Alcor A-3566

Case Report

Prepared by:

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

December – 2024

Table of Contents

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-3566 was a 76-year-old member with neuro cryopreservation arrangements. The member went into cardiac arrest at approximately 21:20 hrs on T-0 days and was pronounced legally deceased in New York at 21:26 hrs on T-0 days in September of 2024.

After stabilization and field cryoprotectant perfusion (FCP), the patient was air transported to Alcor where cryogenic cooldown would be performed. The cryogenic cooldown was initiated on T+2 days at 21:41 hrs and terminated on T+6 days at 17:49 hrs. The patient was transferred to long-term care at liquid nitrogen temperature on T+16 at 12:37 hrs.

2. Member Assessment

T-59 days

The MRD placed this member on the Alcor Watchlist. The member had reached out to the MRD. They informed the MRD of their stage 4 pancreatic cancer diagnosis and asked how to stay in communication with Alcor regarding their condition. They completed the health survey and returned it to the MRD.

T-55 days

Alcor's Chief Medical Advisor explained the member's diagnosis was serious and described the following: "Generally speaking metastatic pancreatic cancer carries a very poor prognosis of several weeks to a few months' time period. It depends on a number of factors. Metastasis to brain, lungs, and liver are worse than bone. Significant weight loss and no appetite are worse than if still eating. Bile obstruction and jaundice are very bad prognoses. Often, a slow or more rapid deteriorating course, not something suddenly causing death."

Nothing of note until T-39 days

The family (son) provided updates in response to a series of questions from the Medical Response Director (MRD). The member was eating, drinking, and mobile with difficulty, did not require oxygen or assistance with daily tasks, and was on a new line of medication, specifically checkpoint inhibitors.

Nothing of note until T-31 days

The member's condition had worsened. They suffered an ischemic stroke, resulting in the loss of most body functions, although they retained cognitive abilities and speech. The member was hospitalized but expected to be discharged soon, if brain scans were favorable. The family planned to consult their oncologist the next week regarding their immunotherapy and other treatments. Additionally, the member was no longer mobile, required assistance with daily tasks, and was in the process of setting up home healthcare.

The MRI result noted: “Redemonstrated are multiple small sub centimeter areas of restricted diffusion suggestive of acute infarcts seen in watershed ACA MCA and MCA PCA distribution bilaterally as well as multiple such areas in the cerebellum. No hemorrhage is seen.”
The ECHOCARDIOGRAM result noted: “kissing lesions suggestive of non-bacterial thrombotic endocarditis; EF 65%.”

T-30 days/T-29 days

The MRD remained in daily contact with the member’s family (son). The member was stable, and the medical team was planning to discharge the member to home.

T-28 days

The member was discharged to home into the care of their family (son). They were eating and drinking by mouth. No jaundice was noted with a bilirubin of 0.5mg/dL.

T-28 days/T-15 days

The MRD stayed in close communication with the member’s family (son), checking in on them weekly.

T-14 days

The MRD messaged the family (son) about the member for the weekly check in. The family (son) relayed that the member had been taken to the emergency room (ER) on T-18 days because they were experiencing symptoms of low hemoglobin. Upon arrival at the hospital, they were diagnosed with thrombocytopenia (a condition characterized by abnormally low levels of platelets in the blood, which can lead to increased bleeding and difficulty in clotting) and low hemoglobin. The member was also diagnosed with Disseminated Intravascular Coagulation (DIC), a serious condition where the body's blood clotting mechanisms become overactive, leading to widespread clotting throughout the blood vessels, followed by excessive bleeding due to the depletion of clotting factors and platelets.

The family (son) further relayed that at 06:45 hrs that morning, the member became unresponsive, and it was confirmed via CT scans that the member suffered a second ischemic stroke. The physicians scheduled the member for an emergency thrombectomy, despite their low platelets (then at 20, normal range: 150 - 400 10*3/uL) and risk of bleeding.

3. Deployment

T-14 days

At 10:00 hrs, the MRD reached out to the Alcor Deployment Committee who agreed to initiate a Level-2 deployment, dispatching the Deployment and Recovery Team (DART) regional member in New York to the member’s location.

Sidebar:
The medical personnel on the Alcor Deployment Committee have established a list of medical indicators to assist in determining whether to call either a Level-1 standby, a high probability of death within seven days, or a Level-2 standby, a medium probability of death within seven days. The Deployment Committee voting members use these criteria when considering if a deployment is necessary.

On Level-2 deployments, it is standard practice to ship kits with equipment and medications required for the initial stabilization procedure, ensuring the DART team is fully prepared for an unexpected cardiac arrest. Once initial stabilization is started, the Alcor Medical Response Director (MRD) has time to ship the necessary perfusate to complete a Field Cryoprotection (FCP).

The DART member contacted the family (son) and arrived at the hospital at 10:44 hours. At 11:24 hrs, the member's surgery was complete. They had been sedated with general anesthesia for surgery. The member remained unconscious; under the medical team's assumption it was due to the anesthesia. The physician stated he did not believe the member was imminent at that time. The DART member left his contact information, and the nurse assured him that she would call him with any updates. The DART member departed the hospital at 11:40 hrs.

The MRD prepared and shipped kits to the DART member's location. At 12:25 hours, the member remained stable but unresponsive.

At 17:19 hrs, the MRD received the update that the member was still not responding to any stimulation. Post surgical labs resulted: hemoglobin dropped from 9 to 6.3 g/dL and platelets were 54 (10*3/uL).

