

Alcor A-1965

Case Report



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1. Summary

Information was derived from multiple sources and was all converted to Mountain Standard Time (MST). For de-identification, dates are not shown. T-0 represents the date of cardiac arrest, T-X represents occurrences before T-0, and T+X represents occurrences following T-0.

A-1965 was a 22-year-old member with neuro cryopreservation arrangements who was killed in a vehicular accident and died on impact. This was a post-mortem notification. For this report, cardiac arrest was estimated to have taken place at 23:00 hrs on T-0 days in 2023. The member was pronounced legally deceased in California at 23:12 hrs on T-0 days. Alcor was not notified until 04:06 hrs on T+1 days. This was a cryopreservation without cryoprotection (a straight freeze procedure).

The patient was ground transported to Alcor for cryogenic cooldown. The patient arrived at Alcor on T+2 days at 10:19 hrs. The cryogenic cooldown was initiated on T+2 days at 10:25 hrs and terminated on T+7 days at 12:11 hrs. On T+138 days at 14:43 hrs, the patient was transferred from a temporary storage location in liquid nitrogen to a permanent long-term care location at liquid nitrogen temperature.

2. Patient Assessment

T+1 days

An Alcor member called the Alcor emergency line at 04:06 hrs to inform Alcor that a member of their family had been killed in a motor vehicle accident and provided the medical examiner's location, phone number, and case number.

Alcor's Medical Response Director (MRD) called the family member back at 04:07 hrs and learned that the family had just been visited by their local sheriff's department to inform them that a

member of their family had been involved in a motor vehicle accident, had been found dead on arrival at the scene at 23:00 hrs on T-0 days, had been pronounced legally deceased at 23:12 hrs on T-0 days, and had been sent to the county medical examiner for further examination.

The MRD called the medical examiner's office at 04:19 hrs and left an urgent message to return the call. At 04:21 hrs the MRD called the pager for the on-call service of the medical examiner's office and was informed that they could not take her call unless she was an official healthcare provider reporting a death.

The MRD received a call back from the medical examiner at 07:29 hrs, stating he would release the remains to Alcor, and only needed to complete a short, approximately 30-minute external exam (no incisions would be made, and the brain would remain intact inside the cephalon). The MRD was sent the appropriate forms to sign to release the remains to the funeral director of Alcor's choice.

There were three reasons this member had to receive the straight freeze procedure:

1. This patient's cryopreservation membership had terminated at his 18th birthday because he did not sign new contracts as required by Alcor. The family contacted Alcor to make Third Party Arrangements, funding needed to be verified and Board approval was required before deployment could be initiated. This was a post-mortem notification.
2. The member had been involved in a motor vehicle accident, had been ejected through the front windshield, and there was also fire damage to the body. The ME had described the damage as "charred".
3. Because extended warm ischemia can result in damage to the vasculature and potentially compromise perfusability, and because of the extensive damage to the patient's body caused by the accident, a straight freeze procedure was utilized to limit further damage to the patient.

Cooling with water ice was delayed because the patient had been examined and moved to a remote cemetery cooler. When Alcor's MRD requested that the patient be covered with water ice, the ME stated that there was no one who could access the patient in order to add water ice.

3. Deployment and Patient Retrieval

At 10:01 hrs the MRD spoke with one of Alcor's co-CEOs about deployment. The Alcor Board of Directors had given full approval to accept the case and flights were booked for the MRD and the Social Services Director (SSD) to deploy for this member. At 10:15 hrs the SSD coordinated with the funeral director to have 150 lbs. of dry ice delivered to the funeral home. At 10:40 hrs the MRD coordinated pick-up of the patient with a funeral director used previously on case work.

The MRD and the SSD had arrived in California and obtained a rental car at 15:55 hrs. At 17:10 hrs the Alcor personnel arrived at the funeral home and awaited the arrival of the funeral director with the patient. At 19:27 hrs the patient arrived at the funeral home. The funeral director had not wanted to drive to the funeral home to pick up the dry ice, so opted to stop and buy some on the way to the pickup location. Unfortunately, this was not possible, as the three places he stopped at were out of dry ice. Due to this, he had packed the patient's head and neck with 20 lbs. of water ice (see the Discussion section).

A nasopharyngeal temperature (NPT) thermocouple was placed in the patient's right nare at 19:28 hrs. The initial temperature reading was 27.2°C. At 19:29 hrs approximately 120 lbs. of dry ice were placed around the patient's head and neck to begin cooling to dry ice temperature and to harden the tissues, making it easier to perform the cephalic isolation.

The cephalic isolation was initiated at 20:24 hrs. The NPT was -2.3°C. Special care was taken to not remove any of the dry ice from around the head and back of the neck during the cephalic isolation to ensure re-warming did not occur. No rise in temperature was noted during the procedure.

