

Fear, Anger, and Hope

The Cryopreservation of Alcor Member A-1876

by

Charles Platt

Six times, now, I have participated in cryonics cases. On each occasion the experience has induced a confusing mixture of fear, anger, and hope.

My fear is caused by intimate personal contact with someone who is legally dead, reminding me uncomfortably of my own mortality. As for my anger, it derives from the frustration of struggling to rectify a massive injustice of the human condition using resources and techniques that are inadequate for the task. I'm angry that we are mortal, and I'm more angry that we are unable, so far, to make ourselves biologically immortal. To use Alan Harrington's fine phrase at the beginning of his book *The Immortalist*: "Death is an imposition on the human race, and no longer acceptable."

My source of hope should be obvious to anyone who has signed up for cryonics. After a case is over, I allow myself the conceit of believing that I may have helped in a very modest way, with an unknown and possibly marginal chance of success, to save the mind and memories of a human being. This is what makes the fear and anger tolerable.

u

The most recent case in which I was tangentially involved was that of Alcor patient A-1876, Eleanor Williams, a remarkable lady who lived in the San Francisco Bay area and fought a battle with cancer that lasted almost three years.

In 1999, Eleanor underwent surgery for a primary adenocarcinoma of the stomach. A large section of her gastrointestinal tract was removed, and she received chemotherapy. Still, she managed to continue a very active life, participating in numerous social causes and groups. Her father had been a communist who wrote an influential book on sociopolitical theory. Some of her friends

described her religious views as agnostic, but she was a member of a Jewish temple and was active also in the Unitarian Church, attending their lectures, meetings, and retreats for more than a decade. In addition she underwent a crowning ceremony to be certified in wicca (witchcraft). So far as we can tell, each group was unaware that Eleanor participated in the other groups. She was truly multifaceted, and initially she didn't tell many people that she had signed up for cryonics.

In 2001, a CT scan revealed that a new tumor was obstructing her large intestine. Once again she underwent surgery, which revealed additional cancer that had invaded the head of the pancreas and had surrounded the aorta. These masses could not be removed. An additional CT scan revealed several masses in the liver.

Eleanor experienced malnutrition caused by chemotherapy and her abbreviated gastrointestinal system, yet she remained stoic and insisted on continuing her social activities. She would go to church meetings even though she had to lie on the floor in order to minimize her discomfort. She became annoyed when this distressed people. She refused recommendations for pain management, such as a Fentanyl patch, and resisted suggestions that she should enter a hospice. However, her refusal to surrender to her mortality received a setback in July 2001 when she was told that she had only three weeks to live.

At this time she was a member of the American Cryonics Society (ACS) but had educated herself about cryonics by reading publications from Alcor and the Cryonics Institute. ACS had a limited ability to handle cases but was hoping that a new company named Kryos Biomedical would enter into a contract to perform hands-on procedures. Jim Yount, chief operating officer of ACS,



Eleanor Williams

suggested that Eleanor contact Kryos, and she did.

After consultation with medical advisors, the consensus at Kryos was that Eleanor's three-week prognosis was far too pessimistic. Her Karnofsky score was around 80. (This scoring system is based on simple observations yielding a number ranging from 100 for a person showing no signs of illness, down to 0 for a person who is legally dead.) When the life expectancy of a patient suffering a progressive disease is only

two to four weeks, a typical Karnofsky score would be 20. Eleanor was informed that she was likely to live at least another two to three months—although survival for more than eight months would be unlikely.

She had read about vitrification and wanted to know if Kryos could provide this. She was told that Kryos hadn't finished equipping its new laboratory and could not guarantee vitrification service within Eleanor's probable life expectancy. The best that the company could offer was a more limited procedure using glycerol as the cryoprotectant.

Eleanor wanted to know if glycerolization would be adequate or if vitrification would significantly increase her chances of future resuscitation. This question created an obvious conflict of interest. Kryos urgently needed capital, and Eleanor's case could literally make the difference between the company surviving or failing. Under the circumstances, Kryos personnel refused to offer any additional advice and urged Eleanor to investigate other cryonics organizations and reach her own decision.

She said she intended to send representatives to visit Alcor, Kryos, and the Cryonics Institute. We can find no evidence that she followed through on this intention, but we do know that ultimately she joined Alcor.

