

*The Bill Blackwood
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Police Use of Automated External Defibrillators

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Abstract

Each year between 350,000 and 500,000 people suffer from out-of-hospital sudden cardiac arrest. The number of people that survive is very small. The American Heart Association feels that the key to survival is the "Chain of Survival". The components of this chain are, early access to EMS, early CPR, early defibrillation, and early advanced care. Research has shown that there is little chance of survival if a victim is not defibrillated within 10 minutes.

The purpose of this paper is to gather information on, and explore the feasibility of police use of automated external defibrillators (AED's). Several studies, articles, and Texas law were used to gather information.

The Health and Safety Code defines what an AED is, mandates training, testing, notification of EMS, provides a liability exemption, and states that to possess an AED one must have an order from a physician.

The studies show that police are generally easy to train in the use of the AED. Police are usually able to respond to calls of sudden cardiac arrest much quicker than EMS or fire departments, because police tend to be distributed throughout the community.

The conclusion is that police can save lives when equipped with AED's. The more police cars that are equipped with AED's the faster the response time is likely to be. When someone suffers sudden cardiac arrest, minutes really do count.

Introduction

The purpose of my research is to gather information relating to the use of automated external defibrillators (AED) by police, and be able to develop a comprehensive policy regarding implementation, training, and use of the AED's.

Police officers by the nature of their jobs are likely to come into contact with individuals who have suffered cardiac arrest. Previously police have been trained in basic first-aid and cardio pulmonary resuscitation (CPR). Many officers who are trained in CPR are not issued barrier devices such as pocket masks to protect them from infection if they were to perform CPR. Furthermore, the likelihood of a person surviving sudden cardiac arrest is very low, even when CPR is performed. With the introduction of AED's, it is possible for police officers on the street to administer a life saving shock to the heart of the victim and greatly increase the survivability of cardiac arrest if the shock is delivered early enough. This procedure only a few years ago was reserved for paramedics in the field, and in the hospital and clinical setting.

The intended audience is my department and any other department that may become interested in implementing the use of AED's.

The sources of information I will use in my research include books, journal and periodical articles, and Texas law.

Historical Context

According to the American Heart Association (AHA), "Each year, nearly 500,000 people die from sudden cardiac arrest." Law enforcement agencies are now equipping themselves with a device that can significantly increase the chance of survival of a victim of sudden cardiac arrest. This device is the Automated External Defibrillator or AED. External defibrillation was first used in 1956. In the mid to late 1970's, Dr. Marvin A. Wayne helped invent and pioneer the modern day AED by doing the first out-of-hospital study of a fully developed AED. In 1985, several AED's were on the market. "The first uses of AED's by police officers are traceable to unrelated programs during 1990 in a rural Pennsylvania township and in Rochester Minnesota (Hall, 1999). Since police began using AED's, they have been governed by different laws depending on what state in which they are located.

In Texas, the use of AED's is governed by Section 1. Subtitle B, Title 9, Health and Safety Code, CHAPTER 779. AUTOMATED EXTERNAL DEFIBRILLATORS. This Chapter defines what an AED is, the training required for use of an AED, the maintenance of an AED, requirements for notifying the local emergency medical services provider, a liability exemption, rules pertaining to the possession of an AED, and a hospital exemption.

Sec. 779.001 defines an Automated External Defibrillator as a heart monitor and defibrillator that has received approval from the United States Food and Drug Administration and is capable of recognizing the presence or absence of ventricular fibrillation or

rapid ventricular tachycardia and is capable of determining, without interpretation of cardiac rhythm by an operator, whether defibrillation should be performed; and on determining that defibrillation should be performed, automatically charges and requests delivery of an electrical impulse to an individual's heart.

Section 779.002 states that a person or entity that acquires an automated external defibrillator shall ensure that each user of the AED receives training given or approved by the Texas Department of Health in cardiopulmonary resuscitation and use of the AED. A licensed physician must be involved in the training program to ensure compliance with the requirements of this chapter and the Texas Department of Health shall adopt rules establishing the minimum requirements for the training, and shall consider the guidelines for AED training approved by the American Heart Association, the American Red Cross, or another nationally recognized association.

