

# **Alcor A-1614**

## **Case Report**



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## 1. Overview

Wesley Du Charme, Ph.D. became a member of Alcor in 1995. Born in Minneapolis, Minnesota, April 3, 1939, he earned a Bachelor of Arts degree, magna cum laude in psychology, from the University of Colorado, and a Ph.D. in psychology from the University of Michigan. In May 1961 Wesley married Skippy Clark and together they had three daughters. He taught psychology at Rice University in Houston and later worked for corporations as an industrial psychologist. He was living in Rathdrum, Idaho at the time of his terminal illness.

Du Charme authored a book: *Becoming Immortal: Nanotechnology, You and the Demise of Death* in 1995, which discussed the opportunity for virtual immortality through combining nanotechnology and cryonics. Wesley also owned Decision Time Tools, a website for retired people looking for leisure-time activities.

He was a voracious reader, a talented singer, an avid tennis player, and a jokester who loved his burgers and beer, jazz and Frank Sinatra music. He lived life fully while always looking to the future; he joined Alcor in hopes of living in the far future.

Wesley's clinical death occurred at 4:59 PM on April 15th, 2010. Surviving relatives included his mother, three sisters, wife, three daughters, six grandchildren and one great-grandchild.

## 2. Personnel

Transport Coordinator Aaron Drake headed the response team which additionally included Steve Graber and Richard Cremeens for the immediate stabilization and cool down. They were supported by Jennifer Chapman, Executive Director; and Steve Harris, M.D., Chief Medical Advisor.

Personnel at Alcor's surgery suite included José Kanshepolsky, MD, Surgeon; Aaron Drake, Surgical Assistant; Hugh Hixon, Perfusionist; Steve Graber, Assistant Perfusionist; Andrei Sobolev, Scribe; Bruce Cohen, Support; and Richard Cremeens, Support.

## 3. Pre-Deployment

Wesley was diagnosed with cancer of the left kidney which was subsequently removed in 1986. In 2008, two tumors in the cerebellum were identified which turned out to be renal cell metastatic carcinoma following the original diagnosis in 1986. These were also removed surgically; however over the course of the next year, Wesley began to notice his balance was

becoming affected, requiring him to use a cane to walk. Tests showed that the cancer had returned. Radiation and chemotherapy were both started, however a follow-up MRI revealed the lesions were continuing to grow. Given his clinical signs and a lack of response to treatment, the only option was another attempt at a surgical procedure.

In May 2009, Alcor was first notified of Wesley's medical issues when he was scheduled for a craniectomy to again debulk the tumors. Alcor monitored his progress through his wife, a registered nurse, who was very helpful in keeping us abreast of the situation. While the surgery was a success and multiple MRIs showed no return of the cancer to the brain, Wesley's health continued to decline. By April 2010, he had lost 50+ lbs. due to decreased appetite, abdominal pain, increased nausea and vomiting.

These ongoing symptoms, coupled with recently developed melena (bloody stools) and hematemesis (vomiting of blood), prompted an endoscopy and CT scan to further diagnose the problems. The tests showed that Wesley now had pancreatic cancer with metastases to the liver and duodenum. At this point, the oncologist said that his condition was terminal and non-operable, and Wesley would not respond to chemo or radiation treatments. When asked how long Wesley had to live, he responded with "...longer than three days, but less than six months."

Given Wesley's greatly weakened condition, the family desired to have him admitted to hospice care in Scottsdale, Arizona, close to Alcor. As Wesley was currently hospitalized, his physician who was supportive of the cryopreservation directives, prescribed TPN (Total Parenteral Nutrition) as a way to increase Wesley's strength and stamina to endure the trip to Arizona. Alcor personnel helped facilitate communication between the hospice facility and the family to finalize the admittance process.

On Saturday, April 10, Wesley and his wife Skippy, flew in to Sky Harbor airport in Phoenix. They had previously made arrangements with the hospice organization to be picked up and transported to the facility. The transfer vehicle was a wheelchair van staffed by non-medical personnel. Aaron Drake met them at the airport on behalf of Alcor and to assist in transporting any baggage, due to concerns of space limitations in the van.

