



P-23

Case & Quality Reports 2025

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Notice: The data in this report is incomplete, in large parts not fully trustworthy, and CT scan analysis was not possible due to differences in CPA composition. While we can't fully analyze the quality of preservation, the procedures and outcomes were not in line with our quality standards.

Introduction

The SST team consisted of seven members. Initially, four team members started the stabilization process at the patient's location after legal pronouncement of death.

The following stabilization procedures were performed by four team members. Please note that several procedures were performed in parallel:

- Nasopharyngeal temperature probes inserted.
- Tympanic temperature probes inserted into each ear.
- Rectal temperature probe insertion (with occlusion device).
- Chest compressions with LUCAS 3 device.
- Approximately 9 kg of ice placed into the portable ice bath. More water and ice were placed in the ice bath during the stabilization process.
- Patient intubated with endotracheal tube, later replaced with i-Gel supraglottic airway.
- SAVe II ventilator attached with inline capnograph.
- SAM IO established in left tibia for additional medication access.

The following medication was administered via PICC line and intraosseous access:

Medication	Dosage
Propofol	200 mg
Sodium Citrate	100 cc (20 g)
Heparin	50,000 IU
Vasopressin	80 IU
Minocycline	200 mg
SMT	400 mg
Decaglycerol/THAM	400 cc
Vital-Oxy	Per protocol (0.7 ml/kg)
Hetastarch	250 ml

SCCD water flow around the body and through the cooling mask was initiated. The patient was transported from the hospital to the partner facility via the mobile operations vehicle (MOV).

At the facility, the surgeon and perfusionist were already prepared to begin. The following procedures were performed:

- Perfusion system primed using MHP-2 washout solution.
- Median sternotomy for cardiac surgical access.
- Placement of an i-Gel supraglottic airway and administration of 300 cc of antacid.
- Ascending aorta cannulated and perfusion initiated.
- Administration of 250,000 IU streptokinase in an open-circuit configuration.
- Drilling of one burr hole for brain temperature monitoring and visualization.
- Cryoprotectant perfusion with gradually increasing concentrations, as shown in the table below:

Concentration
MHP-2
5% VM1
10% VM1
30% VM1
70% VM1

The patient was then placed on dry ice and transported to the European Biostasis Foundation for cooldown. Transport temperature remained constant at -79°C throughout transportation. Upon arrival at the facility, the patient was received and prepared for cooldown to cryogenic temperatures. Cooldown and CT analysis proceeded as follows:

- CT scan performed at -80°C .
- Rapid cooldown to temperatures above the glass transition temperature.
- Slow, gradual cooldown from above the glass transition temperature to cryogenic temperatures.
- CT scan performed at -196°C .