The nurse also relayed the following report: The member's pupils were PERRLA (which stands for "Pupils Equal, Round, Reactive to Light and Accommodation", which is a common neurological assessment to check for normal pupil function and brain activity). If a patient's pupils are described as PERRLA, it means the pupils are functioning properly in response to light) and 3mm+ in size. The corneal reflexes were positive. They were vastly unresponsive with eye opening only to vigorous stimulation. They would move all four extremities but without purpose and were not following commands. The nurse was not able to assess gag and swallow response. CT scans were planned within the hour. The vital signs were: blood pressure (BP) 97/63, respiration rate (RR) 10, heart rate (HR) 90, capillary oxygen saturation (SPO2) 100% room air, was on oxygen at 2 L/min, temperature (T) 36.4°C rectal.

T-13 days

The member had undergone a repeat head CT scan, which noted: "Possible new loss of gray-white differentiation in the left occipital lobe concerning for acute infarct." The member was still vastly unresponsive. The member was receiving blood transfusions for low hemoglobin and low platelet.

The Alcor Deployment Committee discussed the findings, along with the member's most recent health status update, and agreed to initiate a Level-1 deployment at 14:42 hours. Two DART members and two Alcor Canada members deployed. The MRD prepared and shipped a full set of perfusate for the anticipated field neuro cryoprotection.

4. Standby

T-12 days

The DART members and the MRD watched the member closely, relaying information to the entire team regarding lab results, plan of care, and scheduled radiology. The member was scheduled for a palliative care consultation and an MRI.

T-11 days

The palliative care doctor communicated to the family (son) that the member had a very poor prognosis. With low platelets, the medical staff could not anticoagulate the member. So, the member was at high risk of continued clotting, with a high risk of repeat strokes, but coupled with the possibility of bleeding. The family (son) continued discussions with the member's medical team regarding options and care plans. The family (son) decided to continue with full treatment towards lifesaving interventions. The member remained a full code.

T-10 days

The medical team placed a nasogastric tube to start tube feedings for nutrition. The member was also started on I.V. fluids for hydration. The member remained vastly unresponsive, described as not following commands and non-purposeful movements of all four extremities. Hemoglobin and platelets continued to drop, though the member's labs would slightly, and temporarily, improve after intervention. This was displayed as a constant up and down of lab values regarding the hemoglobin and platelets.

T-9 days

The Assistant General Counsel for the hospital requested the member's contracts. They were sent. The member's condition remained the same.

T-8 days

DART attended patient rounds with the family and the medical team. The family expressed a desire to continue pursuing interventions to prolong the member's life despite the poor prognosis.

The member had removed the nasogastric tube overnight, which the MRD noted as a "purposeful response" by the member, though the hospital care team continued to describe the member as unresponsive with no purposeful movements. The member was still not able to follow commands. Plans were made to have the Gastroenterology (GI) team reinsert the nasogastric tube due to a risk for bleeding upon reinsertion. The member was also scheduled to receive a transfusion of two units of platelets. The physician noted that if the member's platelet levels did not remain elevated after the transfusion, there would be no further treatment options, leaving the member at high risk of imminent death.

The physician expressed a lack of optimism regarding the member's prognosis. However, no comfort care plan or transition to palliative care was initiated, as the family continued to request lifesaving and life-prolonging measures, including hematology and neurology consultations, as

well as interventions such as cardiopulmonary resuscitation (CPR), intubation and ventilation, and ICU admission if necessary.

The family (son) had several questions for Alcor regarding the best approach for member's cryopreservation. DART/Alcor/its agents provided no medical advice. DART consulted Alcor's Chief Medical Advisor to discuss the implications of both available options: option one involved life-prolonging measures, while option two considered transitioning the member to hospice or palliative care. Those implications were provided to the family (son).

T-7 days

The member remained stable, and the DART team remained on the scene.

T-6 days

The family (son) reached out to the MRD asking questions regarding the logistics of the case if the family (son) were to make the decision to transition the member into hospice/palliative care. The MRD answered the questions and referred to the family (son) to also speak with the DART team regarding timing of transport to and from the different locations of the case.

The hospital made the decision to stop all communication with Alcor regarding direct updates from the nurse. Alcor was advised we would have to go through the family (son) for updates regarding the member.

The hospital also relayed a state law that required the funeral director of the chosen funeral home to be physically present (once the member was declared legally deceased) before they would release the remains to anyone (see the Discussion section), including Alcor, despite the contracts in place.

T-5 days

The MRD held a conference call with the Assistant General Attorney of the hospital and the funeral home director in order to clarify processes. It was relayed to the MRD that this statute was applicable even with widely recognized organ donation procedures, and not due to any bias towards Alcor. The MRD verbalized understanding to the hospital personnel, worked with the funeral director of the chosen funeral home, and the Assistant General Attorney of the hospital to create a plan for the most time efficient extrication of the member's remains once they were legally declared deceased. The funeral director suggested and offered that DART could call the funeral home if the member was seen to be imminent (within an hour or so of imminent clinical death) and they would dispatch a funeral director to the scene so that the funeral director could attempt to be there upon pronouncement of legal death and sign to handover custody to DART immediately. The MRD and attorney agreed to this plan.

T-4 days

The member had spiked a fever (unknown value) and was being given medication to try and lower the temperature (unknown med). The member's heart rate had been elevated to the 120's-130's. The family (son) had relayed that they were having a conference at 12:00 hours to discuss the next steps and had allowed DART to be present for this.

At 14:00 hours, DART updated the following message regarding the conference: The hospital staff explained that they had exhausted all of their treatment options but would continue with any care the family wanted. They recommended palliative care and provided location options, along with information about what the insurance would cover.

