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City Pushes Cooling Therapy for Cardiac Arrest

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Starting on Jan. 1, New York City ambulances will take many cardiac arrest patients only to hospitals that use a delicate cooling therapy believed to reduce the chances of brain damage and increase the chances of survival, even if it means bypassing closer emergency rooms.

The move by the city's Fire Department and Emergency Medical Service, after a year of preparation, indicates a shift away from the prevailing view among emergency workers and the public that how fast critically ill patients reach the hospital is more important than which hospital treats them.

New York joins a handful of other American cities, including Seattle, Boston and Miami, as well as Vienna and London, in requiring transport to hospitals with cooling systems.

It amounts to an endorsement by the Bloomberg administration of a labor-intensive, often expensive and still-developing therapy that smaller community hospitals say they lack the staffing and financial wherewithal to provide.

Some hospital officials fear that the policy could be unfair to these smaller hospitals, depriving them of income from emergency-room patients and hurting their reputations with the public.

Since the Fire Department sent letters to hospital chief executives this week informing them of the impending change, about 20 of the 59 hospitals with emergency rooms have said they will have cooling operations ready by the Jan. 1 deadline.

Dr. David J. Prezant, chief medical officer of the New York Fire Department, acknowledged the culture change and the possibility that some hospitals would feel slighted. But he argued that scientific data shows the survival rate of cardiac arrest patients treated with therapeutic hypothermia, as the cooling process is called, is so much better than with conventional treatment that it would be irresponsible not to provide it.

"Theoretically every closest 911-receiving hospital will be able to provide this service," he noted. "Whether that will be a reality or not is not for me to say."

New York joins a handful of other American cities, including Seattle, Boston and Miami, as well as Vienna and London, in requiring transport to hospitals with cooling systems. But given New York's large population and concentration of hospitals, the policy may provide the largest test to date of therapeutic hypothermia.

Most patients who suffer total cardiac arrest outside hospitals die because their brains have been starved of oxygen. But studies show that if the pulse of patients can be restarted and the body temperature cooled to about 8 degrees Fahrenheit below normal, brain damage can be reduced or minimized.

Only those cardiac arrest patients revived enough to show a pulse and whose heart problems are not associated with some other trauma are eligible for the cooling treatment, Dr. Prezant said. In New York City, that represents 1,500 to 2,000 of the about 7,500 out-of-hospital cardiac arrest cases reported each year.

Dr. Prezant said that in deference to hospital finances, the city has set no requirements for the kind of cooling techniques hospitals must use — some may start with inexpensive saline solutions and plastic bags filled with ice, while others employ sophisticated equipment manufactured and aggressively promoted by companies like Alsium, Innercool Therapies and Medivance.

The American Heart Association endorsed cooling for some types of cardiac arrest patients after two studies on its effectiveness were published in *The New England Journal of Medicine* in 2002. One study found that 55 percent of the patients who received the cooling treatment ended up with moderate or no brain damage, compared with 39 percent who received standard treatment. About 41 percent of the cooled patients died within six months, compared with 55 percent of the others.

But hospitals have been slow to adopt the treatment because it requires a precision of temperature regulation that is difficult to achieve, constant vigilance and cooperation among nursing, emergency, cardiac and neurological units.

The research has shown that cooling is effective for cardiac arrest from ventricular fibrillation, in which the heart muscle wriggles ineffectively.

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If a pulse can be restarted quickly enough – within a matter of minutes – with a defibrillator, such patients can walk away relatively unscathed. But if not, they become comatose and suffer a cascading series of cellular-level injuries to the brain, which frequently lead to permanent brain damage or death.

Inducing moderate cooling of the body within 6 hours, for 24 hours, followed by gradual warming, slows cerebral metabolism and seems to reduce such injuries, studies have shown. (The technique's effectiveness on other medical problems, including traumatic brain injury, is more controversial.)

Dr. Stephan Mayer, chief of the neurological intensive care unit at NewYork-Presbyterian/Columbia Hospital in Manhattan, spearheaded New York's effort by bringing the idea to a critical-care committee of the Greater New York Hospital Association and United Hospital Fund a year ago. Soon after, the committee held a symposium on hypothermia, where Dr. Mayer continued to advocate for the therapy, and the ambulance protocol developed from there.

"It was a very slow process in terms of really getting it to take hold," Dr. Mayer said of the cooling treatment. "One reason is that cardiac arrest patients have just been surrounded by this shroud of therapeutic nihilism. They come in after cardiac arrest, they're intubated, in a coma, everybody's reflex thought process in terms of caregivers is 'Oh God, there's nothing you can do for these people.'"

Dr. Mayer has served as a consultant for Medivance, and holds stock options in the company, which stands to benefit from the shift. He said in an interview that he has "worked directly or indirectly with cooling technology startup companies since 1998" and helped design "the next generation of equipment" for Medivance, earning about \$10,000 from the company.

He said that his main motivation was not financial but experiential, and that he had been converted by seeing patients who were comatose and given up for dead recover full or near-full function after hypothermia.

Under the New York protocol, patients would be eligible for cooling if they suffered cardiac arrest and regained a pulse within 30 minutes of the start of resuscitation but remained neurologically compromised. Hospitals without the ability to cool patients would be bypassed if one that did was within a 20-minute drive. Dr. Prezant said his goal is, within six months, to begin the cooling process in the ambulance, accelerating treatment.

NewYork-Presbyterian has been a leader in hypothermia in New York, but a number of other major hospitals in the city – including Mount Sinai, Bellevue Hospital Center and St. Vincent's Hospital Manhattan, Elmhurst Hospital Center in Queens, Maimonides Medical Center in Brooklyn and Staten Island University Hospital – also practice cooling, and others are developing plans to start. Dr. Prezant said enough hospitals in each borough had indicated interest in cooling to keep transport time to an average of 10 minutes.

"If people knew about it, of course they'd want it," Dr. Mayer said.

One recent success story is Dr. Syed Hasan Naqvi, 56, who had just finished jogging on the treadmill in his Long Island home on Oct. 18 when his daughter heard a thud and found him on the floor in cardiac arrest. An ambulance took him to Nassau University Medical Center, where he was revived, but he remained comatose and breathing on a ventilator.

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Unable to accept that there was nothing else to be done, Dr. Naqvi's wife, Nina, contacted a neurologist at the hospital who knew Dr. Naqvi, a consulting neurologist at North Shore University Hospital. The neurologist at Nassau had recently heard Dr. Mayer describe the cooling treatment, unavailable at Nassau, and so he called him and then urged Mrs. Naqvi to get her husband to NewYork-Presbyterian.

Since more than five hours had elapsed since the cardiac arrest – the optimal time for cooling was running out – Dr. Mayer suggested putting ice packs on Dr. Naqvi during the hourlong trip to Manhattan. When he got there, Dr. Mayer said, Dr. Naqvi's score on the Glasgow coma scale was a 4, near bottom on a scale of 3 to 15, and he had a high chance of remaining in a vegetative coma permanently.

"The brain waves were very flat," Dr. Mayer said. "But we decided to give it a try."

Dr. Naqvi was cooled for 24 hours, and woke up five days later, though he was confused and had memory lapses. Now, six weeks later, he is back to seeing patients two days a week, and said in an interview that he remains physically weak but has regained all of his mental function.

"The hospital does make a difference," Nina Naqvi said. "The knowledge of the doctors does make a difference."