Cryoprotection Data

Temperature

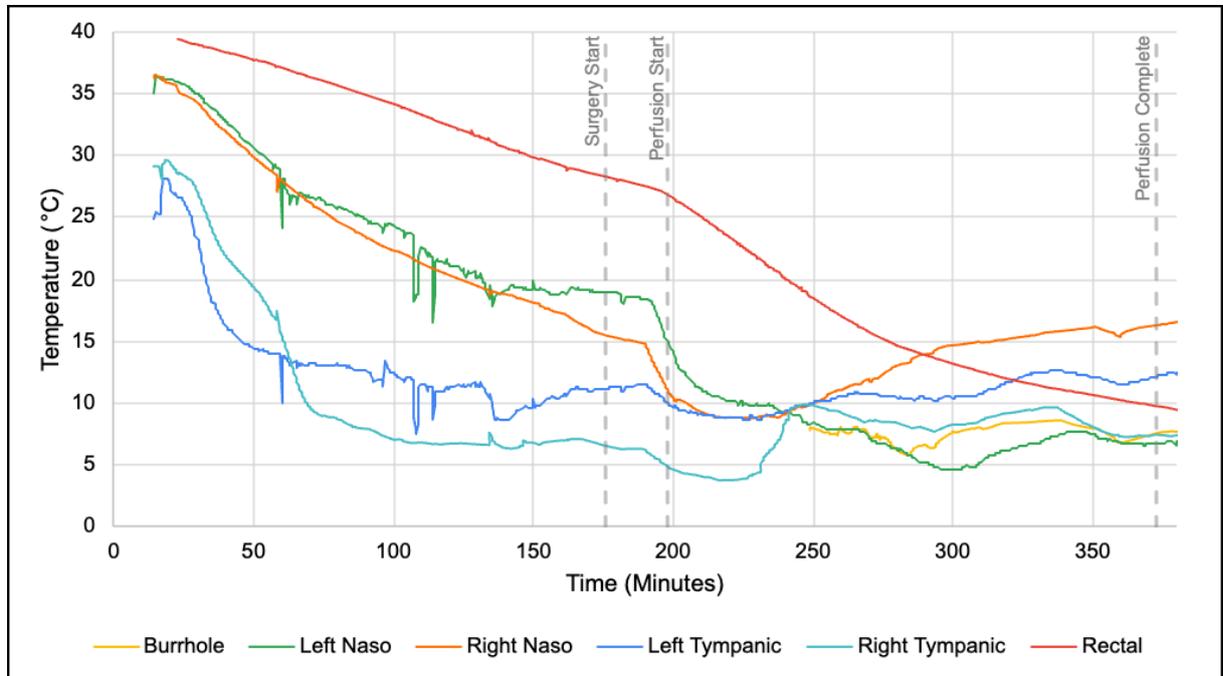


Figure 1. Patient temperature during stabilization, surgery, and perfusion, with a timeline highlighting surgery and perfusion.

Refractive Index

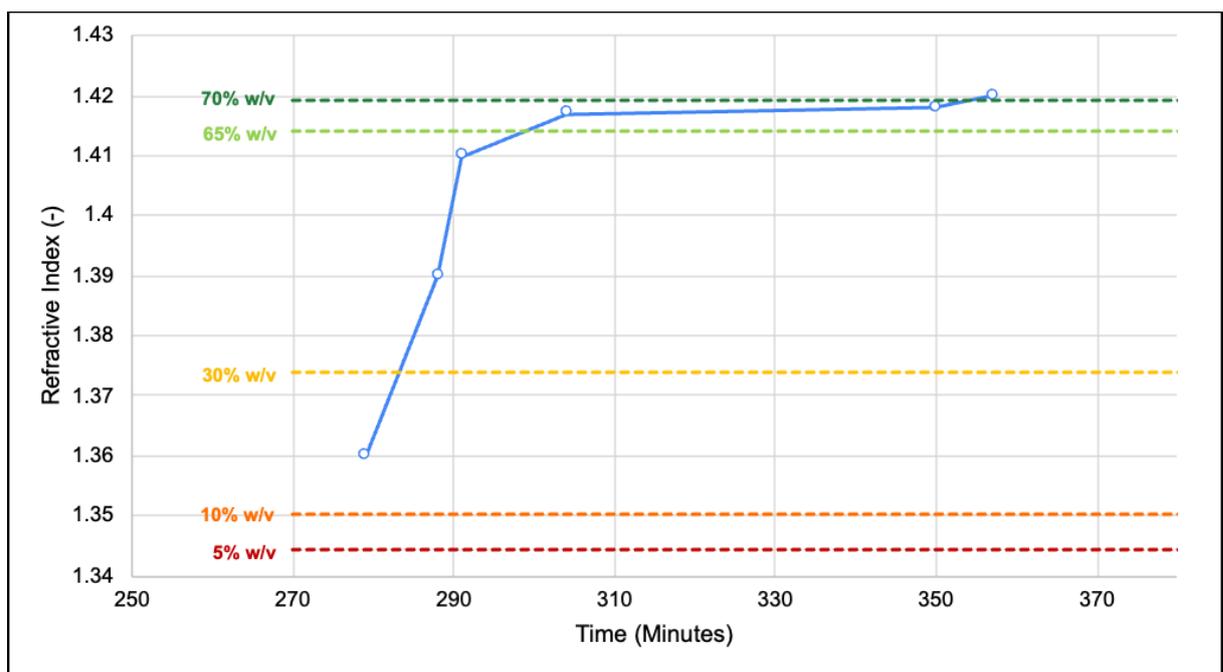


Figure 2. Patient's refractive index during surgery and perfusion.