The family (son) made the decision to transition to hospice, noting they wished the location be one that would best support rapid pronouncement of legal death and allowing for a quick transfer to Alcor's care. They expressed that their only wish at that time was for the member to get the most successful cryopreservation possible. The nasogastric tube was to be removed before the transfer of care.

T-3 days

The family (son) weighed the options regarding where to place the member for hospice care. It was decided that the member would be transported to their home, where the family would render the member end-of-life care, under the supervision of home hospice.

T-2 days

The member remained the same in the hospital. The only delay in transporting the member home was an authorization required by the insurance company.

T-1 days

The son sent the member's vitals to the DART team: BP 88/48, T 36.7°C, SPO2 96% on room air, HR 110. The MRD relayed an estimation of 24-48 hours of life, noting that the member was most likely transitioning (a term used by hospice to report a transition into actively dying). The insurance company had approved the member's transport, and the member was transferred home at 09:20 hours.

At 14:39 hrs, the hospice nurse arrived at the member's home to perform the intake evaluation. The nurse was asked to call the MRD and relay her findings. By 16:22 hrs the nurse had not called the MRD, but the MRD relayed this assessment per the video monitoring device used by DART: The member could be seen on the monitor. They were moving only the right toes in a twitching motion and the right arm up and down in what seemed to be a form of "motor preservation" (motor preservation in a stroke victim refers to the retention of motor functions required for daily tasks, such as movement of bringing food to the mouth while eating, in specific areas of the body despite the stroke's impact on other motor abilities, aka muscle memory, even in settings not appropriate for that movement). It was not possible to get pulse and SPO2 on the monitor due to their skin temperature being so cold, despite the room being warm. No mottling was noted. The member was heavy mouth breathing with shallow breaths at RR of 12/min.

The family (son) was in the room. Two DART members were fully staged in a common area near the member, and prepared.

T-0 days

At 09:45 hrs, the DART team relayed that the family (son) had given a PRN (as needed) dose of Ativan and Morphine (the dosages were not noted). The member's vital signs were: BP 88/30, HR 96, T 36.5°C, RR 20, unable to get SPO2%. Mottling was noted in the fingers and toes.

At 19:30 hrs, mottling had worsened dramatically, HR 88, No SPO2% available, Shallow and laborious breathing at RR 22. BP 85/palp (palp = palpation, which is a term used when a blood pressure is too low to make an audible noise during a manual BP cuff reading).

The DART team was staged in shifts in the transport vehicle (rental), which was staged in the member's family's parking spot of the apartment building. Equipment had been partially stored in the member's apartment communal lounge area, with permission from the building's security team. Upon the security team's change of shift, the DART team was advised they could not stage their equipment there any longer. The equipment was moved to the transport vehicle (rental) for staging.

5. Patient Recovery and Stabilization

T-0 days

The DART member responsible for monitoring the visual monitoring device noted a last breath taken at 21:15 hrs. The MRD witnessed this as well. The family (son) was called to check on the member. Agonal, shallow breaths were noted by the son that were not visible on the monitor. The son called and reported to the nurse that the member had suffered cardiac arrest at approximately 21:20 hours, and the digital audio recorder was turned on. The member was pronounced legally deceased at 21:26 hours (see the Discussion section). The member weighed 39 kg (85.9lbs.).

The patient was moved into the portable ice bath (PIB), which had been staged with 140 lbs. of water ice, at 21:33 hrs and manual chest compressions were started immediately. At 21:37 hrs a BIG intraosseous (I/O) device was placed in the patient's right tibia in order to administer the stabilization medications. A King airway was placed at 21:37 hrs together with the SAVe ventilator and a CO2 colorimeter detector that changes from purple to orange in the presence of C02, affirming that the airway is in the lungs and not the esophagus.

The first stabilization medication was started at 21:39 hrs (see the below Table of Medications Administration for the names of the medications, the dosages given, and the times of administration). Mechanical chest compressions with the Amoul device were started at 21:42 hrs to circulate the medications. The surface conduction cooling device with face mask, used in the PIB to improve external cooling was also started at 21:42 hrs. No nasogastric tube was used, and no antacid was administered, because the patient had no food or water for the last week (see the Discussion section).

After stabilization, patient transport was initiated at 21:46 hrs to the funeral home where the surgery and field cryoprotectant perfusion would be performed. Enroute, thermocouples were placed in the patient's nares at 22:05 hrs. Swimmer wax was placed around the thermocouple

probes to prevent ice water from entering the nose and interfering with temperature measurements. The initial temperature readings were right nasopharyngeal temperature (RNPT) 22.3°C, LNPT 13.1°C.

6. Field Surgery Cryoprotectant Perfusion (FCP)

T-0 days

The patient and the DART team arrived at the funeral home at 22:26 hrs. After moving the patient into the preparation room, cardiopulmonary support was terminated at 22:42 hrs in preparation for surgery.

The burr hole was placed at 23:08 hrs. A thermocouple was placed in the burr hole. The initial burr hole temperature (BHT) was 17.3°C. The surgery for cannulation and cephalic isolation was initiated at 23:10 hrs. The left carotid artery was cannulated at 23:29 hrs with a 16 gauge right angle cannula. The right carotid artery was cannulated at 23:31 hrs with a 16 gauge right angle cannula.

The left jugular vein was cannulated at 23:47 hrs with a 14 French red Robinson cannula. The right jugular vein was cannulated at 23:48 hrs, also with a 14 French red Robinson cannula.

25,000 IU of streptokinase was added to Bladder #1 at 23:41 hrs. The gravity induced FCP system was initiated at 23:45 hrs with bladder #1 containing nM22 cryoprotectant with a concentration of 0.05 concentration needed to vitrify (CNV) and a molarity of 0.47 (see the Table of Concentrations (Brix) of nM22 Solution, for the times the bladders were started, the precalculated concentrations of each bladder, and the refractive index of effluent samples taken).

