Editorial

Out-of-hospital cardiopulmonary resuscitation: Where are we now?

Would we be able to deal with a case of cardiac arrest at a football stadium, at the gym or at the local shopping centre? Since Kowenhoven et al[1] starting using a different, more general approach to cardiopulmonary resuscitation after describing the heart massage technique in 1960, and following the publication in 1968 of Peter Safar's first manual on "Cardiopulmonary and cerebral resuscitation", all aspects related to CPR have changed considerably in a very short space of time. In 1973, the American Heart Association (AHA) published its first resuscitation guidelines. In 1992 the International Liaison Committee on Resuscitation (ILCOR) was created and published its first recommendations on this subject in 1997. The most recent recommendations on the management of cardiac arrest and emergency cardiovascular care[2] were made available at the 2005 ILCOR conference and are now in effect.

Two years have now passed since those recommendations were published and every time they are updated those of us who carry out these techniques on a daily basis, as well as those who teach them, go through a period of feeling both nervous and hopeful. In truth, given that few studies have been carried out in Spain it is difficult to form an opinion about whether these recommendations are better or worse than the last ones. In Spain, these subjects are not researched a great deal but if we believe that cardio-respiratory arrest is the most serious emergency situation that can possibly occur, then there should be more studies published in scientific and medical magazines by those of us who work in this specialised field. We are hopeful and confident that the situation will undoubtedly change now that emergency medicine has been classified as an area of specialisation, encouraging future doctors in this field to add to the research work which currently exists and is quite scarce. However, we should not forget the emergency physicians that have already contributed interesting articles under even more challenging conditions and even with more limited resources[3-6].

Understanding basic life support techniques and characteristics and knowing how to perform cardiopulmonary resuscitation correctly in an out-of-hospital medical scenario is a useful tool for saving lives and avoiding later patient complications[4]. On a social level and in the media, CPR is quite fashionable. It appears in various television programmes as a commonly used technique, however its perceived level of effectiveness is unrealistic. This was demonstrated by a study carried out several years ago in 100 cases of cardio-respiratory arrest (CRA) in television programmes in which, surprisingly, 75% of the CPR manoeuvres were effective and with no sequelae among most of the patients who had a full recovery[5]. This could not be further from the truth as studies like the one carried out by Concheiro et al[6] demonstrate. This study showed that CPR had an 86% failure rate when performed in out-of-hospital cardiac arrest patients. It is clear that survival rates vary depending on where the cardiac arrest occurs[7] (out-of-hospital, hospital emergency department, intensive care unit, resuscitation room) and higher survival figures often involve patients that experience cardiac arrest in a hospital where the amount of time elapsed from the moment the event occurs until CPR is performed is undoubtedly crucial in terms of survival.

The introduction of advanced out-of-hospital life support systems[8] represents a significant step forward in achieving better results in CPR. Most of the studies published state that out-of-hospital resuscitation[7,9,11], whether in the form of advanced support systems or semi-automatic defibrillators, increase the CPR success rate. Other deciding factors that increase survival rates are bystanders who can identify a cardiac arrest, the time that elapses from when the cardiac arrest takes place until CPR is performed, who carries out the CPR, how effective it is and the type of transport used to take the patient to the emergency department[9].

However, some authors[9] highlight the minimal variation in survival rates before and after using a medical emergency system in patients with cardiac arrest which leads us to believe that there may be factors that emergency physicians have overlooked and that this subject should be studied and investigated more in depth.

We have already mentioned that out-of -hospital cardio-respiratory arrest is a significant problem affecting public health in Spain[11]. The figures are alarming given that cardiac arrest (mainly secondary to coronary disease) occurs every 20