Pressure

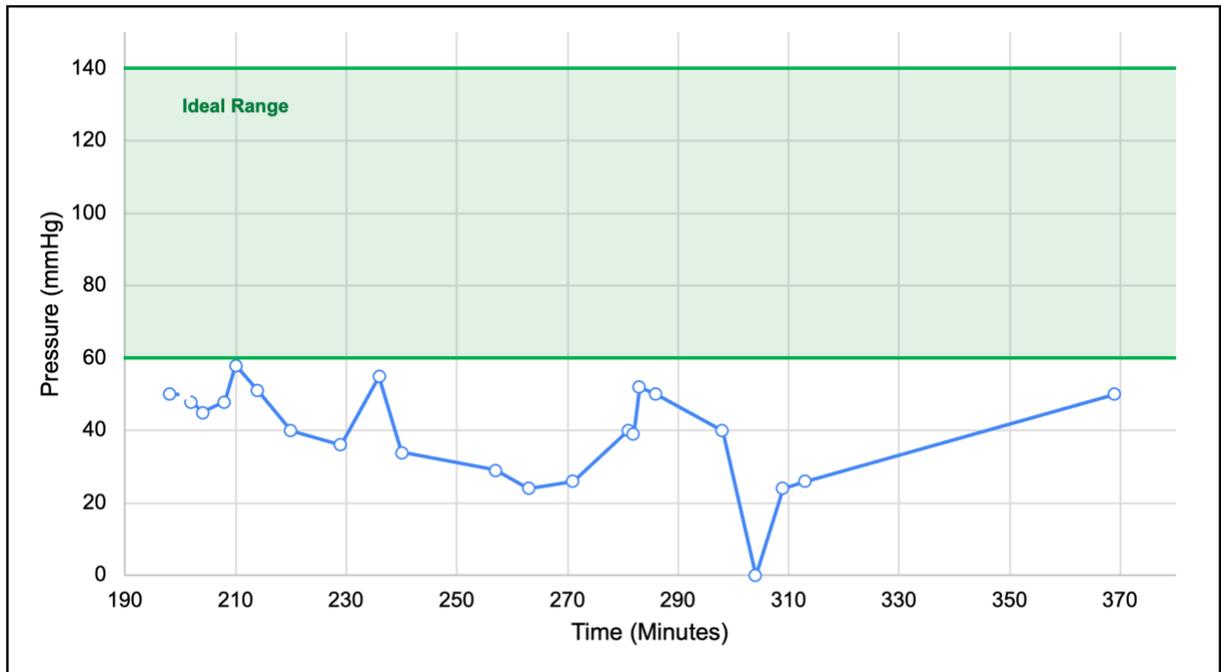


Figure 3. Perfusion pressure over time, with the ideal pressure range highlighted.

Cooldown

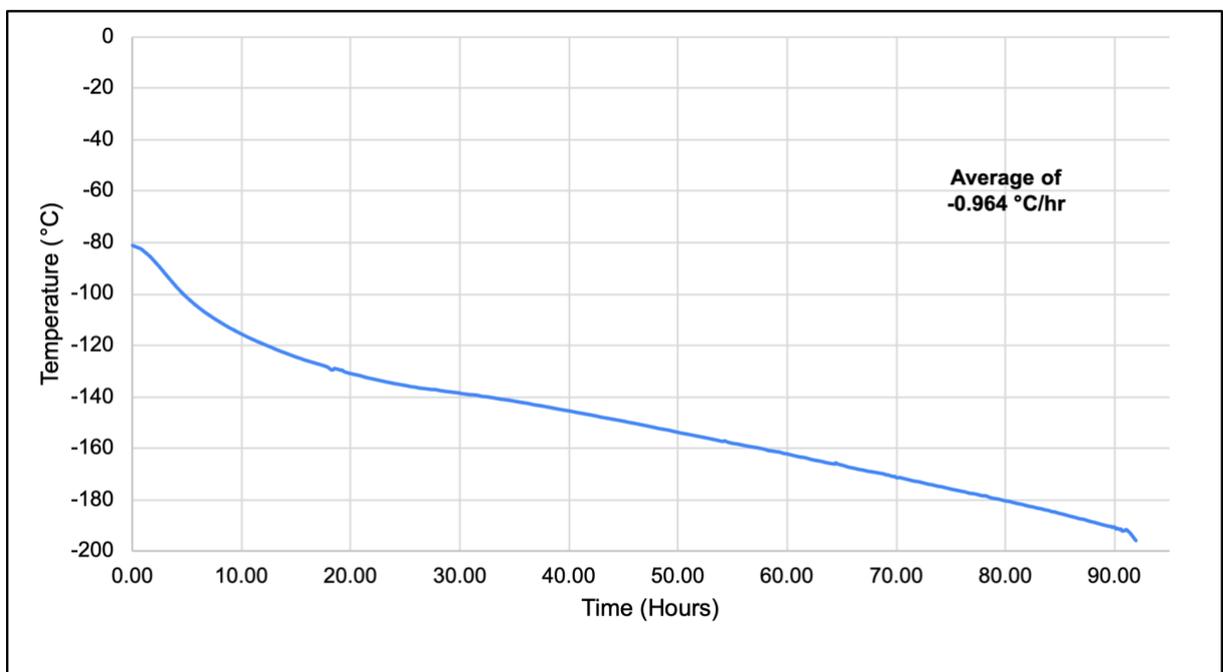


Figure 4. Patient cooldown to -196°C.