T+1 days

The cephalic isolation was completed at 00:18 hrs. The right vertebral artery was cannulated at 00:38 hrs with an 18-gauge straight cannula. The left vertebral artery could not be found and was not cannulated. There was no obvious effect on the perfusion, but Alcor is aware of the importance of flow through the vertebral arteries (see the Discussion section).

Ethylene glycol antifreeze was added to the water in the heat exchanger at 00:36 hrs to bring the perfusate below 0°C. Bladder #5 was started at 00:48 hrs.

Sidebar:
Per the cryoprotection protocol, the ramp is to be paused at 30 Brix (50% of the desired terminal concentration) to allow the patient to come to osmotic equilibrium. When the bladder system is used, bladders 5 & 6 represent the pause. The cephalic/patient enclosure and the chiller are switched from +3°C to -3°C operation. At the end of the 30-minute pause, the ramp is resumed at the maximum addition rate (maximum without losing total volume in the circuit) to go to 105% of the desired end concentration (52.5 Brix) and held between 102% and 105% concentration until the terminal concentration is obtained.

The team encountered difficulties with the refractometer. There are no Brix readings for this case (see the Discussion section). Cryoprotectant perfusion was terminated at 02:45 hrs when the 3-hour time limit (to minimize cryoprotectant toxicity) was reached. Although the Brix

concentrations could not be recorded, the team reported good flow rates, which slowed toward the end of perfusion as the viscosity of the perfusate increased. The effluent ran clear, an indication that perfusion reached and cleared the brain vessels of red blood cells. The team also noted normal tanning seen in successful uptake of the perfusate.

The cephalon was placed in the neuro shipper at 02:54 hrs and surrounded by 40 lbs. of dry ice to begin cooldown to dry ice temperature and prepare for shipment of the patient back to Alcor.

7. Transport of Patient to Alcor

T+2 days

The DART team departed from the funeral home with the patient at 03:29 hrs, transporting the patient to a local airport in the rented vehicle. The patient's RNPT was -65.2°C and the LNPT was -65.7°C. DART delivered the patient to the airline cargo department at 09:23 hrs.

The patient arrived in Arizona at 20:10 hrs and was transported to Alcor by an Alcor staff member.

8. Cooling to Liquid Nitrogen Temperature

The patient arrived at Alcor at 21:25 hrs on T+2 days. The temperature readings were RNPT -71.4°C, RNPT was -71.2°C, and BHT was -69°C.

Computer-controlled cryogenic cooldown was initiated at 21:41 hrs on T+2 days, plunging to -110°C and descending thereafter at -1°C/hour to liquid nitrogen temperature. On T+6 days at 17:49 hrs, an uneventful cooldown was terminated. On T+16 at 12:37 hrs, the patient was transferred to long-term care at liquid nitrogen temperature.

9. Timeline and Time Summaries

Timeline

T-0	21:20	Time of cardiac arrest
T-0	21:26	Time of legal pronouncement
T-0	21:33	Start of ice bath cooling
T-0	21:37	Placement of IO
T-0	21:37	Placement of airway
T-0	21:42	Start of mechanical chest compressions
T-0	21:39	Administered first medication (propofol)
T-0	22:04	Administered last medication (Decaglycerol-THAM)
T-0	21:46	Start transport of patient to funeral home (FH)
T-0	22:26	Arrival of patient at FH (RNPT 22.3°C, LNPT 13.1°C)
T-0	22:42	Termination of cardiopulmonary support
T-0	23:10	Start surgery (cannulation and cephalic isolation)
T+1	00:38	Surgery completed
T-0	23:45	Start of cryoprotectant perfusion ramp (FCP)
T+1	00:48	Start 30-min pause for equilibration
T+1	02:45	Termination of cryoprotectant ramp (FCP)
T+1	02:55	Estimated time of start of dry ice cooling
T+1	03:29	Depart funeral home for airport
T+1	21:25	Arrival at Alcor (RNPT -71.4°C, LNPT -71.2°C, BHT -69.0°C)
T+1	21:41	Start cryogenic cooldown
T+6	17:49	Terminate cryogenic cooldown
T+16	12:37	Transfer patient to long-term care at LN2

Time Summaries

Event Duration hr:min		days	time	
Stabilization				
00:06	From:	T-0	21:20	Time of cardiac arrest
	Till:	T-0	21:26	Time of legal pronouncement
00:13	From:	T-0	21:20	Time of cardiac arrest
	Till:	T-0	21:33	Start of ice bath cooling
00:22	From:	T-0	21:20	Time of cardiac arrest
	Till:	T-0	21:42	Start of mechanical chest compressions
00:19	From:	T-0	21:20	Time of cardiac arrest
	Till:	T-0	21:39	Administered first medication (propofol)
00:25	From:	T-0	21:39	Administered first medication (propofol)
	Till:	T-0	22:04	Administered last medication (Decaglycerol-THAM)
01:50	From:	T-0	21:20	Time of cardiac arrest
	Till:	T-0	23:10	Start surgery (cannulation and cephalic isolation)
01:28	From:	T-0	23:10	Start surgery (cannulation and cephalic isolation)
	Till:	T+1	00:38	Surgery completed
02:25	From:	T-0	21:20	Time of cardiac arrest
	Till:	T-0	23:45	Start of cryoprotectant perfusion ramp (FCP)
03:00	From:	T-0	23:45	Start of cryoprotectant perfusion ramp (FCP)
	Till:	T+1	02:45	Termination of cryoprotectant ramp (FCP)
05:25	From:	T-0	21:20	Time of cardiac arrest
	Till:	T+1	02:45	Termination of cryoprotectant ramp (FCP)
00:35	From:	T-0	23:10	Start surgery (cannulation and cephalic isolation)
	Till:	T-0	23:45	Start of cryoprotectant perfusion ramp (FCP)
05:35	From:	T-0	21:20	Time of cardiac arrest
	Till:	T+1	02:55	Estimated time of start of dry ice cooling
00:10	From:	T+1	02:45	Termination of cryoprotectant ramp (FCP)
	Till:	T+1	02:55	Estimated time of start of dry ice cooling
24:05	From:	T-0	21:20	Time of cardiac arrest
	Till:	T+1	21:25	Arrival at Alcor (RNPT -71.4°C, LNPT -71.2°C, BHT -69.0°C)
00:16	From:	T+1	21:25	Arrival at Alcor (RNPT -71.4°C, LNPT -71.2°C, BHT -69.0°C)
	Till:	T+1	21:41	Start cryogenic cooldown