Eleanor now had to deal with the dilemma that faces any cryonicist afflicted with a terminal condition. At some point, she should abandon her home and her active social life and relocate in a hospice near Alcor's facility in Scottsdale, Arizona. The question was, how long could she wait? Naturally she wanted to postpone the move for as long as possible.

In mid February, 2002, she complained of fatigue and shortness of breath and was diagnosed with a malignant pleural effusion. A tumor had penetrated the pleura (the membrane around the lungs), and a large amount of fluid was accumulating. This fluid could be removed every 24 hours by needle aspiration on an out-patient basis. However, her oncologist recommended that she should undergo pleurodesis, which entails an incision in the chest wall through which a large-diameter tube drains the fluid. Subsequently, sterile talc and an antibiotic such as bleomycin or doxycycline are infused through the tube with the

deliberate intention of causing inflammation and injury to the whole pleural surface, resulting in scarring and permanent adhesion to the lung, thus allowing no space for fluid to accumulate in the future.

Pleurodesis is seldom advised for patients who have less than a few months to live, very low functional status, or very low fluid pH. Also, while 60 percent of patients who undergo this procedure experience mild to moderate pain, the remainder must endure extreme pain. In Eleanor's case the pain turned out to be very severe indeed. An elderly lady who was already malnourished and probably dehydrated became more dehydrated, and she went into shock. Her condition was now extremely serious.

Kryos by this time had gone out of business, and its equipment had been sold. However, a new organization named Suspended Animation (SA) had been incorporated in Florida, and Alcor had adopted a new policy initiated by its new CEO, Dr. Jerry Lemler. Jerry had made a point of encouraging cooperation in cryonics and had established collaborative relationships among people who had been reluctant to work together in the past. In an effort to get the best possible care for Eleanor, he asked the principals of SA to provide technical leadership and some on-site management duties in conjunction with Alcor's California team at the San Francisco hospital where Eleanor had been admitted.

Eleanor's blood pressure was reported at 60 over 40, and she was not expected to live for more than a few hours. Steve Harris, M.D., who serves as CEO of Critical Care Research but has provided advice in many cryonics cases, contacted staff at the hospital and persuaded them to fluid-resuscitate Eleanor. This won her a temporary reprieve during which standby team members could gather their equipment and fly to San Francisco.

Alcor's California team leader, Russell Cheney, loaded his motor home with a transport kit and perfusate that he obtained from the Klockgether mortuary—the center of Alcor's Future Bound initiative in California. Russell then met an SA representative who provided additional equipment including a portable ice bath and an experimental Michigan Instruments ACDC (Alternating Compression/Decompression Thumper). Everything was loaded into a chartered aircraft that flew from Ontario, California, to San Francisco International Airport. David Hayes (of SA) and David Shipman (of Alcor) joined the team and collaborated during the subsequent standby with Bobby June, Sue Lubais, Joe Tennant (of Alcor), and Todd Soard (of SA).

When team members reached Eleanor on February 24th, her respiration rate was 22 per minute and her blood pressure was 90 over 60. Her oxygen saturation was a high 97 percent because she was receiving four liters of oxygen per minute via a nasal cannula.

Eleanor was sufficiently self-aware to state that she didn't believe she would die within 24 hours. Still, her condition was so precarious, no one wanted to fly her to a hospice near the Alcor facility. This turned out to be the last day that she was fully conscious and able to communicate well.

The team received excellent cooperation from hospital staff, who allowed all necessary equipment, including E cylinders of oxygen, to be moved into a hallway not far from the patient's

room. Subsequently, hospital staff supplied the standby team with snacks and blankets, and several staff members showed a sincere interest in cryonics.

However, the standby was extremely tense and grueling because the patient remained in a state of distress and seemed liable to die at any time. Some team members worried that her morphine drip might not be adequate and that her life was being prolonged unnecessarily by hydration ordered by her oncologist. Toward the end, she breathed with obvious difficulty because of the fluid in her lungs. Team members could not do rudimentary lab work to assess her condition because her oncologist would not allow anyone to draw blood. Basic vital signs such as blood pressure, temperature, and respiration were recorded at regular intervals but showed no discernible trend downward. During the next week, team members maintained a 24-hour vigil while Eleanor struggled to breathe. Ultimately she went into cardiac arrest with no warning at all at 7:52 Pacific Standard Time on Sunday, March 3rd, just as the standby team was changing shifts.