S-MIX

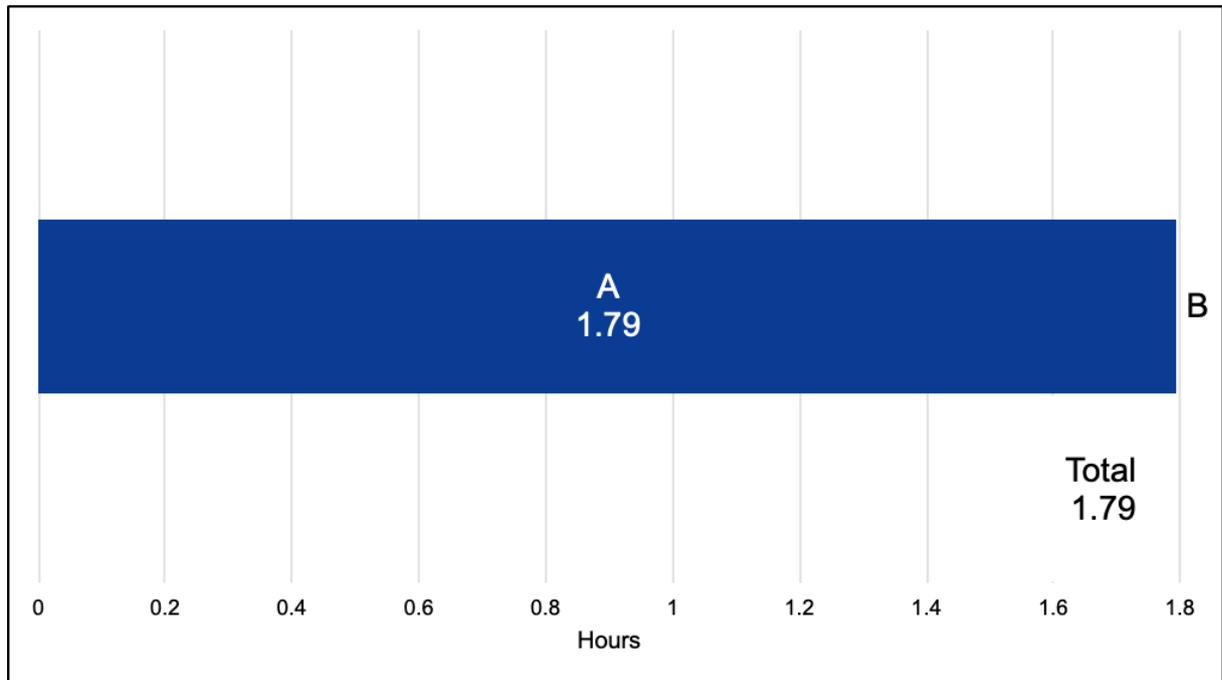


Figure 5. S-MIX calculation.

