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Use of automated external defibrillator in Peruvian out-of-hospital environment: improving emergency response in Latin America

Uso de desfibrilador automático externo en ambiente prehospitalario peruano: mejorando la respuesta a emergencias en Latinoamérica

Uso de desfibrilador automático externo no ambiente pré-hospitalar peruano: melhorando a resposta a emergências na América Latina

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ABSTRACT

This case report relates out-of-hospital care to a patient with risk factors treated in the out-of-hospital services after cardiac arrest and ventricular fibrillation. The patient was treated according to the standards of basic life support and advanced cardiovascular life support; by applying an automated external defibrillator (AED) with favorable outcome and

successful recovery of the patient from his risk of life condition. This is the first documented report with a favorable outcome in Peru, in out-of-hospital services and stresses the desirability of adopting policies for public access to early defibrillation.

Keywords: defibrillator; Cardio-pulmonary resuscitation/methods; Emergency medical services; case reports

INTRODUCTION

Prevalence of cardiovascular diseases is increasing along with death rates by sudden events. It is estimated that in the U.S. and Europe between 250,000 and 450,000 deaths from cardiac arrest occur each year.^(1,2) This is the most common and deadly heart disease⁽¹⁾ where most of these events occur outside of the hospital, known as “out-hospital cardiac arrest (OHCA).

In Peru, there are no data on cardiac arrest mortality, but cardiovascular disease is the second leading cause of death,⁽³⁾ which leads us to believe that cardiac arrest is a sudden important event that should be considered in our society as a public health problem. Currently in Peru, there is little awareness about this problem in the general population. Most people do not know how to face a sudden event of cardiac arrest and even less how to use an automated external defibrillator (AED), when it is crucial,⁽⁴⁾ along with well performed cardiopulmonary resuscitation (CPR)⁽⁵⁾ to improve survival, both in-hospital and for outpatients.

There is no consistent policy to improve the Peruvian healthcare system for outpatient emergency care, even when these preventive measures show cost benefit effectiveness.⁽⁶⁾

That is why it is important to present this case about early defibrillation with an AED in a public facility, as one of the first reported and registered events in Peru.

Received from: Centro de Entrenamiento y Simulación EMS Training Perú / Internacional Training Organization AHA

Conflict of Interest: None.

Submitted on May 30, 2009

Accepted on August 5, 2009

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CASE REPORT

At 7:02 pm on August 19th, 2008 in a public facility, an 81 year old patient presented with chest pain, nausea, sweating, dizziness, sensation of dyspnea at rest, which worsened progressively until a sudden decrease in the level of consciousness, made him unconscious. After two minutes, he was treated by an emergency staff of the facility that diagnosed cardiopulmonary arrest and immediately initiated treatment: basic CPR compressions, mouth-to-mouth ventilation, while another person activated the emergency system. Approximately 4 to 5 minutes after onset of CPR, the basic life support (BLS) medical and paramedical staff arrived in an ambulance and a biphasic AED (ZOLL, AED Pro) was used for treatment, first of all placing the patches. Analysis of the rhythm showed ventricular fibrillation (Figure 1) treated with 120 joules and maintaining compressions, achieved after one minute and 30 seconds, a sinus rhythm with adequate central and peripheral pulses.

During transport to the nearest clinic, which took 10 minutes, a peripheral path was made available for instillation of 200 cc of normal saline bolus, assisted ventilation with bag valve mask was initiated with a 100% fraction of inspired oxygen (FiO₂); there were no problems during transportation of approximately five minutes.

The vital functions monitored after defibrillation and management of the arrest were: heart rate between 95 and 100 beats per minute, respiratory rate 16 breaths per minute, arterial blood pressure 90/60 mm Hg, partial oxygen saturation: 97%, temperature: 36.5°C and Glasgow score 6.

