Cold case: Cryogenics may enter modern emergency care

Doctors in a Pittsburgh emergency room will temporarily freeze patients to keep them alive. Doctors will drain all the blood from patients with severe trauma, like multiple gunshot wounds, and replace it with ice cold saline solution in order to slow down death while they perform life saving surgeries. But, the minutes and hours this process buys are a far cry from the futuristic ideas of cryogenics.

As Helen Thomson at New Scientist reported:

> "If a patient comes to us two hours after dying you can't bring them back to life. But if they're dying and you suspend them, you have a chance to bring them back after their structural problems have been fixed," says surgeon Peter Rhee at the University of Arizona in Tucson, who helped develop the technique.

Dropping a patient's temperature dramatically decreases the amount of oxygen the body's cells need, which is a good thing in severe trauma patients who've often lost so much blood their tissues and organs are shutting down from oxygen loss. The process takes 10 minutes:

> At this point [the patients] will have no blood in their body, no breathing, and no brain activity. They will be clinically dead. In this state, almost no metabolic reactions happen in the body, so cells can survive without oxygen. Instead, they may be producing energy through what's called anaerobic glycolysis. At normal body temperatures this can sustain cells for about 2 minutes. At low temperatures, however, glycolysis rates are so low that cells can survive for hours. The patient will be disconnected from all machinery and taken to an operating room where surgeons have up to 2 hours to fix the injury.

Doctors can then perform necessary surgeries and hope the patient wakes up as blood is returned and the patient warms on his or her own, or resuscitate the patient.

Only 10 patients will be initially enrolled in the trial, and they are truly the most severe cases. Patients who fit the inclusion criteria will have less than a 7 percent chance of surviving with traditional methods.

As Rhee, said, his experiments have begun to change decision making surrounding death:

> After we did those experiments, the definition of 'dead' changed, says Rhee. Every day at work I declare people dead. They have no signs of life, no heartbeat, no brain activity. I sign a piece of paper knowing in my heart that they are not actually dead. I could, right then and there, suspend them. But I have to put them in a body bag. It's frustrating to know there's a solution.

Although the technique is now confined to stalling death for a matter of hours to facilitate treatment of acute medical concerns, there is the potential that humans could go under for longer, but that is likely

years and dozens of experiments away according to the physicians involved.

Additional Resources:

- How to Freeze People and Bring Them Back to Life, Olga Kahzan, Atlantic
- Live to be 100+? Extreme longevity research is futuristic privatized enterprise, Meredith Knight, Genetic Literacy Project
- Transhumanism in the crosshairs: The dark side of radical longevity, Kenrick Vezina, Genetic Literacy Project