10. Table of Medications Administered

T-0 days

TIME	MEDICATION	DOSE	PURPOSE
21:39 hrs	Propofol	200 mg	Anesthetic; reduces cerebral metabolic demand; reduces the theoretic possibility of increased awareness during aggressive CPS.
21:46 hrs	Sodium citrate	10 g Note 1	Anticoagulant; prevents blood clot formation.
21:47 hrs	Heparin	50,000 IU	Anticoagulant; prevents blood clot formation.
21:49 hrs	Vasopressin (1st dose)	40 IU Note 2	Vasopressor; increases blood pressure during CPS.
21:49 hrs	Minocycline	200 mg	Antibiotic and neuroprotectant
21:50 hrs	SMT (S-methyl-isothiourea)	400 mg Note 3	Neuroprotectant (iNOS inhibitor); protects the brain from ischemic injury; raises blood pressure.
21:50 hrs	Decaglycerol/THAM (1st dose)	200 ml Note 4	Decaglycerol inhibits cerebral edema.
21:51 hrs	Vasopressin (2nd dose)	40 IU Note 2	Vasopressor; increases blood pressure during CPS.
22:03 hrs	Vital-Oxy (w/ saline)	40 mL Note 5	Antioxidants: melatonin, vitamin E (D-alpha tocopherol), PBN (alpha Phenyl t-Butyl Nitrone) and anti-inflammatory carprofen.
22:04 hrs	Decaglycerol/THAM (2nd dose)	200 ml Note 4	Decaglycerol inhibits cerebral edema.
23:41 hrs	Streptokinase	250,000 IU Note 6	A thrombolytic used to break up existing blood clots.

Notes:

1. The standard formulation for sodium citrate is 20% w/v, in sterile packaging provided by the manufacturer. 10 grams of sodium citrate are given to patients who weigh less than 40 kg, and 20 grams are given to patients who weigh over 40 kg. This patient weighed 39 kg and therefore received 10 grams of sodium citrate.

2. Vasopressin is a fixed dosage of 40 IU, per dose for two doses. The second 40 IU dose is to be administered concurrently with Vital-Oxy, I.V. Vasopressin is to be administered only if the patient's temperature is above 20°C as it is ineffective at cold temperatures.

3. SMT (S-methyl isothiourea) is a powder, (1 vial = 400 mg) dissolved in 10 mL of saline and injected through a 0.2 µ filter. SMT is unstable in solution with a use life of approximately six hours.

4. Decaglycerol/THAM is administered as a custom formulation of 20% w/v decaglycerol and 4.5% w/v THAM (tromethamine) in water (pH = 10.4 and pKa = 8.3). It is a fixed dose of 400 ml to be given in two separate doses.

5. The medications protocol dilutes 70 mL or less, based on body weight, of Vital-Oxy into 150 mL of saline for a total of 220 cc of diluted Vital-Oxy saline. Each mL of Vital-Oxy

contains 194 mg Sigma Cremophor EL (or Sigma Kolliphor EL), 155 mg ethanol, 19.4 mg PBN, 3.24 mg carprofen, 1.55 mg melatonin, and 198 IU vitamin E.

6. The standard administration of streptokinase is 250,000 IU fixed dose, dissolved in 5 mL of 9% sodium chloride, to be added to the blood washout solution prior to remote blood washout, or to the first cryoprotection flush in the OR. The dosage is reduced to 25,000 IU in field neuro (FCP) cases and added to the first bladder). This medication previously needed to be infused through a 0.2 µ filter. The medication now in use is already sterile-filtered and can be reconstituted in the vial.

11. Table of Concentrations (Brix) of nM22 Solution

A-3566 step-ramp, nM22						
Preferred endpoint is over 49.9 Brix from both jugulars for 1/2hr						
2L Bag label number	**[nM22], CNV**	**Molarity of penetrating CPAs***	**Brix (calc)**	**Bag start hh:mm, MST**	**hrs post pronounc-ement**	**Bag avg. flow rate, mL/min**
1	0.05	0.47	11.81	23:45	2.42	117.6
2	0.08	0.78	13.14	0:02	2.70	87.0
3	0.14	1.29	15.35	0:25	3.08	222.2
4	0.23	2.15	19.03	0:34	3.23	142.9
5	0.50	4.67	29.85	0:48	3.47	125.0
6	0.50	4.67	29.85	1:04	3.73	69.0
7	1.06	9.91	52.31	1:33	4.22	46.5
8	1.06	9.91	52.31	2:16	4.93	222.2
9	1.06	9.91	52.31	2:25	5.08	100.0
END				2:45	5.42	
* does not account for concentration of non-penetrating CPAs						

12. Discussion

Standby and Stabilization

The MRD initiated the normal check-in with the member's family and learned that the member had been admitted to the hospital two days prior. The MRD considers this a delayed notification. Had the MRD not reached out, we do not know when the son would have made contact. Further discussion needs to take place to educate members that timely notification and communication is very important for the MRD to make decisions regarding deployment and standby. Fortunately, this was a prolonged standby, which did not result in adverse results due to the delay in initial notification.