Hospital staff quickly summoned a physician to pronounce legal death. At 7:58, cardiopulmonary support was applied manually using an Ambu CardioPump. All meds were administered within the next two minutes, and by 8:02 Eleanor was in the portable ice bath receiving mechanical cardiopulmonary support from a Michigan Instruments Thumper. External cooling with ice and the Spray Cooling Device (SCD) was in effect by 8:09. The lungs could not be ventilated because of massive pulmonary edema, and end-tidal CO₂s remained at zero throughout the entire transport phase.

Temperature probes were placed by 8:14, and a bolus of fluorocarbon at 0 degrees Celsius was administered at 8:17. The patient left the hospital at 8:28 and received another 500 cc of ice-cold fluorocarbon during transport to the mortuary in a large commercial van that had been rented and modified as an improvised ambulance.

Jim Yount of ACS had generously provided the team with oxygen cylinders owned by his organization. Additional oxygen

was brought to San Francisco from Los Angeles by Bobby June in his car. The oxygen powered the Thumper while Eleanor was moved to a mortuary located less than 15 minutes away. The mortuary turned out to be excellent, and the mortician was very helpful.

The team reached the mortuary around 8:35. Another 1.5 liters of fluorocarbon were administered at 9:30. Nasopharyngeal and oropharyngeal temperatures were now 19.9 and 19.7 respectively and fell to 16.0 and 15.5 by 9:41.

To enable blood washout, a femoral cutdown was executed by the SA team leader working with the mortician. Meanwhile, Thumper support continued without any interruption and was not discontinued until 10:25. The Thumper was of no help ventilating the patient because of the fluid in her lungs, but chest compressions did continue to induce blood circulation to the brain. When the Thumper was finally disconnected, Eleanor's naso/oro temperatures were 9.9 and 8.6 respectively. The combination of external cooling in the ice bath and fluorocarbon cooling via the lungs had reduced her core temperature from around 36 degrees Celsius at the time of death to approximately 9 degrees in just two-and-a-half hours.

No one had obtained an emergency transit permit to enable Eleanor to be moved to the facility in Scottsdale. Since Eleanor had experienced legal death on a weekend, there was no way to obtain documents to move her out of California. Reluctantly, the team decided to separate her head, since the detached cephalon could be transported legally without paperwork.

Cephalic isolation started at 11:25. Both carotids and both jugulars were raised and ligated, and the incision was deepened to the vertebrae, which were identified and ligated. The cephalon was separated at noon. It had been packed in ice throughout the procedure and was now placed in a protective plastic bag and moved into a small ice chest. Cleanup of the mortuary began at 12:15, and by 1:00 P.M. Eleanor's naso/oro temperatures were 6.7 and 7.3.



Surgery in progress at the mortuary. The patient is lying in the portable ice bath.



The ATP unit that was used at the mortuary.



Surgery in progress at the mortuary. The patient is lying in the portable ice bath.

The team took their patient to San Francisco International Airport, where a chartered jet was used to transport Eleanor to Scottsdale Air Park, only a few minutes from the Alcor facility. In Alcor's operating room, personnel were ready to perfuse her with vitrification solution.

Inside the chartered jet flying the patient from San Francisco to Scottsdale. In the foreground, the cephalon is in an ice chest with a handheld temperature monitor resting on top of it.



u

My own involvement with this case began shortly after Eleanor went into shock on Sunday, February 24th, when I received a call from Hugh Hixon warning me that she was in serious condition and might be near death. Hugh felt it would be better to have too many people for a cryopreservation than too few and had been told that SA wanted me to be present as the scribe, meaning that I would log as much data as possible during the cryoprotective phase of this case. He suggested that since I live only two-and-a-half hours from Alcor, I should drive there immediately.

I called the team in San Francisco for an update on the patient's condition. They reassured me that although she had been in shock previously, she had stabilized. Everyone now believed that Eleanor was unlikely to die imminently. They promised that someone would call me if she did go into cardiac arrest, and when I received the call I would still have ample time to reach Alcor before she did, because the postmortem procedures, plus her travel time to Alcor, would total at least seven hours.

