and speaking to different officers of the same airline can lead to different answers. Despite this, it would be very beneficial to create a document that specifies dry ice regulations for all major airlines and contact information for human remains shipment. It would also be valuable to see if Alcor (and collaborating organizations) can establish an account at airlines that provides waivers for special circumstances, to allow smooth shipment of patients on (dry) ice. Additionally, we should try to arrange a cargo account that facilitates the shipment of stabilization equipment and reduces costs and last-minute paperwork.

Cooling Graphs



Timeline

TIME IN FLORIDA	
02/14/10	
11:11	Alcor receives call from emergency service about cardiorespiratory arrest A-1712
11:16	General Manager of Suspended Animation contacted about case
11:30	Conference call with hospital staff and Alcor Chief Medical Director
15:09	Primary care physician located about signing death certificate
16:58	Alcor is informed of transfer of patient to Medical Examiner (ME) office
19:22	Update from Alcor attorney about ME's opinion and option of CT scan
23:29	Alcor receives draft letter for ME's office for review
02/15/10	
08:24	Conduction of toxicology screen at ME
08:46	ME's office requests CT scan of the head; order placed with vendor
11:47	Insurance agent contacted to confirm funding
13:41	Alcor attorney informs Alcor that there will be no hearing of the case before tomorrow A draft of Motion for Emergency Injunctive Relief is received for filing the next day
02/16/10	
09:21	Paperwork filed to request release of the patient's head and CT scan
02/17/10	
10:48	Alcor attorney informs Alcor that the judge has signed the order
15:07	Patient arrives at local hospital for CT scan
15:23	CT scan completed
15:45	CT images delivered to ME office and cephalic isolation of the patient authorized
15:50	Cephalic isolation completed
16:04	Body of patient returned to the ME
02/18/10	
04:16	Patient's head is at -38 degrees Celsius with ~ 15 lbs. of dry ice
12:11	Patient's head is at -64 degrees Celsius with ~ 20 lbs. of dry ice
19:05	Departure of flight from Fort Lauderdale
TIME IN ARIZONA	
20:45	Arrival of patient at Phoenix airport
21:53	Arrival of patient at Alcor
22:14	Start of cooldown to -196 degrees Celsius
02/22/10	
	Alcor receives results of CT scan
02/23/10	
08:34	Completion of active cooling phase
14:41	Transfer of patient to "neurovault" for long term care

Addendum: No-Autopsy Card: Be Prepared

By Mike Perry

As cryonicists we want to be cryopreserved in the best possible state for future resuscitation; thus we want to avoid autopsy. In general an autopsy will be mandated under certain circumstances, for example, accidental death or death by violence. In such cases the best that can be done may be to seek a minimally invasive autopsy, for example to use CT scans on the head rather than removal and sectioning of the brain. (And there is no guarantee, of course, that such procedures will be used, or that there will not be a long delay in cryopreservation in any case.) Even if autopsy is not mandatory a coroner or medical examiner generally has discretionary authority to order one, and here especially is where a clear and visible expression of the patient's wishes might make a difference. Objections to autopsy can take different forms, one strong form that has legal recognition being a religious objection. In fact, cryonicists often sign a "certificate of religious belief" or similar document stating their personal objection to autopsy on religious grounds. Sometimes it is objected that many cryonicists are not particularly religious, in any traditional sense, thus their principled objection to autopsy invoking religion might be questioned. "Religion" and "religious," however, are broadly interpreted in jurisdictions where the majority of cryonics cases occur, that is to say, in the U.S. In 1965 the U.S. Supreme court ruled, *U.S. v. Seeger*, that "a sincere and meaningful belief that occupies a place in the lives of its possessors parallel to that filled by orthodox beliefs in God is, in effect, a religious belief." To date no cryonicist's statement of religious objection to autopsy has ever been challenged in court.

There is a problem however. One's paperwork details, though well-planned and thorough, may not become known immediately to medical and other officials in time of emergency. Thus it is desirable at all times to carry some reminder of one's objection to autopsy. Cryonicists generally wear a Medic-Alert bracelet or similar identifying tag indicating "no autopsy or embalming" along with instructions for initial preparations in event of cardiac arrest. But space in this format is limited and something more eye-catching and dramatic is desirable. Toward this end, the Society for Venturism, a cryonics-oriented philosophical/religious/scientific group, issues a wallet card to its members affirming one's religious objection to autopsy. To qualify for membership in the organization and be eligible for the card one must be a signed-up cryonicist with a fully funded contract. One must additionally subscribe to the two Venturist principles, (1) to try to do what is right, and (2) to advocate and promote the worldwide conquest of death through technological means. A \$20 donation for the service of providing the card is suggested (if not a hardship). Further details will be found at the Venturist website, <http://www.venturist.info/services.html>. For more general information about the Venturist organization see <http://www.venturist.org> and/or email me, Mike Perry, mike@alcor.org.

