

Keeping it Simple and Saving Lives

By: Chief Mary Cameli

Fire based EMS systems continue to look at innovative ways to improve patient care. Even the medical ABC's can be perfected in our line of work. In fact, rearranging the order of those three letters is what the Mesa, Arizona Fire Department (MFD) is doing and witnessing very positive results. CAB---Circulation, airway and then breathing is how the process is being implemented today, this is known as MICR (Minimally interrupted cardiac resuscitation).

Cardiac arrest accounts for approximately 325,000 deaths every year. Many patients with cardiac arrest who have a return of a pulse ultimately have a poor functional outcome due to lack of oxygen during and after the arrest. Despite many years of data analysis and improvements in CPR techniques and advanced cardiac life support protocols, the American Heart Association reports that median survival after sudden cardiac arrest is less than 8%.

A new phenomenon is taking place with cardiac resuscitation, and fire service-based EMS systems have taken a lead role in this transition process. The Mesa Fire Department has been involved in a study since October 2008 with the University of Arizona Medical Center in conjunction with the State of Arizona Medical Director, Dr. Ben Bobrow, with performing continuous cardiac compressions when patients are in cardiac arrest. Rapid and deep chest compressions are performed for two minutes, prior to any other intervention, and then the needed medications and airway management are applied along with the continued compressions. The key to the success of this procedure is simple; the earlier compressions are initiated and ongoing the better the patient outcome....the key is compressions. During the first half of the study the survival rate of all patients treated who were in cardiac arrest was 12% and for patients in Ventricular Fibrillation (V-Fib) only was 22%. During the second half of the study, when our members were completely engaged in the process and

the fact that many more bystanders were being taught MICR through public education programs, the save rate overall increased to 22% and for patients in V-Fib only, the save rate improved to 58%! These are amazing results.

I said it during training – this is one of the biggest advances in medicine we are likely to see in our careers!” Dr. Ben Bobrow.

Several Fire Departments in the Phoenix Metropolitan area are using MICR for patient care and all departments are showing improved survival rates.

On October 11, 2010, the Mesa Fire Department began taking this study one step further. We implemented another phase to the process that will enhance the quality of life after survival from cardiac arrest.

Over the years, the prognosis after sudden cardiac arrest has remained unchanged in spite of massive educational efforts and improved technological advances. However, mild therapeutic hypothermia as a possible treatment has promising outcomes.

Moderate hypothermia before cardiac arrest has been used successfully since the 1950s to protect the brain against the ischemia that occurred during some open-heart surgeries. Successful use of therapeutic hypothermia after cardiac arrest in humans was also described in the late 1950s. There have been many studies throughout the world that have proven to be successful with therapeutic hypothermia resuscitation. Therapeutic hypothermia decreases energy use and oxygen consumption in the brain and heart as well as the glucose consumption during cardiac arrest.

The criteria for this treatment is very basic: it is applied when there is return of spontaneous pulse and the patient remains intubated and ventilated, after cardiac arrest due to V-Fib. In this study, a patient is cooled directly after they have a return pulse after a cardiac arrest. The goal of the study is to reach a core temperature of 32°C - 34°C within four hours after the patient’s pulse returns. In several studies across the world, the survival rate has doubled when the patient returns to a normal lifestyle post cardiac arrest if hypothermic resuscitation has been initiated. Many hospitals are now practicing

therapeutic hypothermia resuscitation and almost every hospital in Mesa, Arizona is participating.

The Mesa Fire Department is involved in a pilot program for six months whereby we begin the cooling process immediately after the patient regains a pulse. This is done by using IV solutions that have been cooled (kept in a cooler) and applying ice packs to the patient's armpits and groin area. By initiating this procedure in the field, this starts the cooling process 15-20 minutes sooner. This is a very inexpensive treatment that can have extremely positive results.

In a European study, there were 56 deaths in the 137 participants in the hypothermia group versus 76 of 138 in the normothermia group.

In an Australian study, 21 of 43 patients treated with hypothermia had good neurological function at discharge compared with 9 of 34 in the normothermia group.

MICR coupled with hypothermia resuscitation will not only increase the survival rates of the patients in cardiac arrest but will also improve their quality of life for several years post incident.

Our goal within the fire service is to continue improving the patient care modalities that we have been using for years. Not only do we continue to improve the way we fight fires but we are consistently looking at ways to improve the pre-hospital 911 emergency care provided to the patients and public we serve. The Mesa Fire Department serves a city of 500,000 population and responds to 50,000 emergencies each year. The department treats 40,000 patients yearly in their fire service-based EMS system. We continue to make every effort to improve patient care through continued research to enhance upon the services we provide each and every day. The Mesa Fire Department's role is to serve the community today and continue looking for ways to provide better service and enhance the quality of life for tomorrow for the people treated by our fire department based EMS system.

About the Author: Mary Cameli has 27 years with the Mesa Fire Department. She has been in the role of Assistant Chief for the past 5 years. She currently oversees the Training/Special Teams Division, Public Education, Public Information and Emergency Medical Services.