The airplane landed in Phoenix, and was taxiing up to the deplaning gate. One of the on-board flight attendants called Aaron on his cell phone. She reported that Wesley was not doing well. Apparently, while en route, he became quite short of breath and was placed on oxygen. Additionally, he looked very pale and they were very concerned about him dying on the plane. Skippy had given the flight attendant Aaron's cell phone number to request that he meet them at the gate and assess Wesley's condition. But Aaron informed them he could not get through security without a ticket or medical response documentation. The flight attendant said she would

have an airline representative take Wesley to the security exit in a wheel chair and to meet them there.

As they rolled down the ramp through security, Aaron could see that Wesley was slumped over in his wheelchair and looked unconscious. He was no longer receiving any supplemental oxygen. When they met, Aaron had to rub Wesley's shoulder to arouse him, to confirm he was still alive. Wesley slowly stirred. Aaron held his wrist while he attempted to communicate, subtly feeling for a pulse. Wesley was able to look up and acknowledge Aaron but no radial pulse was detectable indicating that he might be dangerously hypotensive. Wesley's voice was weak and his wife was very concerned about whether he would survive long enough to arrive at the hospice. Aaron shared the concern and decided to ask the airport paramedics if they could take Wesley's vitals to determine the seriousness of his condition. Aaron called the airport dispatcher and was told the paramedics would meet them at the baggage claim.

While waiting for the baggage, the emergency medical providers attended to Wesley, assessing his blood pressure, pulse and oxygen saturation. While the vitals were quite low, they were not critical. The responders were thanked for their time and Wesley was rolled out to the waiting ambulance transport vehicle, where he was loaded and secured for the drive to the hospice facility. Aaron followed in his personal vehicle.

When the ambulance arrived in Scottsdale, around 30 minutes later, the attendants unloaded Wesley and took him into his assigned room. Aaron coordinated with staff to have him admitted and periodically checked on. Although Wesley looked quite sick, he indicated that he felt much better and was very relieved that he had made it to Scottsdale. He said with a smile "Now that I am here, I am ready to die." Aaron stayed another hour to speak with Skippy and learn the details of the previous 48 hours and of their air travel.

The next day, Sunday, Aaron and Steve Graber were assigned to supervise the transfer of another Alcor member to the same hospice facility. Fortunately, both members would be located just across the hallway from each other, allowing the response team to monitor the health status of each member simultaneously. The hospice staff and physician provided regular clinical updates on Wesley over the next three days. His condition appeared to improve as he was now eating and drinking some, and not vomiting.

The response team had officially been on standby since Monday morning for the other Alcor member due to her very precarious condition. On Wednesday afternoon (April 14<sup>th</sup>) her heart failed and she was pronounced. The team performed the immediate stabilization and cool down at the facility and then transferred her to Alcor for the subsequent surgical and cryoprotective procedures. After Aaron finished his role in surgery, he returned to the response vehicle to clean and restock it in preparation for when it would be needed again.

Wesley's condition meanwhile appeared to have improved, and the hospice physician was pleased with his progress, so the family took the opportunity to get a good night's rest. Until this time, someone from his family had stayed with Wesley 24 hours a day. A nearby hotel provided the first restful night's sleep for everyone. As Alcor was not officially on standby for Wesley yet, Aaron also returned home for the first time since Sunday.

#### **4. Deployment**

At 5:30 am on Thursday morning, less than eight hours later, Aaron's cell phone rang. It was an urgent call from the hospice nurse asking if he could respond immediately. She was very concerned that Wesley could pass at any time. He apparently had experienced uncontrolled vomiting with copious amounts of blood. Aaron called Jennifer to let her know of the events and that he was departing for Alcor to get the rescue vehicle to respond. Jennifer contacted Randal Fry, Alcor's Equipment Fabricator, to meet Aaron at the hospice and help if needed. She also contacted Steve Graber, who would be able to respond later that morning.

When Aaron arrived at Alcor, he filled four coolers with crushed ice and loaded them onto the rescue vehicle. He then drove to the hospice and parked near the exit of the building. Upon entering, he learned that while Wesley was no longer vomiting blood, he was still critical. Seeing that no family members were present, Aaron asked the nurses if they would contact the family, as they would probably want to be aware of what might happen. Aaron proceeded to move the stabilization equipment into Wesley's room. The ice was also pre-positioned next to the equipment. Randal arrived and they prepped the equipment together.