During hospital stay the following tests were performed: troponin t in 0.198 ng / ml, electrocardiogram (EKG) upon admission where a negative T wave in DI, DII, aVR and aVL was found, ST segment elevation (STSE) in V1 V2 V3, and non-ST segment elevation (NSTE) in V5 V6. In view of these results acute myocardial infarction (AMI); acute coronary syndrome (ACS); anterior elevation of ST segment; post-resuscitation syndrome; acute renal failure vs acute exacerbation of chronic renal failure and respiratory failure were diagnosed. Two days after admission to the emergency service, a coronary cineangiography was performed in the same hospital, disclosing severe coronary atheromatosis with occlusions of 60 and 70% in the right coronary artery, 90% and 70% in the anterior descending coronary artery and 100% occlusion in the circumflex artery. Thrombolysis was neither performed, nor surgical intervention for stent placement.

After hospital stay, the patient was discharged with appropriate treatment and outpatient medical care.

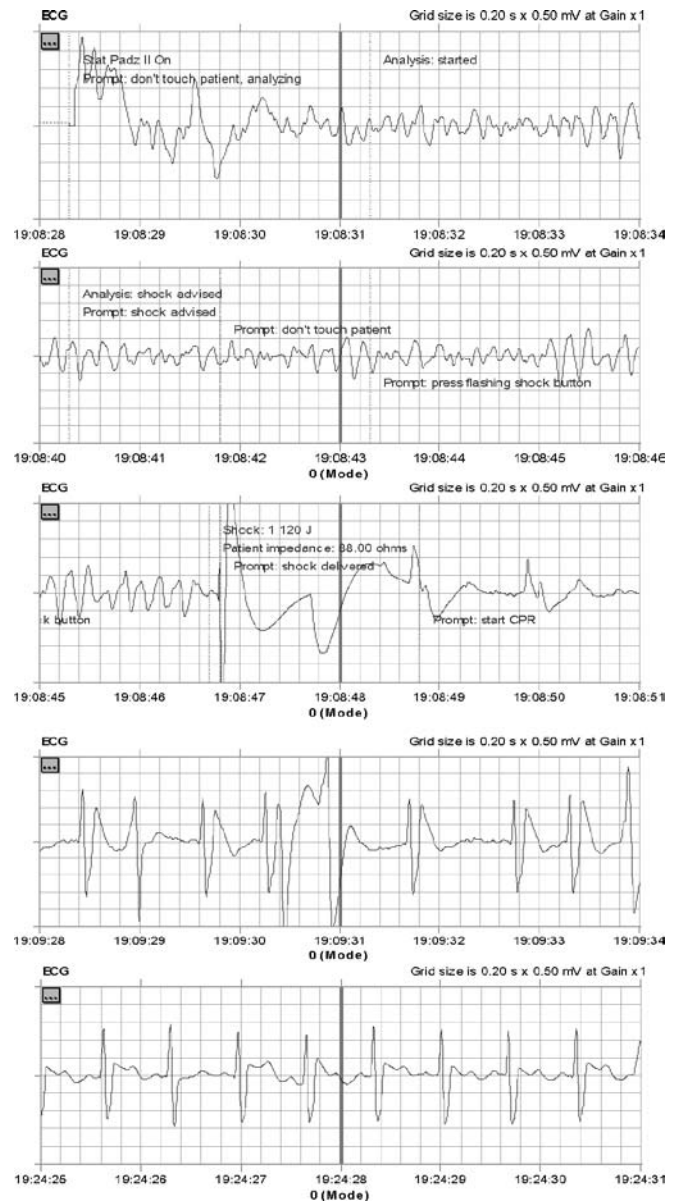


Figure 1. Records of defibrillation by automatic external defibrillator (AED)

DISCUSSION

Access to an early intervention reduces mortality of patients suffering a cardiac event.^(7,8) That is why, in most countries of the world there is an awareness about use of public automatic external defibrillators (PAED), that has increased the survival of patients with cardiac arrest.⁽⁹⁾ There are public facilities, residential and commercial buildings that have this equipment, 13% of working places and 11.6% of public facilities, commercial and residential buildings have used