Still, the logistics and timing of cryonics cases are always problematic, and I saw several ways in which things could go wrong. Cellular coverage in my rural area is patchy. What if I happened to be out of range when someone wanted to alert me that Eleanor had suffered cardiac arrest? What if she died in the middle of the night, compelling me to make my journey to Alcor in the small hours of the morning, which would leave me feeling sleep-deprived and would make me less effective as a team member? Or what if the people in California simply forgot to call? This was unlikely, but conceivable amid the stress and urgency of postmor-

tem procedures.

I decided to drive to Alcor, and reached the facility around 11:00 on Sunday night. After I made a quick call to San Francisco to verify that Eleanor's condition was still stable, I inflated an air mattress in a vacant room at Alcor and was asleep by midnight.

I stayed at the facility throughout the next day and the next night, calling San Francisco for updates every four to six hours. Since Eleanor's condition remained unchanged, the team encouraged me to stop waiting and go back home. On Tuesday, February 26th, I took their advice.

Each time I called the team during the next few days, I sensed their weariness as the standby wore on. By Saturday, March 2nd, the team was debating whether I should fly out to join them in San Francisco. They could certainly use a fresh, well-rested volunteer—but this plan created new logistical problems. If I went to join them in San Francisco, Eleanor might die while I was in transit, and I would arrive to find that everyone had already left the hospital. Depending on traffic and other unpredictable factors such as flight delays, I might even reach the mortuary too late. At that point I would have to make my own way back to Scottsdale via the next scheduled flight, and might find that all the procedures had been completed without me.

On Sunday morning, while I was still trying to decide what to do, I received a quick, urgent call to notify me that Eleanor had gone into cardiac arrest. The cellular connection was breaking up, but I could hear the Thumper running in the background.

Within an hour I was ready to head down to Scottsdale. Then I paused to wonder if anyone had called Brian Wowk, the biophysicist who co-developed the vitrification solution used by Alcor. If he was available, we could all benefit from his technical knowledge. I dialed his number and found that he hadn't been informed of Eleanor's death, but he was willing to drive to Scottsdale from his home in southern California. The journey should take him about six hours, and he would arrive in time to assist us.

When I reached Alcor myself, I found that the operating room was well prepared, with the exception of the LabView data acquisition system. Relatively little data had been gathered during some previous Alcor cases, and since I was to be a data gatherer in this case, I wanted to be sure that I could do a good job. I found Alcor's former consultant, Jeff Benjamin, trying to explain how he had set up the system to a new LabView programmer named Jim Medlin. Jeff's complicated explanation devolved to one simple fact: The system couldn't measure cryoprotective concentration. I didn't have the expertise to offer any help, and Hugh Hixon had other things to do.

Fortunately, Brian Wowk has extensive LabView experience and arrived in time to deal with the problem. Some of the primary data sensors are refractometers, which "look at" the perfusate as it passes through a tubing circuit. These refractometers are sensitive to temperature and have to be calibrated before perfusion begins. Brian was still rushing to complete this task when the standby team arrived at the facility, bringing Eleanor's cephalon with them.

LabView was up and running about 20 minutes later, and the delay was not considered significant, since the patient was being maintained at around 1 degree Celsius and had been washed out with organ preservation solution at the California mortuary. Her head was removed from the ice chest shortly after 6:30P.M. (Note: All times in the remainder of this account are local to Arizona, which was on Mountain Standard Time, one hour later than Pacific Standard Time.) The cephalon was perfused with an initial rinse solution at 6:38 P.M. By 6:48, because she had been removed from the ice chest, her core temperature had risen above 4 degrees, assuming the LabView readings were correct.

She went onto closed-circuit perfusion at 6:47, and ramping of the cryoprotective agent concentration started at 7:10. Her cephalon was enclosed in an improvised cooling unit consisting of a clamshell formed by two plastic storage boxes about 18 inches square. Liquid nitrogen vapor flowed through this unit, while vitrification solution was pumped through the major ves-

sels in her neck. Her brain was monitored via a burr hole in the top of her skull. The perfusion was largely uneventful, although it was interrupted a couple of times when the recirculating reservoir ran dry. Also, the venous return line air-locked when gravity drainage was being used, which caused the sump under the cephalon to accumulate perfusate, interrupting the smooth ramping of concentration.