This member had prolonged standby, which may have resulted in pre-mortem ischemia to the brain. Further research and education should be conducted on the effects of stroke with prolonged life-sustaining measures and how it may affect cryopreservation of the brain. The MRD will reach out to Alcor's Director of research and development regarding this matter. Once research is conducted, we can provide the findings to our membership so they can make informed decisions regarding their care and how it affects their cryopreservation.

The MRD also notes that the family struggled with decision making for the member. The CARE committee needs to finalize education for our members on the importance of an advanced directive to guide their families' decision making during these difficult times.

Equipment had been partially stored in the member's apartment communal lounge area, with permission from the building's security team. Upon the security team's change of shift, the DART team was advised they could not stage their equipment there any longer. The equipment was moved to the transport vehicle (rental) for staging. Though this created more work for DART, it did not cause a significant delay in stabilization.

The hospital referred to a state law that required a funeral director to be physically present after declaration of legal death before they would release the remains to anyone, including Alcor. This law only applies when a patient dies in the hospital, and not when they die at home. However, fighting this issue would have taken longer than accepting the delay imposed.

According to the regulations in that state, family members were permitted to call the hospice nurse to pronounce legal death. Due to the need to call the nurse and relay information, as well as the time needed for the nurse to call and receive authorization from the attending physician, there was a 6-minute delay from time of cardiac arrest to pronouncement of legal death. The member was pronounced legally deceased at 21:26 hours. There was a 6-minute delay from the time of death to when the patient was placed in the portable ice bath (PIB) due to logistical challenges in transferring the patient from an upper floor to where the equipment was staged, requiring manual transport of the patient to where the PIB was staged.

On this case, the rectal occlusion device was not used, and the antacid was not administered. This was a decision made by the DART team leader because the patient had taken no food or water for the week prior to cardiac arrest. This has been addressed. It was made clear that changes to the protocol are never made without authorization from the Medical Response Director, who in turn must clear any changes with Alcor Management prior to implementing such a change.

Temperature data was accidentally deleted in the field. The refractive index readings (in Brix) were not possible due to malfunction of the refractometer. A DART training with all US and Canadian personnel was just held, with heavy coverage given to the importance of temperatures and refractive index readings, as well as the function and user interface of both devices used for these measurements.

Field Surgery and FCP

Sidebar: By hanging two bladders with different cryoprotectant concentrations on a teeter-totter atop an elevated tripod, a smoother transition of increasing concentrations of cryoprotectant can be achieved.

The gravity feed system for FCP uses a tripod that can be adjusted for height to control the arterial pressure. The pre-mixed cryoprotectant was in a series of bladders with graduated concentrations [measured by the refractive index (RI) in Brix units]. The height of the bladders on the teeter totter for this case was 39 inches which is (39" x 2.054 mmHg per inch of height) a maximum arterial pressure of 80 mmHg at the infusion site. The goal is to have the pressure between 70 and 80 mmHg and the bladders can be raised or lowered as needed to optimize flow and protection of the vasculature.

The right vertebral artery was cannulated, but the left vertebral artery could not be found or cannulated. There was no obvious effect on the perfusion, but Alcor is aware of the importance of flow through the vertebral arteries. In field cryoprotection procedures, it is standard practice to cannulate the vertebral arteries. When perfusion through the carotid arteries begins, effluent flow should be observed from the vertebral arteries. This indicates that the Circle of Willis is intact and enabling perfusion to reach all areas of the brain.

The Circle of Willis is a ring-like arterial structure located at the base of the brain. It connects the major blood vessels supplying the brain (the internal carotid and vertebral arteries) creating a redundant circulation pathway. This redundancy ensures that blood flow to the brain can continue even if one vessel is blocked or narrowed.

In contrast, in Alcor's local operating room (OR), it is standard practice *not* to cannulate the vertebral arteries unless no flow is observed from them during perfusion through the carotids. This approach minimizes unnecessary vessel cannulation, reducing the risk of complications. If no flow is noted, cannulating the vertebral arteries ensures complete perfusion in patients with an incomplete Circle of Willis.