Aaron then requested that the nurses obtain another set of vitals on Wesley. Most of his vital signs were undetectable. Aaron found a quiet room across the hall and started preparing the medications. Richard Cremeens, an Arizona Response Team member, arrived a little later in the morning to relieve Randal so he could return to Alcor for his regular work assignments. Richard assisted Aaron in prepping the remainder of the medications. Once they were ready, Aaron spent some time explaining to the family what would probably happen and the sequence of events they could expect. Aaron directed Richard to pre-filter the medications so administration could occur more quickly.

Plans were made to have additional team members respond later in the day if needed. Sandra Russell from Critical Care Research in Rancho Cucamonga, California was planning on flying out to join Andrei Sobolev, another local team member who would be available for relief later that evening. By late morning, Steve Graber had also responded to help on the standby.

As the day progressed, Wesley's breathing became more erratic leading to longer periods of apnea. He became unresponsive to any stimulus by family members. Nurses could not obtain any blood pressure or oxygen saturation and his pulse was very thready. As all of the equipment was prepared and repositioned in the room, next to the bedside, the team members retreated to the spare patient room across the hallway and the rescue vehicle to allow the family members to have some private time. The wife, being very familiar with the clinical signs of impending death due to her nursing background, said she would notify the team when clinical death was near.

At 4:50 pm the wife notified Richard, who was across the hall, that she felt Wesley did not have much time remaining. Richard ran out to the rescue vehicle to get Aaron and Steve. The entire team was now present in the room with Wesley, his wife and one daughter. His breathing was very apneic with as much as 20 seconds between breaths. Aaron told Richard to summon the hospice nurse quickly. The nurse arrived in a couple of minutes. At this point, Wesley had not taken a breath for a little over a minute. She listened to his chest for either breath sounds or a heartbeat. After 30 seconds, the nurse said she could not hear any sounds nor see any movement and that we could begin our procedures. Clinical death occurred at 4:59 PM on April 15th, 2010.

## **5. Field Stabilization and Cooling**

Aaron immediately turned on his voice recorder and pushed the first 5 medications through the previously established PICC line. A 60cc bolus of saline was given to help flush the medications. Meanwhile, Richard and Steve were placing a base layer of ice down in the Portable Ice Bath (PIB). The team grabbed the four corners of the bed sheet and lifted the patient, moving him directly into the PIB. Additional ice was placed around and over the body. Aaron placed the Lucas chest compression device over the patient's chest and turned it on. As soon as the compressions began, large amounts of coffee ground emesis begin to flow from the patient's mouth. Ventilation would not be possible at this point however a King airway was still placed into Wesley's esophagus and the airway's balloon cuff inflated to stem the flow of fluid. A thermocouple probe was placed in the nasopharynx and secured to the side of the head. After 10 minutes of cooling, the DuaLogR read 37.8 degC, indicating the internal body temperature at pronouncement must have been quite high.

Aaron sent Steve out to lower the lift-gate on the rescue vehicle and prepare to depart. Steve took some of the extra supplies with him and loaded them into the vehicle. Aaron and Richard continued to work through the medications, administering all of the low and medium volume doses. The nurses were notified, per their request, a couple of minutes before the team was ready to depart so the nurses could clear the hallway and close the doors of the other patient's rooms. Aaron began to gather all of the remaining equipment and loaded it on and under the PIB.

After a couple of minutes, the nurse returned and said they were ready. At this point, only 17 minutes had passed since pronouncement. Aaron covered Wesley with a bed sheet for privacy and Richard turned off the Lucas to minimize the noise and potential disturbance of the other patients. Together, they pushed the PIB out of the room and down the hallway towards the exit door. The nurse who was next to the exit door, entered the security code into the alarm panel just on the wall to the right, enabling the door to open. Once outside, the Lucas was turned back on and compressions restarted. They rolled the PIB across the parking lot and onto the back of the rescue vehicle's lift-gate. Steve was standing on the side of the vehicle by the operator panel of the lift-gate, ready to raise them into the back of the truck. Once inside, the PIB was secured to the floor and locked in place while Steve closed the rear door.