Section 779.003 states that a person or entity that owns or leases an AED shall maintain and test the AED according to the manufacturer's guidelines.

Section 779.004 states that a person or entity that provides emergency care to a person in cardiac arrest by using an automated external defibrillator shall promptly notify the local emergency services provider.

Section 779.005 states that a person or entity that acquires an AED shall notify the local emergency services provider of the

existence, location and type of AED.

Section 779.006 provides a liability exemption to persons or entities involved in the use of and training for unless their conduct is willfully or wantonly negligent, or has not complied with the requirements of this chapter.

Section 779.007 states that a person or entity must have a prescription or other similar order from a physician in order to possess an AED.

Section 779.008 states that this chapter does not apply to licensed hospitals (Health and Safety Code,).

Review of Literature or Practice

A 57-month study was carried out in a city with a population of 76,865 in an area of 32.6 square miles. Central 911 dispatched police and an advanced life support (ALS) ambulance simultaneously. In order to obtain accurate intervals, all defibrillator clocks were synchronized with the 911-dispatch clock. The personnel who arrived first delivered the first shock. In cases where the police delivered the first shock, paramedics provided additional care if needed. Main outcome measures were time elapsed before the delivery of the first shock, restoration of spontaneous circulation (ROSC) and survival to discharge home.

There were a total of 84 patients. Police shocked thirty-one of the patients first. Of these 31, 13 experienced ROSC and did not require ALS treatment. All 13 survived to discharge. The other 18 required ALS and

five of those survived. Of the 53 patients first shocked by paramedics, 15 had ROSC after shocks only, and 14 survived. All of the remaining 38 required ALS treatment and of those 38 patients, nine survived.

This study only used victims that presented with ventricular fibrillation as the initial rhythm. To be considered a survivor, a patient had to be released from the hospital to go home and not have neurological impairment that would necessitate assistance in carrying out everyday activities. There were three patients listed as non-survivors due to being released to a nursing home for prolonged or permanent care.

The study showed that the biggest factor in survival was shown to be a shorter call-to-shock time, and did not depend on who the shock was administered by. Other studies have noted a short collapse-to-shock time as being the most important factor. This study chose the call-to-shock because it was more precise (White et al 480-484).

In a 1992 to 1994 study conducted in Kentucky, 32 Basic Life Support (BLS) services covering 22 counties with a total population of 412,120 were used to determine if population density is a predictor of survival of out-of-hospital cardiac arrest when managed by a BLS service using AED's. This study was divided into two groups. One group had a population density of greater than 100 persons per square mile and the other group had a density of less than 100 persons per square mile.

There were a total of 311 patients with out-of-hospital cardiac arrest. Of the 311 patients, 110 were defibrillated, and 19 survived to be released from the hospital. This study found 4 factors to be significant to patient survival: EMS response time of less than eight

minutes, defibrillation by an AED, initial rhythm of ventricular fibrillation (VF) or ventricular tachycardia (VT), and a population density of greater than 100 persons per square mile (Stapczynski, Svenson, and Stone 552-556).

In another study, a training program for police use of AED's was examined. During the period of February 1, 1992 through January 31, 1995, there were 128 patients. The study found that the AED was used three times in inappropriate applications. Twice the AED was used on apneic patients with a pulse and once on a patient with major trauma. All three did go into cardiac arrest and the AED was used. Seven criteria were used to measure the performance of the police officers. Proper pad placement was used 97% of the time with problems cited as excessive hair on the chest, profuse sweating, and confusion as to proper pad placement on a woman with large breasts. Analysis within 2 minutes of arrival occurred in 82%, with excessive assessment times and interference from others cited as problems. Shock within 30 seconds of prompt was 100%. Clear before shock was 100%. Reanalysis within 15 seconds of shock was 100 %. Perform CPR without delay if no shock advised was 68%. Police were taught to provide three shocks when appropriate and when no shock was advised they would reanalyze instead of beginning CPR. Adequate airway management was correct 85% of the time, this seemed to be due to poor basic life support skills (BLS), poor mask seal and poor patient positioning. The errors in airway management were stated to have declined over the study period (Davis, Mosesso and Vincent 101-106).