PAED d at least once in the last year.⁽¹⁰⁾ To make a 10 years forecast, it is estimated that between 90 to 100% of public facilities might use the equipment at least once.⁽¹⁰⁾

The aim of this article is to disseminate in Peru and the rest of Latin America, the need to reduce the response times for these events. Policies for general public access to defibrillation in easily available facilities must be implemented. Furthermore, proper training about their use must not be restricted to healthcare personnel but extended to the population, thereby improving care for these patients.^(7,10-12)

In Peru the concepts of the Chain of Survival advocated by the American Heart Association (AHA), have only been implemented 10 years ago, together with the basic and advanced courses for the healthcare personnel. Appropriate use an AED, is important but must be combined with knowledge about the other components of CPR.^(4,5) Thus, the number of people with appropriate expertise to provide good care has increased in recent years. This progress was brought about by the efforts of a small group of people dedicated to disseminate the concepts of resuscitation in Peru. It is noteworthy that people involved in this case report have been trained according to BLS and ACLS courses (Basic Life Support and Advanced Cardiovascular Life Support) / AHA 2005 standards.

It must also be stressed that the response time in this case does not represent the usual situation in Peru, which may vary according to each location. For reference, in the metropolitan area of the capital city Lima, the response time of the different emergency systems ranges from 5 to 19 minutes.

No surgical intervention nor emergency thrombolysis were performed due to the limited hospital logistic resources even though they are highly recommended for a case like this with ST-segment elevation,^(13,14) in addition, the patient did not have the financial resources to perform some of these interventions at a later opportunity. This shows a restricted hospital management for this case, an issue that will not be addressed in this article, is unfortunate but common in developing countries.

We would like to use this case as an opportunity to commend the people dedicated to this subject and hope that they will prompt other healthcare workers

in Peru and Latin America, to be aware of the importance of this issue. We believe that it is important to develop policies for public access to defibrillation (APD) and produce records using the Utstein report.

We still have a long way to go on this subject, especially in Latin America and more so in Peru. All must work together to improve the health of people, ameliorate our emergency response systems and equip public facilities with a DEA, accessible to those with proper training.

RESUMEN

El presente reporte de caso, relata la atención prehospitalaria de un paciente con factores de riesgo atendido en el área prehospitalaria al sufrir arresto cardíaco y presentar fibrilación ventricular. El paciente fue atendido bajo estándares de Soporte Básico Vital y Soporte Cardiovascular Avanzado Vital, se aplicó un Desfibrilador Automatizado Externo (DEA) con resultado favorable y éxito al recuperar al paciente de su condición de compromiso de vida. Este es el primer reporte documentado con resultado favorable en el país, en el área prehospitalaria y refuerza la conveniencia de adoptar políticas de Acceso Público a la Desfibrilación Temprana.

Descriptores: Desfibrilador; Resucitación cardiopulmonar/métodos; Servicios médicos de urgencia; Informes de casos

RESUMO

Este relato de caso reporta o atendimento pré-hospitalar de um paciente com fatores de risco atendido pelos serviços pré-hospitalares ao ser acometido por uma parada cardíaca e apresentar fibrilação ventricular. O paciente foi atendido seguindo os padrões de suporte básico de vida e suporte cardiovascular avançado. Um desfibrilador automático externo (DAE) foi aplicado com resultados favoráveis e o paciente recuperou-se de seu quadro de perigo de vida com sucesso. Este é o primeiro relato documentado com resultados favoráveis no Peru, na área de atendimento pré-hospitalar e enfatiza a necessidade de serem adotadas políticas de acesso público à desfibrilação precoce.

Descritores: Desfibriladores; Ressuscitação cardiopulmonar/métodos; Serviços médicos de emergência; Relatos de casos

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