## **6. Transportation**

Steve backed up the vehicle and started towards Alcor. While driving, Aaron decided he wanted to have a second vascular access point to administer the large volume meds. He asked Richard if he would be comfortable in starting an intraosseous line (I/O) with the Bone Injection Gun, if Aaron talked him through it. Richard said "yes" and in less than a minute, had established his very first I/O in Wesley's leg. This allowed them both to bolus the large volume meds without competing for the same I/V tubing space. The drive to Alcor took only about 10 minutes. They pulled up to the rear doors of Alcor's surgery suite at 5:31 pm, just 32 minutes after the nurse had pronounced Wesley.

Upon arrival, Wesley's temperature had decreased 2 degC. Aaron requested that the Alcor staff bring two additional coolers of ice to be placed over Wesley to aid in faster cooling. The remainder of the large volume medications were administered and the temperature was continually rechecked. After 45 minutes the temperature had only dropped to 27 degC and Hugh said to bring the patient into the surgery suite. Although the goal was 20 degC, Hugh speculated that Wesley's extreme hypovolemic state due to the excessive gastric hemorrhaging might have impeded the body's ability to cool. Rather than wait longer than normal to reach the optimal temperature, he wanted to start the surgical procedure without delay.

The rear door was opened and the PIB was loaded onto the lift-gate. It was lowered to the ground and taken into the surgery suite. The surgical team was scrubbed and ready to start. Aaron quickly changed clothes, scrubbed up and put on a sterile gown to assist the surgeon.



## 7. Cryopreservation Summary:

After considering that Wesley was hemorrhaging through his stomach, ACDC (LUCAS) circulation was terminated at about 27 degC (1.6 hours post-pronouncement). Subsequently it was observed that the time required to washout visible blood from the head was unusually brief, so his head had been just about completely drained of blood. Probably all the cooling was by conduction in the icebath. Since Alcor's perfusion system presently requires isolation of the head before blood washout can begin, and cranial burr holes are difficult to make after isolation, the burr holes were completed first and then we proceeded with the isolation. The head was installed in the neuroperfusion box and washout began at about 2.8 hours post-pronouncement. The cryoprotective ramp was started at about 3.2 hours post-pronouncement.

Due to issues of excessive noise with the computerized data collection system, data collection was done with two 2-channel recording thermocouples and the bench refractometer. Although the jugulars had thermocouples inserted, that data set was apparently not obtained.

We perfused at 100-120 mmHg, and achieved high flow rates throughout the perfusion. The brain had initially been ~1/8" retracted from the skull, and it retracted quickly and symmetrically throughout the cryoprotection. In the end, it had retracted nearly an inch from the top of the skull, and Hugh was able to pass a soft probe around the right hemisphere all the way to the bottom of the skull. The eyes were very dehydrated.

The cryoprotection was ended at 6.6 hours post-pronouncement, when effluent from both jugulars had exceeded the target concentration for over 30 minutes.

Hugh said he had not seen this degree of contraction of the brain since an Alzheimer's patient was cryopreserved a number of years ago. The blood-brain barrier apparently remained intact throughout the cryoprotection, as we had previously observed with M22. NOTE: There was no indication of any kind of dementia in the patient.

Using the backup cooldown system, cooldown was begun about midnight (seven hours post-pronouncement) with the plunge to -110 degC, and the slow cooling ramp started at about 15 hours post-pronouncement, and -1degC/hr. The ramp ended at LN2, at about 103 hours. An operator error at about 27.25 hours resulted in a long LN2 shot that dropped the burrhole and nasopharyngeal temperatures about 5 degC in the following 15 minutes.

## 8. Timelines:

### Stabilization

4:59 PM Patient pronounced  
 Permission to begin procedures given  
 Directed nurses to call 800 emergency number to alert network  
 Moved furniture to gain access to patient's bed

5:00 PM 120 mg Propofol administered  
 250,000 U Streptokinase administered  
 100,000 U Heparin administered  
 12 mg Epinephrine in administration pump started  
 30 U Vasopressin administered  
 60 mg Gentamicin administered

5:01PM 60cc saline bolus given to flush medications

5:02 PM Patient moved to ice bath, cut away clothing to fully expose  
 Rectal occlusion device placed.