The cephalic isolation was completed at 21:05 hrs with the patient's temperature at -6.2°C. The patient was transferred to the neuro-shipper and packed with 20 lbs. of dry ice remaining from the original order. Another 10 lbs. of dry ice was saved in the cooler for use during transport.

4. Patient Transport

Attempts were made to purchase additional dry ice. One store was visited, and four additional stores were called, however, any store that sold it was out of stock. Patient transport back to Alcor was initiated at 21:49 hrs with an estimated drive time of six hours.

T+2 days

Alcor personnel stopped in California at 01:09 hrs to rest, for their safety and the safety of the patient. At 05:58 hrs they resumed driving to Alcor after checking the ice level, which was adequate, and the patient's temperature, which was -58.7°C . The patient arrived at Alcor at 10:19 hrs and the NPT was -69.4°C .

5. Cooling to Liquid Nitrogen Temperature

Computer controlled cryogenic cooldown was initiated at 10:25 hrs on T+1 days, plunging to -80°C and descending thereafter at $-1^{\circ}\text{C}/\text{hour}$ to liquid nitrogen temperature. On T+7 days an uneventful cooldown was terminated at 12:11 hrs. On T+138 days at 14:43 hrs, the patient was transferred from a temporary storage location in liquid nitrogen to a permanent long-term care location at liquid nitrogen temperature.

6. Timeline and Time Summaries

Timeline

T-0	23:00	Estimated time of cardiac arrest
T-0	23:12	Time of legal pronouncement
T+1	04:06	Notification of legal death
T+1	19:28	Placement of NPT thermocouple (27.2°C)
T+1	19:29	Start of dry ice cooling
T+1	20:24	Start cephalic isolation (-2.3°C)
T+1	21:05	Completed cephalic isolation (-6.2°C)
T+1	21:49	Patient transport to Alcor initiated
T+2	10:19	Arrival of patient at Alcor (NPT = -6.2°C)
T+2	10:31	Start of patient cooldown to LN2 temperature
T+7	12:11	End of cooldown to LN2 temperature
T+138	14:43	Transfer of patient to long-term care at LN2 temperature

Time Summaries

Event Duration hr:min		days	time	
Stabilization				
00:12	From:	T-0	23:00	Estimated time of cardiac arrest
	Till:	T-0	23:12	Time of legal pronouncement
20:29	From:	T-0	23:00	Estimated time of cardiac arrest
	Till:	T+1	19:29	Start of dry ice cooling
22:05	From:	T-0	23:00	Estimated time of cardiac arrest
	Till:	T+1	21:05	Completed cephalic isolation (-6.2°C)
35:19	From:	T-0	23:00	Estimated time of cardiac arrest
	Till:	T+2	10:19	Arrival of patient at Alcor (NPT = -6.2°C)
00:12	From:	T+2	10:19	Arrival of patient at Alcor (NPT = -6.2°C)
	Till:	T+2	10:31	Start of patient cooldown to LN2 temperature
35:31	From:	T-0	23:00	Estimated time of cardiac arrest
	Till:	T+2	10:31	Start of patient cooldown to LN2 temperature

