

Alcor A-1152

Case Report



Prepared by:

**Linda Chamberlain, Co-Founder and
Director of Special Projects,
Alcor Life Extension Foundation**

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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-1152 was a 70-year-old member with neuro cryopreservation arrangements. This was a post-mortem notification. The Death Certificate shows the cause of death to be cardiopulmonary arrest, myocardial infarction, and coronary artery disease.

Cardiac arrest was estimated to be at 00:00 hrs on T-0 days and the member was pronounced legally deceased in Indiana at 09:50 hrs on T-0 days in 2023. This was a cryopreservation without cryoprotection, a straight freeze procedure.

The patient was packed in dry ice and then air transported to Alcor for cryogenic cooldown. The patient arrived at Alcor on T+2 days at 22:22 hrs. The cryogenic cooldown was initiated on T+2 days at 22:34 hrs and terminated on T+9 days at 13:07 hrs. The patient was transferred to long-term care at liquid nitrogen temperature on T+30 days at 14:37 hrs.

2. Patient Assessment

T-0 days

Alcor received a call on the emergency line at 09:26 hrs from the member's family stating the patient had been found by a friend that morning, having died sometime in the night. The time of cardiac arrest was not approximated by the coroner or police. For this report, and with no evidence, the time of cardiac arrest is arbitrarily approximated to be at 00:00 hrs on T-0 days. Due to the circumstances of the death, the patient had been placed in the coroner's custody after being called by the police. At 09:30 hrs Alcor's DOD called the funeral home to have the patient picked up, transported to the funeral home, and to place dry ice around the patient's head and neck (the time when this was done was not recorded).

Alcor's Medical Response Director (MRD) spoke with the coroner's office at 10:35 hrs and confirmed that the patient was in their custody. It was learned that the member was not a coroner's case, and no autopsy was required, but the patient had been placed in the custody of the coroner since a funeral home had not been arranged. The coroner had stored the patient in a cooler at a cemetery 2.5 hours from the chosen funeral home. The cooler temperature was not recorded but an internet search found that regulation temperatures are 35-39°C. The coroner authorized release of the remains to the funeral home of Alcor's choice.

3. Deployment

At 13:58 hrs Alcor's MRD and Director of Development (DOD) departed Phoenix for Nashville, TN (see the Discussion section). At 19:33 hrs the MRD and DOD purchased 250 lbs. of dry ice and drove from Nashville to Indianapolis by car.

4. Patient Recovery

T+1 days

The MRD and DOD arrived in Indianapolis at 00:01 hrs, checked on the patient, who was in the cooler of the funeral home and packed in dry ice. Approximately 20 lbs. of dry ice was added.

The MRD and DOD arrived at the funeral home at 08:00 hrs to meet the family who wanted to view their loved one. Since the patient was cooling, Alcor personnel agreed to let the family view the patient prior to cephalic isolation. Before the family arrived for the viewing, Alcor personnel prepared the body in the viewing area and then remained on site to ensure that the dry ice would not be disturbed during viewing.

The family arrived at the funeral home at 10:23 hrs along with a close friend of the patient. The [friend](#) informed the family and Alcor for the first time (see the Discussion section) that the patient had recently converted to the Muslim religion, and that the patient needed to undergo a religious ceremony prior to cephalic isolation. It was agreed that since the temperature of the (still attached) cooling cephalon would not be compromised, they could perform this ceremony. Since the ceremony was not to take place until T+2 days, the cephalon would be at or near dry ice temperature.

T+2 days

Muslim leaders arrived at the funeral home at 08:40 hrs. The ceremony began at 09:00 hrs and took approximately an hour.

Although the times were not recorded, dry ice was replenished once before the ceremony, once during the ceremony, and again after. Approximately 50 lbs. of additional dry ice was added throughout the day. The dry ice was not disturbed during the ceremony.

Preparation of the patient for the cephalic isolation started immediately after the conclusion of the ceremony. The cephalic isolation was started at 10:20 hrs and completed at 10:45 hrs. The patient was packed in a neuro shipper with approximately 30 lbs. of dry ice at 10:55 hrs.

5. Patient Transport

The funeral home assisted in making the shipping arrangements with the airline and also assisted with transporting the patient to the airport cargo bay.

The MRD and the DOD accompanied the patient on the flight from Indianapolis to Phoenix. The flight departed Indianapolis at 19:25 hrs and arrived in Phoenix at 20:24 hrs.

6. Cooling to Liquid Nitrogen Temperature

The patient arrived at Alcor at 22:22 hrs. The nasopharyngeal temperature upon arrival was -73.9°C .

Computer controlled cryogenic cooldown was initiated at 22:34 hrs on T+2 days, plunging to -80°C and descending thereafter at $-1^{\circ}\text{C}/\text{hour}$ to liquid nitrogen temperature. On T+9 days at 13:07, an uneventful cooldown was terminated. On T+30 days at 14:37 hrs, the patient was transferred to long-term maintenance at liquid nitrogen temperature.