Segment A: Time of death until start of perfusion – 1.79

Segment B: Start of perfusion until the end of perfusion – 0

CT Scan Analysis

Overview

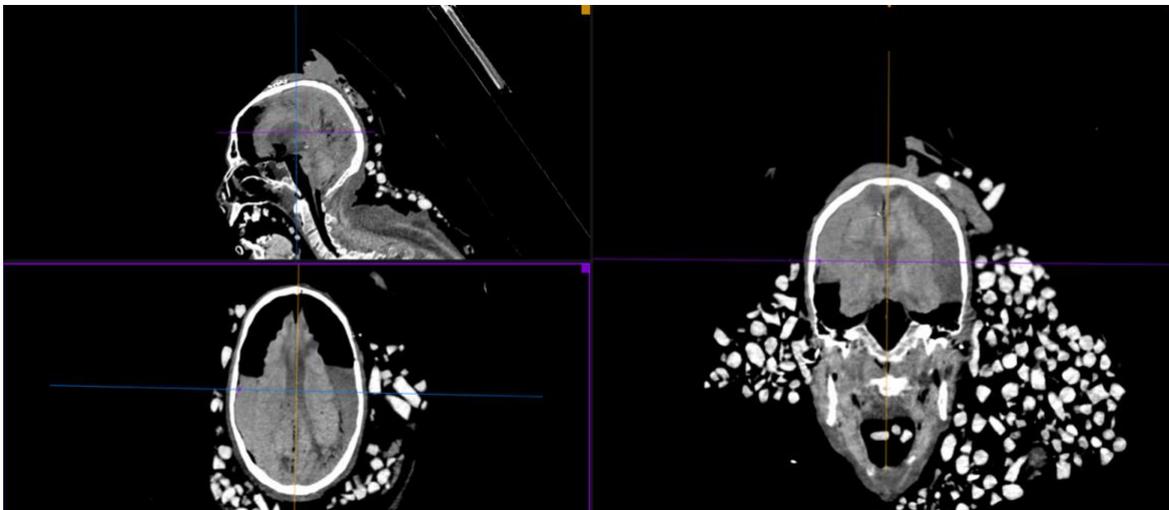


Figure 6. 3-panel projection (gray-scale).



Figure 7. Axial plane CT slice 1.

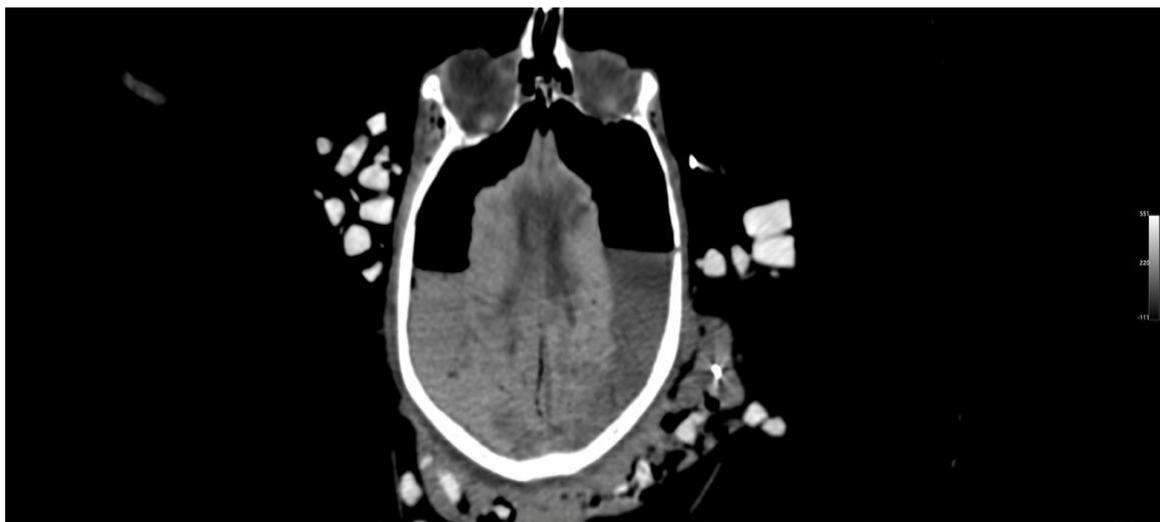


Figure 8. Axial plane CT slice 2.



Figure 9. Axial plane CT slice 3.