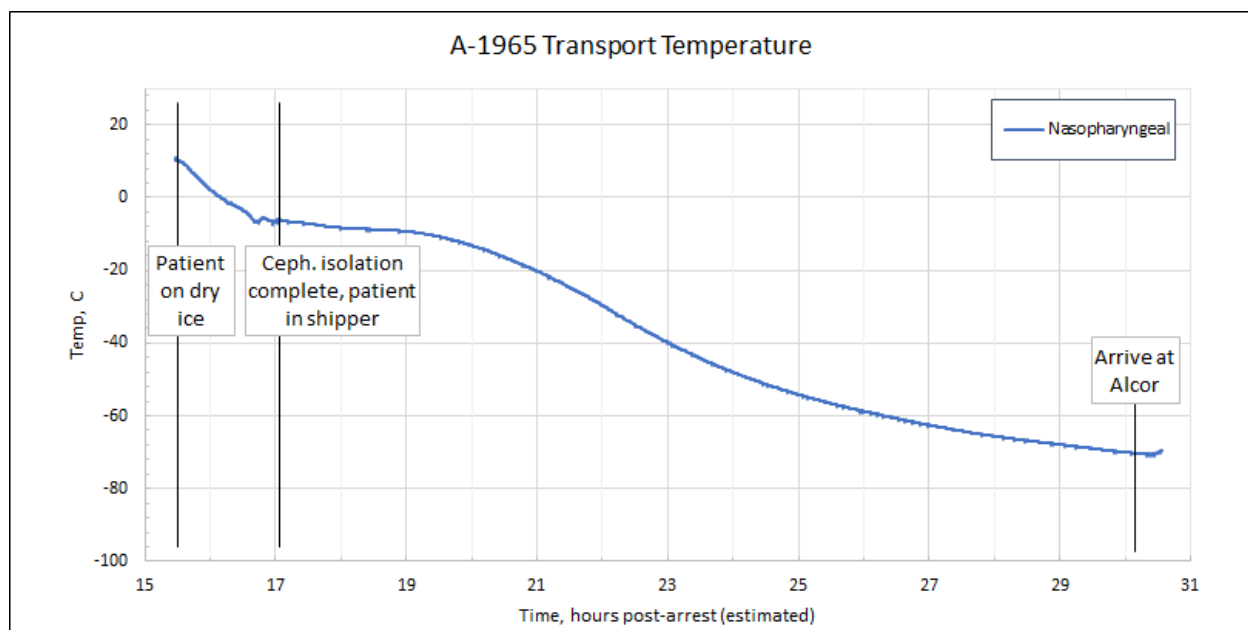
7. Discussion

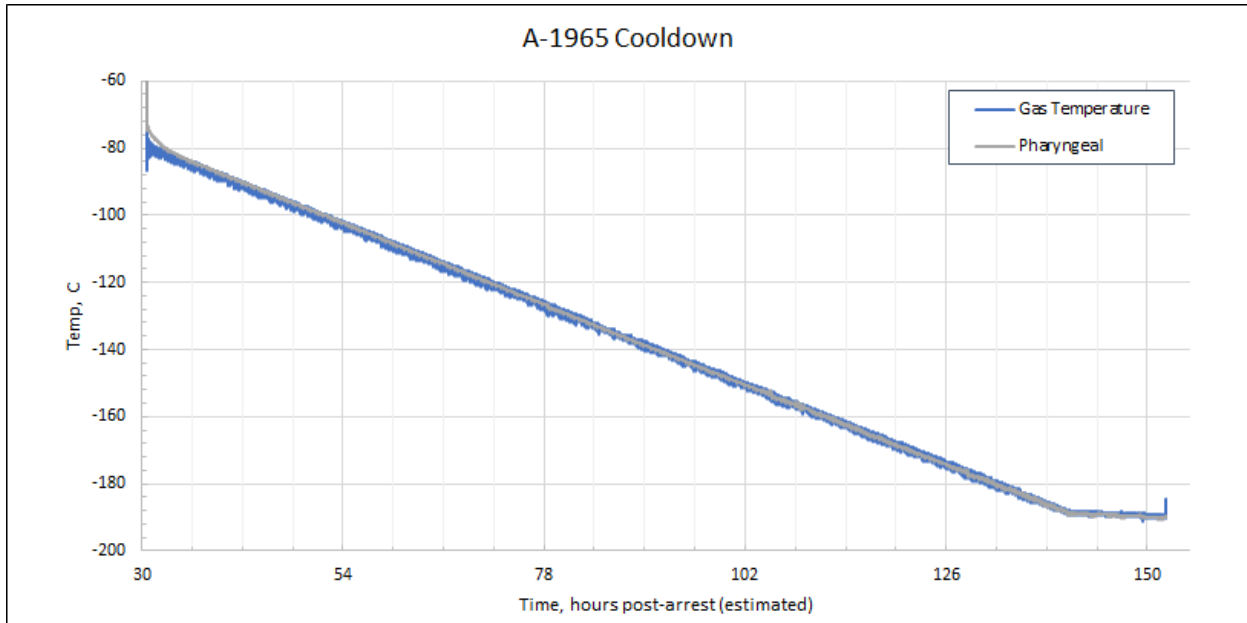
Patient Retrieval and Transport

In spite of agreeing to place dry ice on the patient immediately when picked up at the medical examiner's office, the funeral director decided that in order to save time, he would not drive to the funeral home to pick up the dry ice, shipped to him by Alcor, before picking up the patient but intended to purchase dry ice on the way to the medical examiner's office. Unfortunately, after stopping at three separate suppliers he was not able to find dry ice available. The funeral director placed water ice on the patient, but the patient was not at an optimal temperature when he arrived at the funeral home for the surgical procedure. When they arrived at the funeral home, the SSD and MRD discussed options and decided to cool the patient with dry ice prior to the cephalic isolation in order to stiffen the tissues to make cephalic isolation easier.

In the future, dry ice should be shipped to the medical examiner's office rather than the funeral home to start dry ice cooldown immediately. Additionally, traffic caused a 1-hour and 45-minute drive from the office of the medical examiner to the funeral home to be a 3.5-hour drive. Without the dry ice, the member was not cooled adequately following pickup. This is a further reason to have the dry ice shipped to the office of the medical examiner.

8. Temperature Graphs





9. CT Scans

Cryoprotectant Distribution (Post-cryopreservation CT scan)

Because this was a straight freeze procedure, no post-cryopreservation CT scans were obtained.