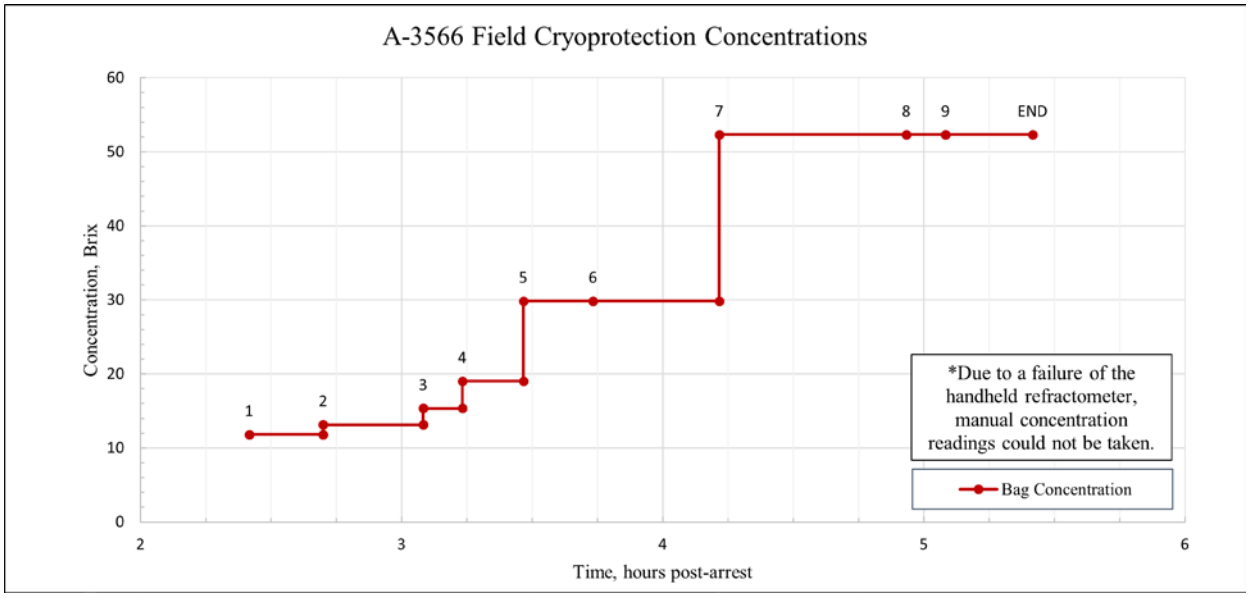
During the cryoprotection procedure, the DART team encountered difficulties with the refractometer, which failed to zero out, preventing accurate BRIX (refractive index) readings. The underlying cause of the malfunction was unclear at the time. Upon testing at Alcor during the kit restocking process, no issues were detected with the refractometer. The tester confirmed that both temperature and BRIX readings were recorded correctly during sample testing. When the team was asked if temperature discrepancies could have been a factor, they confirmed having observed similar irregularities. Specifically, they noted that the temperature readings were inconsistent with the expected sample temperature, and BRIX readings were off by 20-30%. Due to the persistent issues and uncertainty regarding the malfunction, the refractometer was removed from service.

