January 9, 2006

Position Paper: AED use in Children

Early defibrillation is critical in treating ventricular fibrillation and pulseless ventricular tachycardia. The Emergency Medical Directors Association of California (EMDAC) endorses the use of AED in children who are pulseless and in these rhythms. In the absence of pediatric specified defibrillators, the only viable option is utilizing standard AED's when advanced life support equipment is not immediately available.

While pediatric patients comprise a small number of the total population of cardiac arrests, the National Registry of Cardiopulmonary Resuscitation (NRCPR) reported the prevalence of pediatric ventricular fibrillation to be 14% of total the total cardiac arrests in the hospital setting of 880 total children, with a survival rate of 29%.[1] Greater than previously thought, this number may be due to greater numbers of children surviving respiratory failure, circulatory shock, and cardiac anomalies.

In the field setting, Automatic external defibrillators (AEDs) can dramatically reduce the time to first shock in patients and thus, significantly improve outcomes. In many cases, AED's have been used by minimally trained, or even untrained bystanders. One important concern is assuring that all patients that may benefit from AED actually receive it when indicated; including children down to one year of age. Failure to use available AEDs on all eligible patients may result in unnecessary, preventable deaths.

The American Heart Association 2005 guidelines (AHA)[2], and the International Liaison Committee on Resuscitation (ILCOR)[3] guidelines for AED use in children also endorse this approach, which EMDAC now recommends in this position paper.

Many of the arguments against the use of an AED on pediatric patients are founded on the previous AHA guidelines published in 1999[4]. Those outdated guidelines were based on data from a single retrospective study that was conducted in 1976[5]. The study concluded that standard AEDs, not being capable of lowering the energy to a "safe" level were not indicated for use on patients less than 8 years old (<25 kg). More recent research has determined that delivering life saving electricity using a standard AED results in much better outcomes than withholding shocks and waiting for a manual defibrillator. Another argument against the use of standard AEDs in children is that the machine would not recognize pulseless ventricular tachycardia as a shockable rhythm. While this may sometimes be the case, untreated pulseless ventricular tachycardia progresses to ventricular fibrillation recognized as shockable by the AED. Currently, both the AHA and ILCOR recommend the importance of prompt defibrillation in children, using a standard AED, if a pediatric AED or manual

defibrillator is not immediately available as a first line intervention in the pediatric cardiac arrest patient.

In October 2002, ILCOR offered the following conclusions based on the medical literature:

"The AED is becoming widely available and may be the first device available for defibrillation in the prehospital setting. Current evidence suggests that AEDs are capable of appropriate sensitivity and specificity for pediatric arrhythmias and are both safe and effective for defibrillation of children 1 to 8 years of age. Ideally pediatric pads/cables should be used, whenever available, to deliver a child dose."

After ILCOR released the above cited statement, more research was conducted and the AHA recommended the following:

"Many AEDs can accurately detect VF in children of all ages and differentiate shockable from nonshockable rhythms with a high degree of sensitivity and specificity. Some are equipped with pediatric attenuator systems (eg. Pad-cable systems or a key), to reduce the delivered energy to a dose suitable for children.

For children 1 to 8 years of age, the rescuer should use a pediatric dose-attenuator system is one is available. If the rescuer provides CPR to a child in cardiac arrest and does not have an AED with a pediatric attenuator system, the rescuer should use a standard AED. There is insufficient data to make a recommendation for or against use of the AEDs for infants < 1 year of age (Class Indeterminate).[2]

EMDAC supports the use of AED in the pediatric population as established by the AHA 2005, ILCOR, and the National Association of Emergency Medical Services Physicians (NAEMSP)[6].

Early defibrillation is critical in treating lethal ventricular dysrhythmias. In the absence of pediatric specified defibrillators, the only viable option is utilizing standard AEDs. "The arrhythmia detection algorithm used in the device should demonstrate a high specificity for pediatric shockable rhythms…(Class IIb)".[3] Considering the current research and scientific evidence based medical standards, EMDAC recommends AED resuscitation in any cardiac arrest patient one year old or older when advanced life support equipment is not readily available. Clearly, the benefits in treating these young patients with standard AED outweighs the risks of waiting for advanced life support units to arrive.

References

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