7. Timeline and Time Summaries

Timeline

T-0	00:00	Estimated time of cardiac arrest
T-0	09:50	Time of pronouncement
T-0	20:00	Estimated time of dry ice application to patient
T+1	20:00	Estimated time dry ice temperature reached (24 hours)
T+2	10:20	Start of cephalic isolation
T+2	10:45	End of cephalic isolation
T+2	10:55	Packed cephalon in dry ice shipper
T+2	19:25	Start transport of patient to Alcor
T+2	22:22	Arrival of patient at Alcor
T+2	22:34	Start of cryogenic cooldown
T+9	13:07	End of cooldown
T+30	14:37	Transfer patient to long term care

Time Summaries

Event Duration hr:min		days	time	
Stabilization				
09:50	From:	T-0	00:00	Estimated time of cardiac arrest
	Till:	T-0	09:50	Time of pronouncement
20:00	From:	T-0	00:00	Estimated time of cardiac arrest
	Till:	T-0	20:00	Estimated time of dry ice application to patient
44:00	From:	T-0	00:00	Estimated time of cardiac arrest
	Till:	T+1	20:00	Estimated time dry ice temperature reached (24 hours)
70:22	From:	T-0	00:00	Estimated time of cardiac arrest
	Till:	T+2	22:22	Arrival of patient at Alcor
00:12	From:	T+2	22:22	Arrival of patient at Alcor
	Till:	T+2	22:34	Start of cryogenic cooldown
70:34	From:	T-0	00:00	Estimated time of cardiac arrest
	Till:	T+2	22:34	Start of cryogenic cooldown

8. Discussion

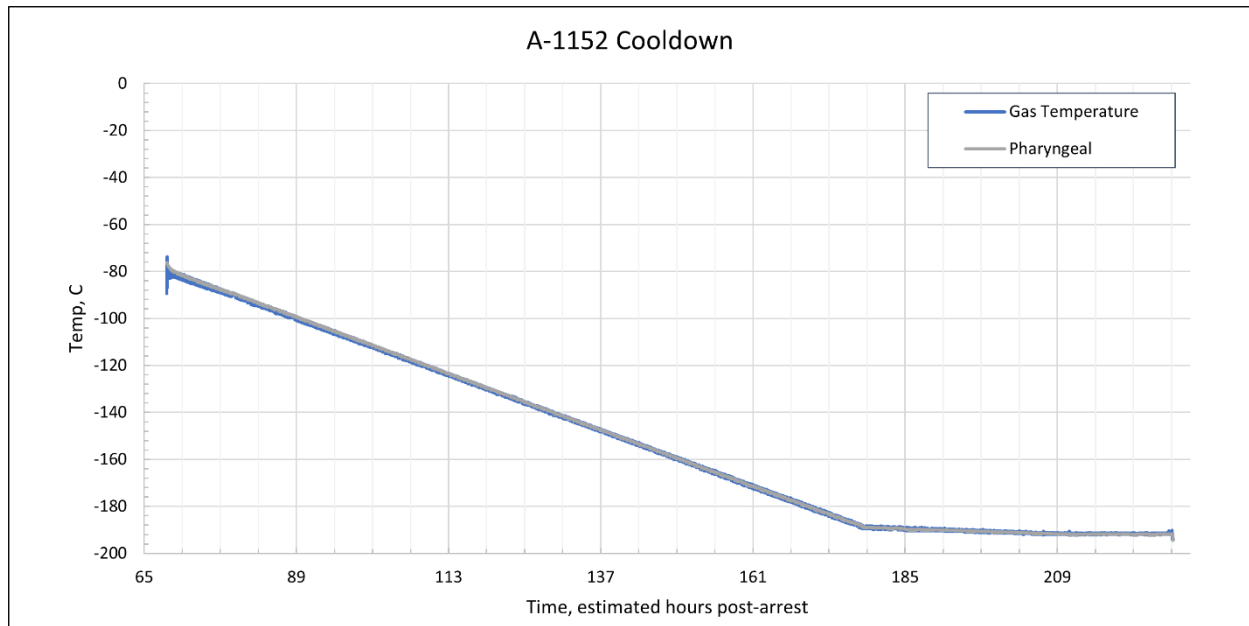
Deployment

Alcor's Medical Response Director (MRD) and Director of Development (DOD) flew into Nashville instead of Indianapolis for two reasons. First, a supplier for the amount of dry ice needed could not be found in Indianapolis, and second, the flight to Nashville plus the approximately 4.5 hour drive to Indianapolis resulted in arrival at Indianapolis a few hours earlier than a direct connection.

Patient Recovery

The cephalic isolation was delayed by the need to allow for a Muslim ceremony. A close friend of the patient arrived at the funeral home with the patient's family and informed both Alcor and the patient's family for the first time that the patient had recently converted to the Muslim religion. Because the member was packed with dry ice and still cooling to the proper temperature for the isolation procedure, the delay did not cause damage to the patient. Had this delay been foreseen, the ceremony would not have been allowed.

9. Cryogenic Cooldown Graph



10. CT Scans

Cryoprotectant Distribution (Post-cryopreservation CT scan)

Because this was a cryopreservation without cryoprotection, no post-cryopreservation CT scans were obtained.