Cardiac Arrest Survivors Attended by Out-of-Hospital Emergency Teams

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Objective: This study describes the clinical and epidemiological characteristics of patients with a cardiac arrest diagnosis attended by out-of-hospital emergency teams and later discharged from the hospital in Almería (Andalusia, Spain), over a one-year period, as well as a one-month follow-up regarding quality of life.
Methods: All consecutive cases of cardiac arrest from 01 January–31 December 2003, in which emergency medical services (EMS) responded and attempted resuscitation, were reported and followed until discharged from the hospital, and later were followed-up after one month to check the quality of life of these patients.
Results: The out-of-hospital emergency teams attended to 96 patients with cardiac arrest. Of these, 23 patients (24%) were admitted to the hospital alive and 73 (76%) died in an out-of-hospital setting. Nine patients (9.3%) were discharged from the hospital: eight males (89%) and one female (11%). The average age of the patients was 61 years old. The initial rhythms included five with electromechanical dissociation (56%), two with asystole (22%), and two with ventricular fibrillation (22%). The out-of-hospital crew witnessed four of the cardiac arrests. Advanced life support (ALS) was performed in one case (11%). The average of the time interval between cardiac arrest and the initiation of ALS was 3 minutes, 30 seconds. Six patients (67%) had cardiac etiology. Three patients (33%) had non-cardiac etiology. In the one-month follow-up, all nine patients still were alive (100%). Eight patients (89%) reported good quality of life, and one patient (11%) had bad quality of life (coma).
Conclusion: Survival rates reported were similar to other studies, although the number of patients is limited. These survival rates can be explained in part by the short time intervals between calls being received by the emergency dispatch center to the arrival of EMS on the scene. Cardiac etiology was predominant. Half of cardiac arrests were crew witnessed. For survivors, the quality of life was good.
Keywords: cardiac arrest; emergency medical services (EMS); out-of-hospital; quality of life; Spain; survival
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Prehospital Use of Automated External Defibrillators (AEDs) in the First Three Minutes after Cardiac Arrest Due to Ventricular Fibrillation (VF)

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Introduction: Cardiac arrest is the most frequent cause of death in western populations. Each year in Germany, 130,000 patients die of a potentially treatable, cardiac arrest. The use of automated external defibrillators (AEDs) currently is being evaluated worldwide.

This study evaluates the prehospital use of AEDs in the first three minutes after cardiac arrest due to ventricular fibrillation (VF).
Methods: The AEDs were used by a representative cross section of the German population including nurses, paramedics and emergency physicians, but mainly by medical laymen. Data was collected from 3,093 AEDs during an 18-month period.
Results: During this time, a total of 493 defibrillators were used in the first three minutes after cardiac arrest due to ventricular fibrillation. In 165 (33%) cases, a successful defibrillation was performed, resulting in the patient's long-term survival.
Conclusion: The results of this study reveal the importance of educating medical laymen in the use of AEDs because quick therapy is an important factor in the successful treatment of VF. The analysis confirmes that AEDs can provide effective therapy in cardiac arrest, due to VF, and can improve the outcome of cardiac arrest patients.
Keywords: automated external defibrillator (AED); cardiac arrest; prehospital care; ventricular fibrillation (VF)
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Identification of Predictors for Survival in Out-of-Hospital, Cardiac Arrest—Analysis of Prehospital Resuscitations in the Rescue Service of Dachau over Three Consecutive Years

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Introduction: Sudden cardiac arrest is one of the most common causes of death in industrial countries. The main objective of this study was to identify possible predictors of survival in out-of-hospital, cardiac arrests, in order to improve training and organization of prehospital resuscitations.
Methods: The study evaluated all prehospital resuscitations in the district of Dachau over three consecutive years prospectively. Endpoints were death versus the return of spontaneous circulation (ROSC) on arrival at the emergency room (ER) and 30-day survival. All prehospital resuscitations were included, regardless of the cause (cardiac, trauma, other). The resuscitations were recorded via a standardized form completed by the paramedics after the incident.
Results: Between 2000 and 2003, a total of 269 resuscitations were recorded by the Dachau emergency medical service (EMS). Of these, 39.4% (n = 106) obtained the ROSC and admitted to the ER. A total of 49 (18.2%) patients survived the first 24 hours and 26 (9.7%) patients were still alive after 30 days, resulting in a 30-day mortality of 90.3%.