5:03 PM Ice placed on top and sides of patient

5:04 PM Lucas positioned over patient

5:05 PM Lucas started

5:06 PM King Airway placed and secured  
 1.5 g Ni-Ky in 100 cc Citrate-Dextrose administered  
 400 mg SMT in 50 cc Citrate-Dextrose administered  
 Steve left to prepare rescue vehicle for departure

5:09 PM Thermocouple placed in nasopharynx and secured  
 DuaLogR turned on and logging commenced  
 Nasopharyngeal Temperature (+37.8 degC)

5:10 PM 4-Hydroxy-Tempo flakes in 50 cc Citrate-Dextrose administered

5:11 PM 32 mg Acetylsalicylic Acid in 10 cc Tham administered

5:12 PM Notified hospice nurse we were almost ready to depart

5:16 PM Nurse returned and said that the hallway was secure  
 Leave room with patient covered in PIB

5:18 PM Arrive at rescue vehicle

5:20 PM PIB secured in vehicle

5:21 PM Depart for Alcor

5:23 PM I/O access point established

5:24 PM 400 cc Vital-Oxy administration started

5:31 PM Arrived at Alcor  
 Nasopharyngeal Temperature (+35.8 degC)

5:35 PM 190 cc Tham administration started

5:45 PM Additional crushed ice added to PIB  
 5:50 PM 500 cc Mannitol administration started  
 6:02 PM 500 cc Hetastarch administration started  
 6:15 PM Medication administration completed\*  
 6:20 PM Nasopharyngeal Temperature (+27.4 degC)  
 \*Note: No Maalox was administered due to excessive gastric hemorrhaging.

## **Surgical**

6.25pm Patient is brought into OR. Temperature (+28.2 degC).  
 6.35pm Thumper stopped.  
 6.44pm Moved patient to table. Floor very slippery due to dripping ice water from moving patient.  
 6.46pm Hair removal on head is started.  
 6.58pm Dr. Kanshepolsky establishes burrholes (polishes with various tools).  
 7.20pm Carotid arteries are separated.  
 7.28pm Cephalic isolation is complete.  
 7.29pm Thermocouple is initiated.  
 7.34pm Head is moved to cooling system.  
 7.37pm Logging temperature on both burrholes.  
 7.51pm Carotid arteries were cannulated.  
 8.00pm Vertebrae isolated and clamped .  
 8.05pm Thermocouples are placed in jugulars.  
 8.10pm Hugh: "Close circulation".  
 Started the ramp.  
 8.11pm Richard took 1st sample 9.6 both arterial and venous.  
 8.13pm Box chilling down has started by Hugh.  
 9.37pm A 30.5  
 Hugh stops ramp.  
 Dropping temperature of the box to (-3 degC) .  
 9.58pm Ramp is back on.  
 10.46pm VR 50.4 VL 50.6 A 52.5.  
 Hugh: "will run till 11pm then stop ramp".  
 10.59pm Brain is significantly contracted: 5/8 of an inch.  
 Left side contracted more than the right.  
 11.00pm Ramp is off.  
 11.33pm VR 52.0 VL 52.0 A 51.9.  
 Hugh stops the system.  
 Brain retraction is at least  $\frac{3}{4}$  of an inch from skull and skull sides.

11.43pm Dropped connections, loosens bindings that hold the head.  
 11.47pm Patient's head is moved to cooldown.  
 11.54pm Program is started.

A-1614, Wesley Du Charme, PhD, is now Alcor's 94th patient.

## 9. Discussions and Recommendations:

**Problem:** It was necessary to terminate cardiopulmonary support at an unusually warm temperature due to blood loss, increasing the urgency of perfusing cold washout solution. However perfusion had to be delayed while burr holes were made prior to isolating the head for perfusion.

**Solution:** The possibility of equipping the operating room to do blood washout and cold perfusion of neuropatients while still on the operating table prior to cephalic isolation, for cases in which this is indicated, will be discussed.

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**Problem:** The floor is very slippery in Alcor's operating suite due to ice water that drips while transferring the patient from the ice bath to the operating table.

**Solution:** Consider adding a non-slip surgical mat to the floor.

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**Problem:** The cooling rate with just external ice placement may not be quick enough.