According to Niskanen, "Automated external defibrillators play an

important role in the effort to decrease sudden cardiac death.” In a conference on further development of AED’s, a major concern of those attending was simply to be able to incorporate a way to synchronize clocks within all parts of the emergency response. (Niskanen, 1997)

Discussion of Relevant Issues

The Texas Legislature removed most legal constraints in 1999 by passing House Bill 580, which became CHAPTER 779 in the Health and Safety Code. Before this time it was possible for police department to use AED’s, but it necessitated a creative interpretation of the existing statutes. HB 580 also made it much easier for police departments to be able to implement AED programs by removing liability from the prescribing physician, those who train, and those who use the AED in compliance with the chapter.

Police, by the nature of their job, tend to be out in the community more than Emergency Medical Services (EMS). While police tend to be distributed throughout the community in patrol cars, EMS generally responds to calls from their station. Many EMS providers work 24-hour shifts and allow employees to sleep while on duty. It is easy to see why many times police can respond more quickly to emergencies. It is this reduction in response time that makes it such a good idea to equip police officers with AED’s.

In communities with a combined dispatching center, it is easy to dispatch both police and EMS simultaneously. In communities where EMS is dispatched by someone other than the law enforcement agency, it would be necessary for the EMS dispatcher to be trained to pass along

the information about calls that may be related to sudden cardiac arrest to the law enforcement dispatch.

“A national survey of US law enforcement agencies found that 81% currently respond to medical emergencies and 50% provide some level of patient care” (Mosesso et al 2006). Responding to medical calls is not always a high priority for many police departments, however it certainly is reasonable when officers are trained and may be able to save someone’s life. Having an AED available in a patrol car will make it possible for officers to save lives. The more patrol cars available that are equipped with AED’s, the shorter the response time could be. Even though sudden cardiac arrest is the leading killer in this country, having AED’s in patrols cars should not over tax patrol officers on the street, and officers who are already assigned to a call should be able to make a decision as to the priority of the call against the possibility of saving someone’s life.

The training required to learn to operate the AED is not difficult. Most officers find it easy to learn during a four hour training period. Departments are also able to have their own personnel become trainers. The AED’s take the decision to shock a patient out of the officer’s hand. The AED interprets the heart rhythm and knows whether a shock is needed, and prompts the officer along the way.

The benefits of an AED program far outweigh the costs. What price would someone be willing to pay to save their, mother, father, sister, brother, son or daughter? Most AED’s cost around \$3,000.00. Some cost more and some, a little less. When measured against the

possibility of saving the lives of persons in our communities, the investment is small. Communities may ask for donations, hold fundraisers, or plan for the AED's through the budget process. Some communities have used all of these methods to buy AED's.

Conclusions/Recommendations

"A large body of research, combined with more than 15 years of clinical experience, has confirmed automated external defibrillation as a major breakthrough for improving survival after sudden cardiac death." (Cummins et al, 1995 p. 621) Because there is roughly a seven to ten percent decrease in survivability with each minute that passes after sudden cardiac arrest, police are uniquely positioned to make a real difference. The minutes saved by police responding can translate into lives saved when the police are properly equipped. (Kanable, 1999)

Research has shown that early defibrillation is the most critical element in the chain of survival for victims of sudden cardiac arrest. Since police can easily be trained to operate the AED, it makes sense to equip them with this piece of equipment that saves lives.

It is my conclusion that police should be equipped with AED's, and provided with the necessary training. A comprehensive policy covering training, use of, and reporting should be included.

I would recommend that an AED be placed in each patrol car on the street and also an AED in the station. It would be far better to phase in an AED program than to not have one at all. Many departments are starting to use the AED and in the future it may become a liability not to

have them, when you are unable to provide a service that is expected by the community.

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