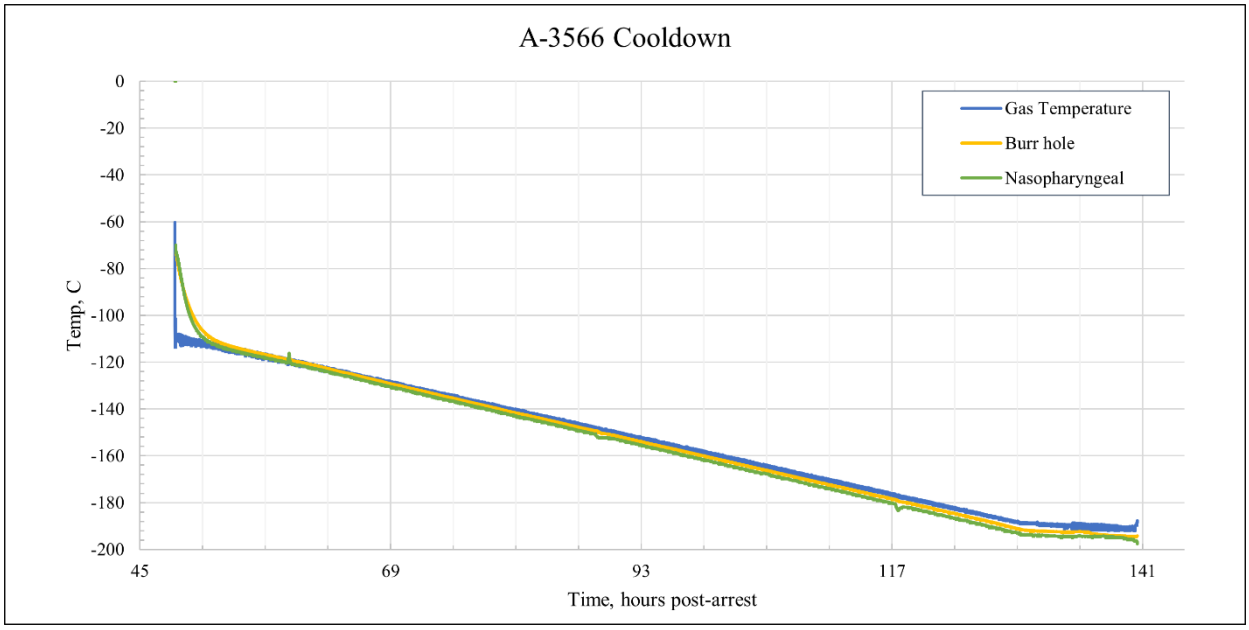
Patient Transport to Alcor

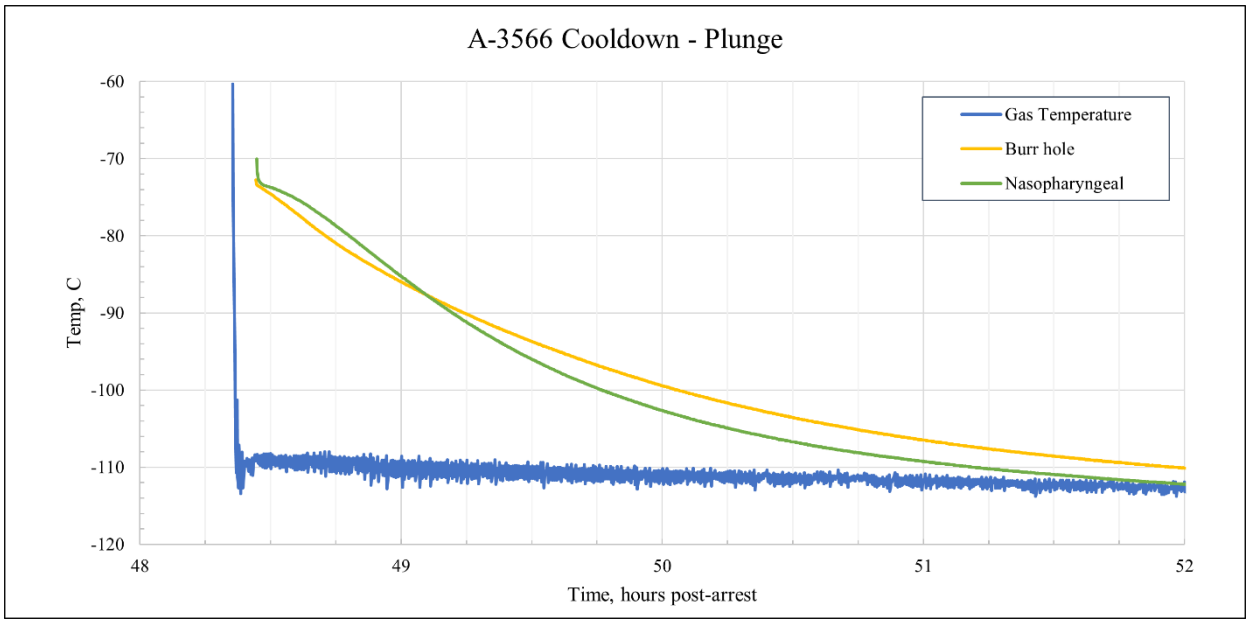
The standard protocol requires waiting at least 24 hours after the initiation of cooldown on dry ice before transporting the patient. This hold allows the patient to be as close as possible to dry ice temperature before leaving them at the airport cargo department. If the patient is still cooling down and the dry ice runs out (because of some airport maintenance problem that creates a multiple-hour delay, for example) the patient could warm up before it is possible to add more dry ice. That has happened in the past. Rewarming from dry ice temperature is very damaging to the patient and needs to be prevented. The team adhered to this protocol.

13. Cryoprotection and Temperature Graphs

The patient was transported to Alcor on dry ice in the neuro shipper. A temperature plot could not be generated due to the absence of data.



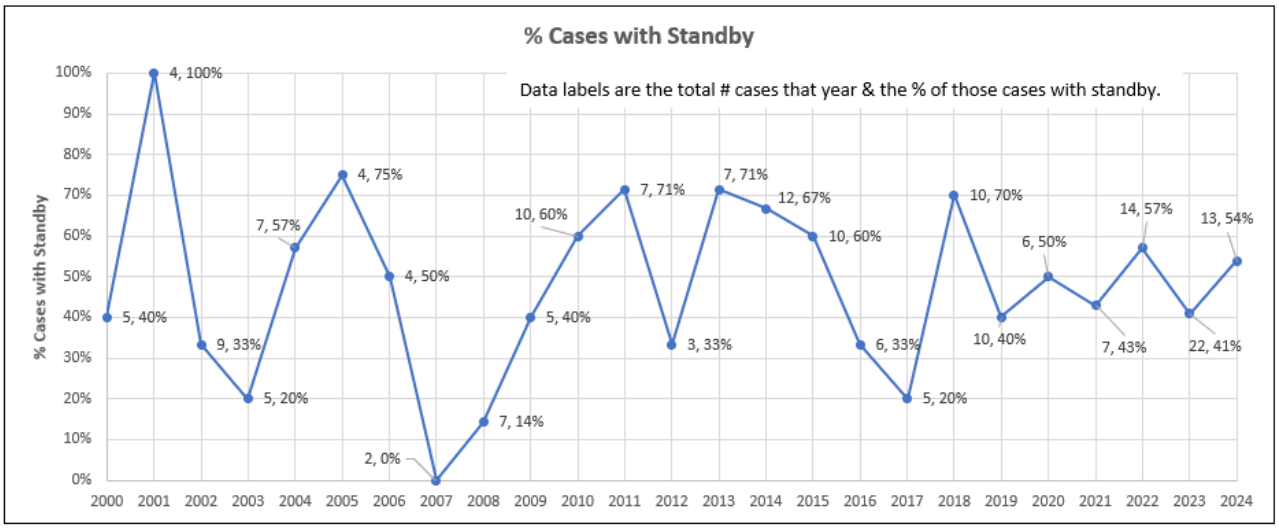

A-3566 Cooldown
Gas Temperature
Burr hole
Nasopharyngeal
Temp, C
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
45
69
93
117
141
Time, hours post-arrest


A-3566 Cooldown - Plunge
Gas Temperature
Burr hole
Nasopharyngeal
Temp, C
-60
-70
-80
-90
-100
-110
-120
48
49
50
51
52
Time, hours post-arrest

14. S-MIX

The S-MIX for this case could not be calculated due to a lack of sufficient data.

The following plot shows how often cases receive standby. Cases may not receive standby for a number of reasons. The most common reason is that Alcor is notified postmortem. This happens when a member dies unexpectedly, when a member dies alone, when a third party decides to cryopreserve a person after they die, and for various other reasons. Roughly speaking, half the cases receive standby. This 2024 case did receive a standby.



Note: the total # cases from 2000 - 2024 is 194 and the % of those cases with standby is 50%

15. CT Scans

Cryoprotectant Distribution (Post-cryopreservation CT scan)

When the in-house scanner is functional and patients are being scanned, additional information will be added to this report.