**Solution:** Consider redesigning a squid to be added back into the kits.

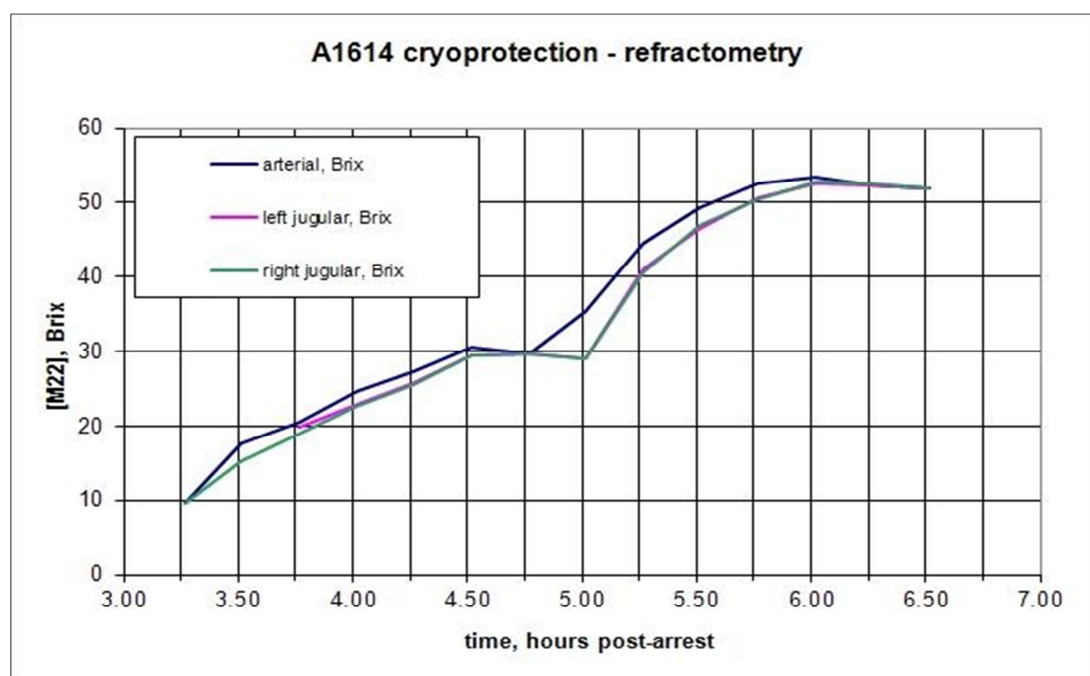
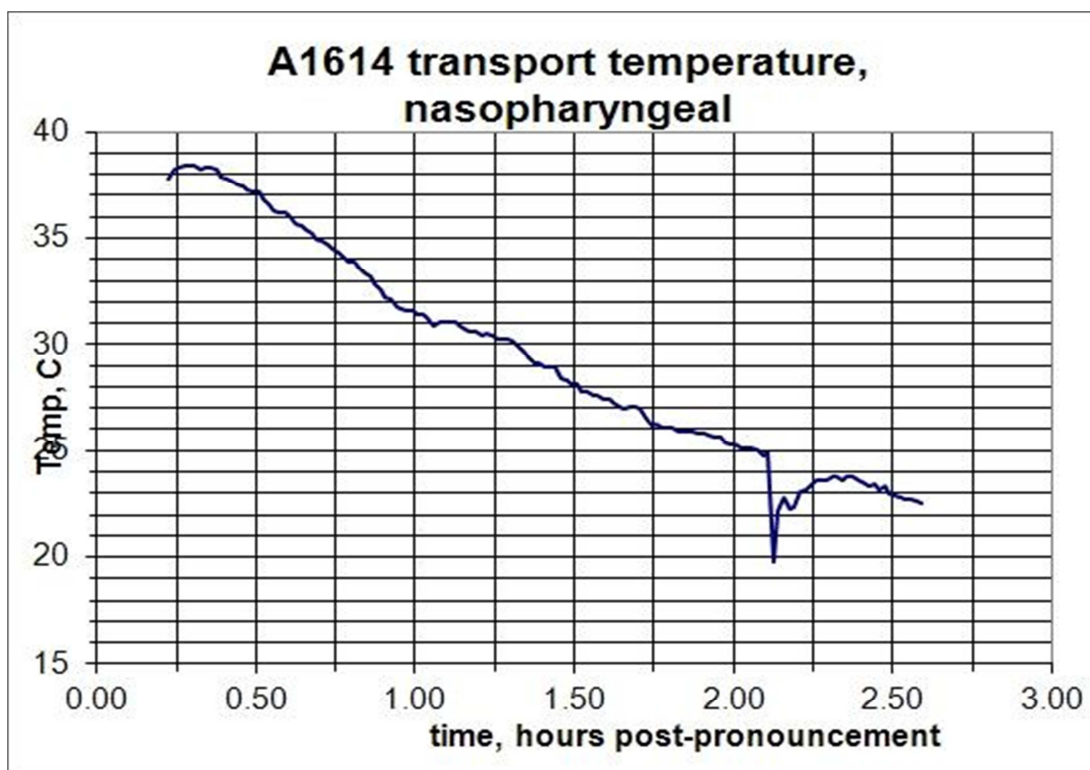
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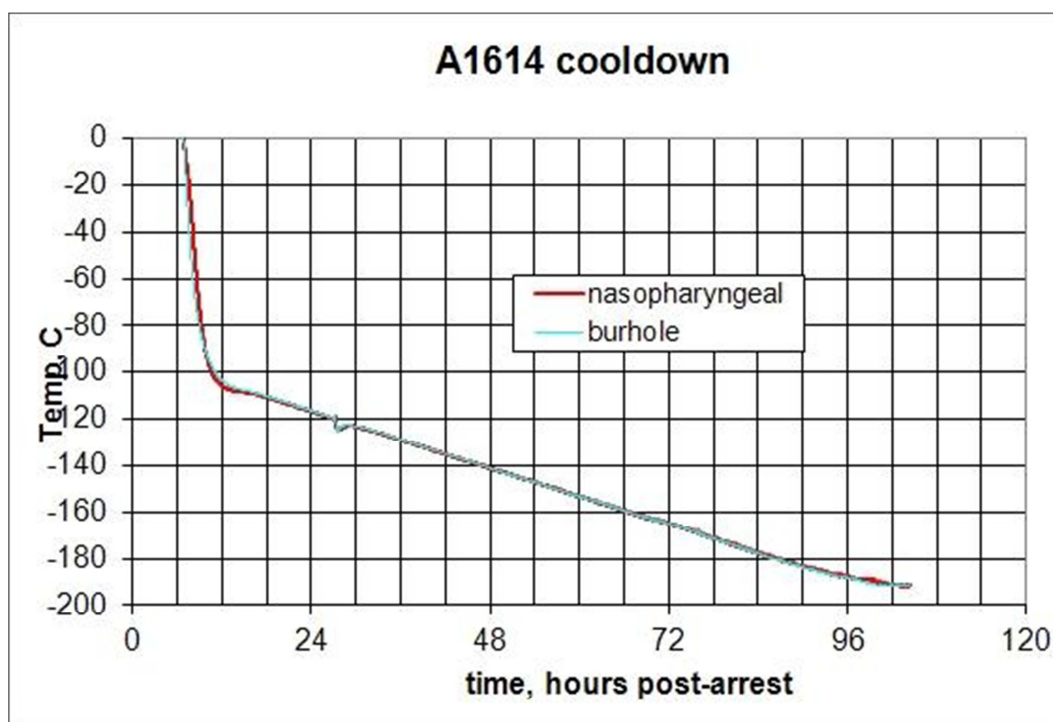