I transcribed data from the LabView display by hand every ten minutes, to provide backup for the automatic data logging. I also noted any significant events. Occasionally I used my digital camera and digital camcorder to record some of the procedures.

By midnight, perfusion had been completed successfully, and the cephalon was moved into a small dewar for gradual cooling to liquid nitrogen temperature during the next eleven days. The cleanup crew started work in the operating room, and another human cryopreservation had been completed.



Alcor's operating room, with many spectators, near the beginning of cryoprotective perfusion. Photograph by Charles Platt.



The LabView data acquisition system is in the foreground. The patient is immediately behind the electronic equipment, under the lights. Photograph by Charles Platt.



Alcor's contract surgeon at work in the operating room in Scottsdale. Mathew Sullivan looks on, at right. Hugh Hixon and Jerry Lemler are in the background. Photograph by Charles Platt.



Late in the evening, when the perfusion is almost complete, Brian Wowk (left) talks with Mathew Sullivan. The five units beside Brian are roller pumps, some of which are used during cryoprotective perfusion. The video monitor displays patient data via the LabView system. Photograph by Charles Platt.

Was the procedure a success? There's no easy answer to this question because we have no objective criteria by which success can be measured. Of course, we know that some scenarios are more damaging than others, such as a case of sudden death followed by hours of zero blood flow at room temperature. Compared with this baseline, Eleanor was extremely fortunate, receiving prompt cooling, medication, and uninterrupted cardiopulmonary support. But even in a patient who receives such prompt attention, we have no way of verifying that vitrification has been entirely successful and freezing damage has been minimized. Nor do we know exactly what happens when thermal stresses induce fracturing during the long journey down to the temperature of liquid nitrogen. We may infer from logical arguments that nanotechnology will enable cell repairs, but still this is an inference, not an observation.

What we do know is that Eleanor received excellent treatment from a team that was standing by; she cooled rapidly; there were no apparent obstructions (such as blood clots) that would have interfered with perfusion of her brain; and she was given

state-of-the-art cryoprotection that should have vitrified her brain with minimal ice formation. Relative to most other cases, this case went very well.

Consequently I did allow myself some hope when I left the Alcor facility; and hope does help to mitigate the fear of death. It does nothing, however, to mitigate my anger at having to take such extreme measures, absorbing the time and goodwill and expertise of so many people because we are such fragile creatures, vulnerable to disease and the aging process. The famous lines that I learned 40 years ago, written by Dylan Thomas when his father was dying, are as relevant now as they were then:

Do not go gentle into that good night,
Old age should burn and rave at close of day;
Rage, rage against the dying of the light.

I hope I may live to see a time when death need not be a source of rage because it is no longer such a threat. I

Many thanks to the SA team leader and other members of the standby team in San Francisco: Russell Cheney, David Hayes, and David Shipman (all of whom journeyed to Alcor for the conclusion of Eleanor's case), and Bobby June, Sue Lubais, Todd Soard, and Joe Tennant. Their dedication may have given a very wonderful lady an opportunity to resume her life in the future.

Much gratitude to Steve Harris for intervening to avert the death of this patient before the standby team could arrive.

At Alcor in Scottsdale, Hugh Hixon and Mathew Sullivan set up the equipment and supplies, while Jerry Lemler, Jim Medlin, Judy Muhlstein, Dave Shumaker, Jessica Lemler Sikes, James Sikes, Brian Wowk, and myself provided assistance in the operating room.

When I participated in this case, I didn't know that I would be writing about it. Consequently, I did not take general notes and had to compile this report primarily from other people's notes and recollections. While I have tried to verify the most important facts, I was not able to do rigorous checking. In particular, I apologize if I have omitted to name anyone who participated in this case. A more technically detailed report should appear in a future issue of Cryonics magazine. Any small errors that I have made will be corrected at that time.



After cryoprotective perfusion, the patient's cephalon is moved to a small dewar (at bottom right) supplied with liquid nitrogen vapor from a storage cylinder (bottom left). Hugh Hixon, in white lab coat, chats with Mike Perry, in front of video monitors that display temperature readings as cooldown continues. Brian Wowk is leaving the area, having completed his role in the procedure.

Photograph by Charles Platt.