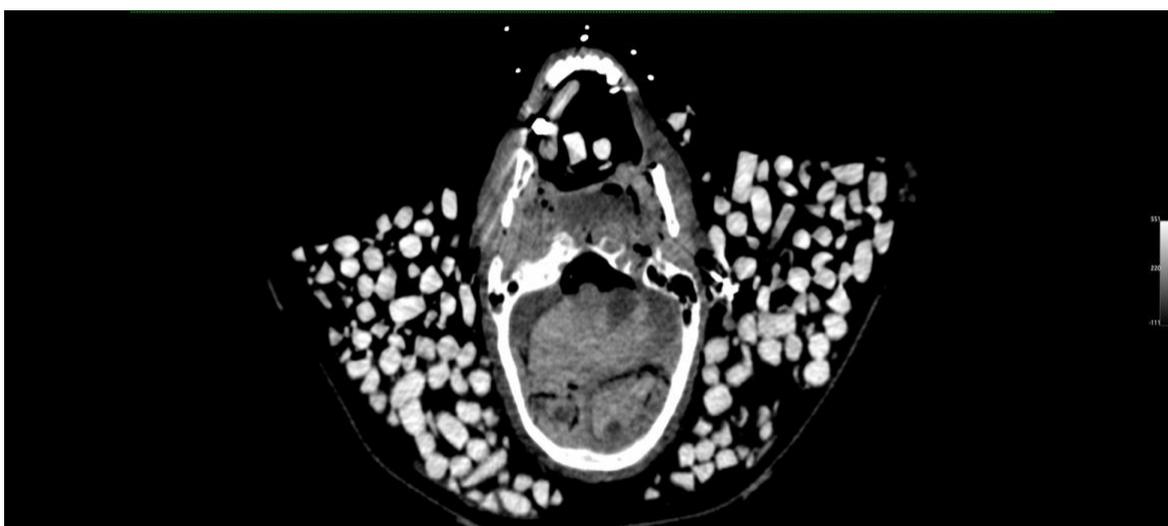


Figure 10. Axial plane CT slice 4.

Brain Shrinkage 2D Analysis

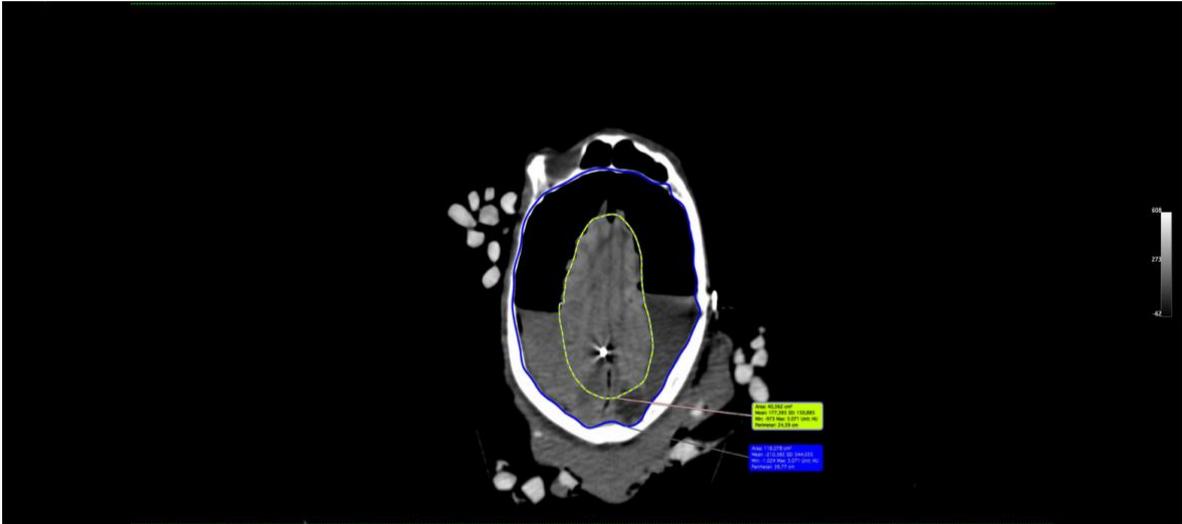


Figure 11. Brain shrinkage 2D analysis.

Brain shrinkage was calculated to be 65.8% based on a single 2D axial slice, without a comprehensive analysis of the brain's 3D volume.

Discussion of Results

Initial stabilization and perfusion were performed by a partner team in the U.S. The patient was transported to a long-term storage facility at the European Biostasis Foundation. Patient arrived at -79°C . An initial CT scan was performed before cooldown. Cooldown was initiated and after cooldown a second scan at -196°C was taken. CT scan analysis showed significant shrinkage indicating very low ischemia, quantitative analysis of perfusion quality was not possible due to different CPA composition. Patient was placed into dewar for long-term storage.

Timeline

Activity	Timestamp from cardiopulmonary arrest (minutes)	Timestamp from patient pick-up (minutes)
Patient transfer to portable ice bath	6	0
Chest compressions (LUCAS 3)	7	1
Patient intubated	8	2
First medication administered	8	2
Temperature probes inserted	11	5
SCCD mask applied	21	15
Final medication administered	23	17
Hetastarch completed	46	40
Transportation	66	60
Arrived at partner facility	126	120
LUCAS deactivated	171	165
First cut	176	170
Chest opened	179	173
Perfusion started (open circuit MHP-2)	198	192
Recirculation started	209	203
VM1 perfusion started (5%)	240	234
Burr hole drilled	249	243
Perfusion completed	371	365
Chest closed	400	394
Patient transferred to cooldown	438	432