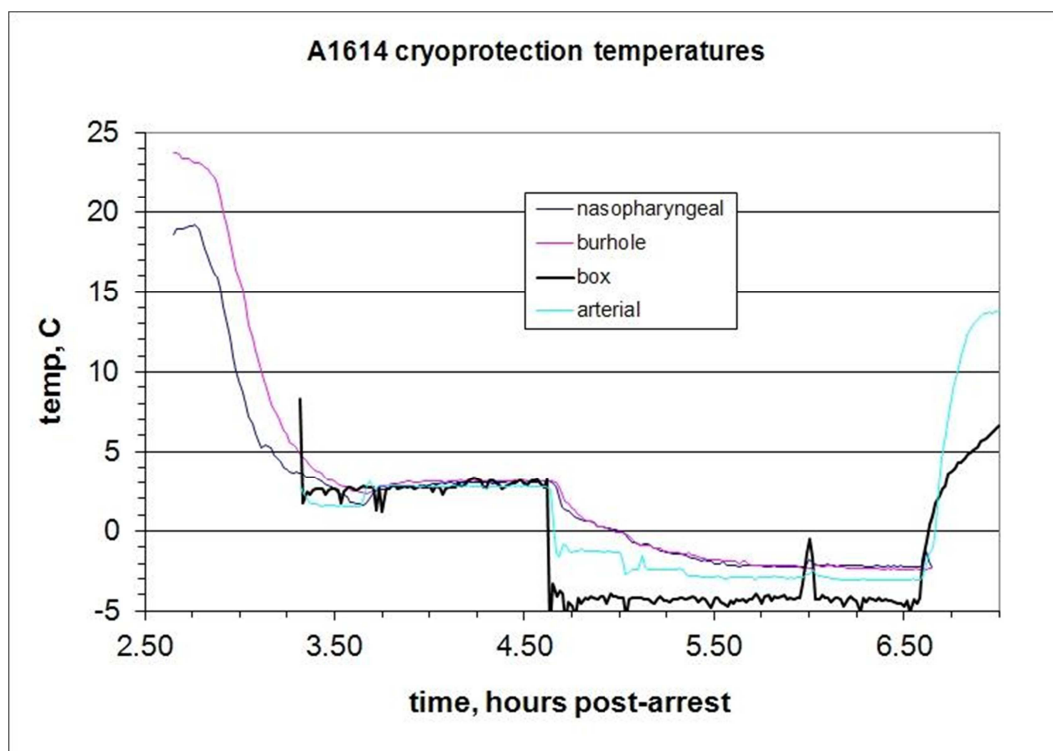
**Problem:** The hospice requested that all Alcor items be removed from the patient's room upon departing. This will allow them to clean sooner and admit their next patient more quickly.

