

Cellular ECG Transmissions Save Lives

BY RHODA WEISS

When a person suffers a heart attack, the best clinical outcomes are achieved when he or she is treated within two hours of the onset of acute symptoms. Treatment benefits decline as further time elapses.

Health care providers have instituted various communications and medical strategies to reduce the time between onset and treatment. Among these strategies are patient education initiatives, specific clinical protocol development for emergency departments (EDs), and the transmission of preadmission electrocardiogram (ECG) tracings from emergency medical services (EMS) vehicles to EDs.

Several states (and communities within them) are working together to speed the identification and treatment of myocardial infarctions—heart attacks—which are today the number one cause of death in the United States.

A NORTH CAROLINA PROGRAM

One example of such a program is the North Carolina Acute Coronary Response ECG Study (NC CARES), which was begun in the early 1990s. A comprehensive community-based program, NC CARES is dedicated to finding ways of ensuring earlier ECG use among EMS teams in the field, thereby improving the recording and interpretation of ECG data. The territory covered by NC CARES includes rural, regional, and tertiary medical centers in eastern and central North Carolina. The program has made great strides in encouraging community hospitals to partner with EMS teams and save lives.

One of the hospitals participating in NC CARES is NorthEast Medical Center in Concord, NC, a suburb just outside Charlotte. "For more than 15 years, cellular transmissions of ECGs to receiving stations in hospitals have been commonplace," says Mark Rado, RN, clinical director of the ED at NorthEast. "This initiative has been shown to reduce the time from the EMS's arrival at the scene to successful transmission of the ECG to the ED."



Ms. Weiss is a

Santa Monica,

CA-based health

care consultant

and speaker.

To speed treatment, a more advanced program was recently developed by NorthEast and the Cabarrus County EMS. With it, ECG data taken from a suspected heart-attack victim can be directly transmitted not just to the hospital ED but—via a hand-held computer device that employs a wireless modem—to a cardiologist as well.

The great thing about this advanced communications method—called the "digitized heart imaging information system"—is that it can provide life-saving treatment for thousands suffering from heart attacks, according to Dari Caldwell, PhD, chief operating officer at NorthEast.

Initiated earlier this year at NorthEast, the new digitized system links paramedics throughout the county to cardiologists and emergency medicine teams at the hospital. It has enabled NorthEast to establish a national record for what is known as "door-to-dilation" response time.

"Door-to-dilation" response time, according to Rado, is the time elapsed between the patient's arrival at a cardiac catheterization laboratory and the successful completion of an angioplasty procedure to alleviate the effects of a blocked coronary artery. The national average of such times is 104 minutes. The shortest previous time recorded by the American College of Cardiology was 39 minutes. Recently NorthEast Medical Center recorded a response time of 33 minutes.

The process involves preparing the catheterization lab to receive the patient; assembling the team that will perform the angioplasty; prepping the patient; locating the artery blockage; and inserting into the blocked artery a balloon device that, by removing the blockage, will reduce the patient's pain and other symptoms. All this must be done quickly, before lack of blood flow damages the heart muscle.

A CASE HISTORY

One of the first Cabarrus County residents to benefit from this new technology was a 41-year-old Concord resident who experienced chest pains

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while exercising at a gym. Returning to his home, he complained about the pains to his daughter. She called the EMS. When the paramedics arrived, they immediately taped ECG leads to the man's chest.

The ECG data went straight via cellular transmission to Paul Campbell, MD, a cardiologist on call at NorthEast. Dr. Campbell read the ECG tracings transmitted from the patient's home and quickly determined that he needed an immediate cardiac catheterization because of blockage of a coronary artery. Dr. Campbell knew that if proper blood flow were not quickly restored to the patient's heart muscle, he could sustain severe heart damage and perhaps even die.

Dr. Campbell told the paramedic team, "Take the patient directly to the catheterization lab." He also notified the catheterization team that it must hurry to the lab and prepare it for the patient's arrival. When the ambulance

pulled into the ED 19 minutes later, the lab was ready for the patient, who was taken straight to the catheterization lab, where Dr. Campbell and the team awaited him.

The door-to-dilation clock started the moment the patient was wheeled through the lab door, and, 33 minutes later, Dr. Campbell successfully established good blood flow through the affected coronary artery to the heart muscle. "Under normal circumstances, it takes 30 minutes just to get the team assembled, but this experience proved that new technology and training can really pay off," Dr. Campbell says.

GOOD NEWS FOR INFARCTION VICTIMS

In NorthEast's case, the new technology and training was funded by the Duke Endowment and William T. Morris Foundation, which together gave more than \$175,000 to provide EMS personnel and cardiologists in

Cabarrus County with field-transmission ECG devices and receiving equipment. In addition, the grant provides English and Spanish language materials to help people become more aware of warning signs and symptoms.

As part of the project, NorthEast and Cabarrus County EMS is conducting clinical research in collaboration with Duke University. "A team of doctors at Duke will review analysis and reporting of data collected during the year-long study," says Dianne Snyder, RN, executive director of NorthEast's department of Health, Wellness, and Community Outreach. Bringing the project to fruition required more than two years of research, grant application work, and training.

The hospital's public relations department is also part of the team, according to Lee Brower, director of public relations and marketing at NorthEast. □

CASES IN GENETICS

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ing desires, and contribute to the well-being of patients.

• **Professionalism** The provider-patient relationship is professional in nature and therefore implies a fiduciary responsibility to those being served; that is, the well-being of those being served takes precedence over the interests of health professionals and health organizations. The professional responsibility of clinicians and health care organizations also requires that patients are provided only care that is needed and beneficial.

• **Respect Human Dignity** Because we believe that each person is made in the image and likeness of God, we ought to treat others with profound respect and utmost regard.

• **Benevolence** Our decisions and actions ought to contribute to the

well-being of others.

• **Nonmaleficence** Our decisions and actions should not harm others.

• **Informed Consent** When making decisions about possible diagnostic or therapeutic modalities, individuals should have adequate and accurate information and understanding of the nature of the modality, its risks, benefits, and burdens (as well as information about and understanding of the alternatives to that modality) and should make the decision about its use freely—that is, without force, coercion, or manipulation.

• **Stewardship** Health care resources should be delivered and used prudently, efficiently, effectively, equitably, and in a manner that reflects professional standards of quality. Providing unnecessary services is a violation of good stewardship.

• **Solidarity** Because we are made in the image of a triune God, we are social by nature. This fundamental relatedness with others implies responsibilities to them. At minimum, we should not harm them. Optimally, we ought to seek their good.

• **Distributive Justice** Societal goods and resources should be distributed equitably.

• **Common Good** Because of our social nature, we ought to contribute to the creation of "conditions of social life by which individuals, families, and groups can achieve their own fulfillment in a relatively thorough and ready way" (*The Church in the Modern World*, section 74). In this light, health care organizations ought to contribute to the public good, in part by seeking to improve the health status of the community. □

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