Significant differences in survival could be demonstrated in patients with ventricular fibrillation (VF) (n = 82) versus asystole, electro-mechanical dissociation (EMD), or other rhythms (n = 187) as the primary electrocardiogram (ECG) (30-day survival 20.7% vs. 4.8%). Also, in the patients with witnessed cardiac arrest (n = 163 vs. n = 106 non-witnessed), a significant difference in 30-day survival rate (14.1% vs. 2.8%) was found.

Conclusion: The results of the resuscitation data recorded over three years are similar to the results from other studies. In this analysis, VF and witnessed cardiac arrest appear to be independent predictors for survival (as in other studies). The results suggest that future efforts to improve survival in out-of-hospital, cardiac arrest also should focus on these predictors (e.g., deployment of automated external defibrillators (AEDs)/ public access defibrillators (PADs) to reach more patients while still in VF).

Keywords: 30-day survival; cardiac arrest; out-of-hospital; resuscitation; ventricular fibrillation
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Implementation of Automated External Defibrillation (AED) within the Belgian Prehospital Emergency Medical Services System

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Introduction: In Belgium, about 10,000 people die due to cardiac arrest every year. Ventricular fibrillation (VF) and pulseless ventricular tachycardia (Pulseless VT) are the most frequently witnessed, initial rhythms documented in a cardiac arrest. Defibrillation is the most effective treatment for VF/Pulseless VT. It is an intervention with time-limited success. The probability of successful defibrillation with return of spontaneous circulation decreases about 7–10% for every minute defibrillation is delayed after onset, and VF tends to convert to asystole within a few minutes if left untreated.

Methods: In 2003, the government questioned all prehospital emergency medical services. With this inquiry, the number and type of Automated External Defibrillators (AEDs) in use, their frequency of application, and the percentage of ambulance personnel familiar with the use of AEDs was identifed.

From 2003–2004, instructor sessions (European Resuscitaion Council guidelines) were organized to implement uniform AED-use. A total of 160 instructors were used. The purpose was to educate 9,000 ambulance workers involved in the EMS system using a pyramid system of teaching. Practical problems were discussed, such as uniformity and compatibility of AED devices and the use of mannequins and training equipment for education. The total cost of equipping the ambulances with AEDs is estimated at 908,333 euro (1.178 million USD).

Results: AEDs record the rhythm pattern during cardiac arrest; feedback information allows analysis of the intervention performed by EMS personnel, so the cardiologist possesses an elementary document for the patient's medical file. Registration (Utstein) is a good indicator for measuring the quality of an EMS system. The implementation of the use of AEDs by EMS requires adjustment of current legislation, which refers to the use of manual defibrillators as a delegated medical act.

Conclusion: The chain of survival represents the best approach to the treatment of a cardiac arrest involving: (1) early access (100-112) to EMS system; (2) early bystander resuscitation; (3) early defibrillation; and (4) advanced cardiac life support by medical intervention team. A training program in AED was necessary for the permanent education of EMS personnel.

Keywords: access; automated external defibrillation (AED); Belgium; education; emergency medical services (EMS); legislation; training; Utstein guidelines
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Free Papers Theme 4: Education-1 Educational Courses

Development of Prehospital Emergency Health Curriculum Based on a Themes Approach

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The curriculum models for the new Bachelor of Emergency Health and Graduate Diploma in Emergency Health (MICA) have been influenced by the new Monash University five-year medical curriculum, adapted to the particular practice context of the ambulance paramedic, and expanded to five themes.

The course framework utilizes a number of well-known models to structure each theme. However, in the absence of a paramedic model of professionalism, this course draws heavily on the model of the "Interactive Professional" developed by Higgs and Hunt for undergraduate physiotherapy at the University of Sydney. This model of professionalism has been transferred and contextualized to the practice domain of the ambulance paramedic.

The model particularly focuses on the factors interacting with the beginning practitioner. These factors serve to define the basis for the statement by Higgs and Hunt that professionals of the future are required to "operate effectively within changing local and global context...[and be] situational leaders and managers, competent to deal with changes, challenges and contingencies through the employment of creative, relevant, valid and effective strategies of intervention, development and evaluation."

The themes approach recognizes that a paramedic is primarily a clinical professional who requires knowledge of healthcare and emergency care systems, human development, and common health events. A paramedic is expected to provide clinical, community-based care for acute and emergency conditions for people of all ages, and the profession requires expertise in health transport. A paramedic also is required to respond to mass-casualty incidents in a range of settings within a multidisciplinary emergency healthcare system. This curriculum addresses these relevant attributes and prepares the student for practice within this environment.

Keywords: ambulance; approach; curriculum; health; paramedic; themes; training; transport
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