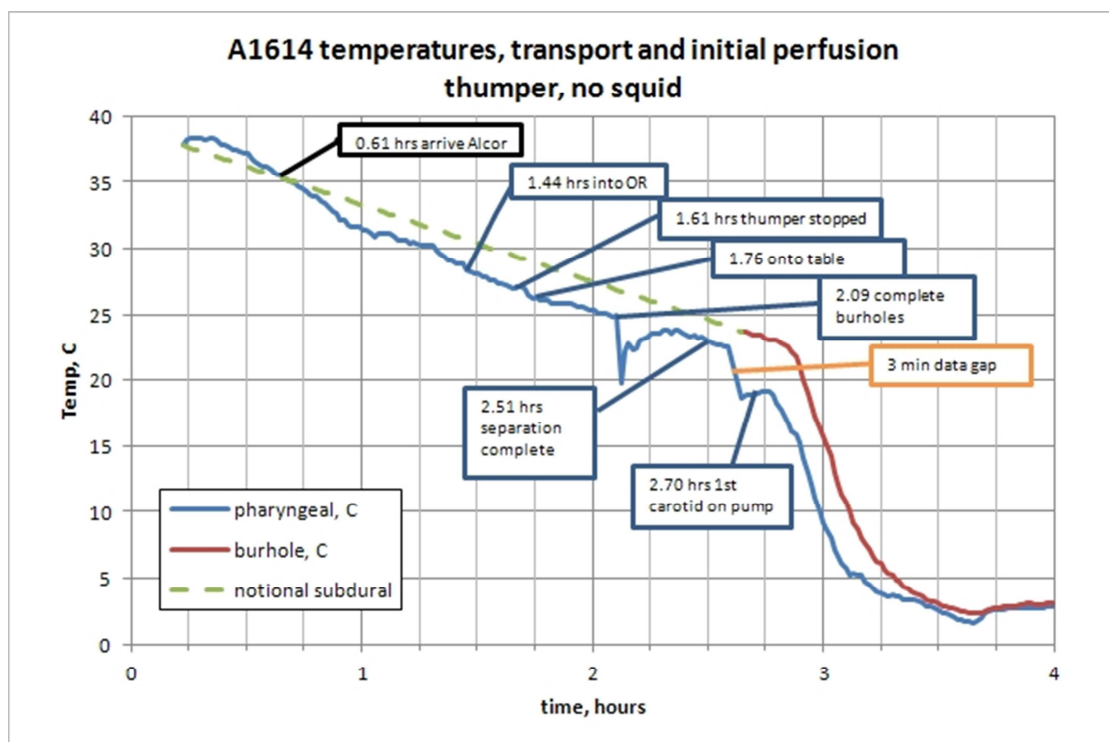
**Solution:** We will assign someone to stay behind to collect and transport all of the remaining supplies. If no additional staff is available, we will complete this prior to departing.

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## 10. Graphs







End of report.