minutes and the mortality rate is much higher than that of patients involved in road accidents. Most authors agree that recommendations for improvement are focused on reducing response times to cardiac arrest and strengthening the links in the chain of survival such as early defibrillation, which is a crucial tool. The I Foro de Expertos en Defibrilación Semiautomática (1st Experts' Forum on Semi-automatic Defibrillation) which took place in Madrid in 2002 also focused on the need to optimise the chain of survival by calling for an increase in the amount of training in resuscitation techniques for the general public, promoting CPR training for bystanders[11] as well as early defibrillation techniques for first responders. We believe that this is where most of our efforts currently need to be concentrated and all of the autonomous communities in Spain are working on this issue, often with the support of scientific organisations. In a document recently published by SEMES (Spanish Society of Emergency Medicine), the medical authorities were urged to regulate semi-automatic defibrillation with the aim of lowering the number of cases of sudden death. Today, if the statistics available are correct, only 8 autonomous communities (Andalusia, Aragon, Asturias, the Canary Islands, Catalonia, Galicia, Navarre and the Basque Country) have legislation on the use of defibrillators by non-medical staff. Another 3 regions (Castile and Leon, Madrid and Valencia) have drawn up legislation but are pending publication. Moreover, there are significant differences in legislation from one region to another. Once all of these out-of-hospital emergency systems have been introduced, we believe that the main priority should be the education of the general public, bystanders and most importantly, first responders who perform CPR and use SAEDs (Semi-automatic External Defibrillators). No medical knowledge is required for their use but prior basic and adequate training is necessary.

Galicia was the first autonomous community in Spain in this respect to implement specific legislation on the use of SAEDs by non-medical personnel, which includes provisions for courses on defibrillation that are specifically designed for medical transport technicians and training at a later stage for first responders[12]. In a study published in EMERGENCIAS[12] in 2003, suggestions were already being put forward (to reduce emergency service reaction times, more CPR to be carried out by bystanders, shorter waiting times, a decrease in defibrillation times) in order to achieve higher survival rates.

In the excellent study by Iglesias Vázquez et al[13] which can be found in this issue of EMERGENCIAS, cardiac arrests in children were recorded and studied during the period from June 2002 to January 2005. This was a prospective study in contrast to most of the studies published previously. The data collected was systematized using the Utstein style which makes it comparable to other studies using the same systematization. The study shows the estimated cardiac arrest- CPR time which, in some cases, was excessive (20 minutes). This may be attributed, in part, to a delay in calling the emergency services and, in part, to the geographically dispersed nature of the region. A common objective would be to reduce the time elapsed between the cardiac arrest and the call to the emergency services, which in some cases is too long. We also observed a high percentage of cardiac arrest patients (87.1%) that only received CPR from the advanced life support team, which is another aspect that clearly requires improvement by educating the population and first responders (we have called for more CPR to be carried out by bystanders and non-medical personnel). Undoubtedly CPR is a technique that stands alone but can also form part of chain of actions and a delay in medical care leads to a higher number of asystolic patients and a poorer prognosis for recovery. We agree with the authors that trained staff in the emergency department can be an advantage when dealing with cardiac arrest in adults but has its limits when dealing with cardiac arrest in children, and this should be rectified by providing more training in this area.

In this issue, a retrospective study by Navalpotro Pascual et al[14] in 582 out-of-hospital cardiac arrests obtained similar results to those found by other authors and once again concluded that survival is higher if PCR is permormed by an emergency department team with heart rythmn compatible with ventricular fibrillation/ventricular tachycardia (VF/VT). These results continue to reflect the harsh reality of the current situation: no resuscitation techniques are performed in 42% of patients before the medical team arrives. However, as the authors suggest, it is true that this low survival rate for CPR may not be accurate since on many occasions CPR may not have been indicated which may have produced a bias in this study and others of similar characteristics.

In summary, it is worth stating that all authors believe that training medical and non-medical personnel is key in improving recovery rates following a cardio-respiratory arrest. Since 2002, when the Emergency Cardiovascular Care Agreement was signed by SEMES and the AHA, over 12,000 people have already been trained and the forecasts for the next few years look even more promising[15]. Considering that in Spain there are over 20,000 sudden deaths a year, educating the general public, first responders and medical staff in CPR techniques is a significant challenge[7-9,12]. It is also important to mention that the government has recently approved the degree of "Medical Emergency Technician" and those who have worked hard to achieve this deserve special recognition given that this represents an important step forward in critical patient care.

A small number of prospective studies are published in Spain and the few that are involve small samples, however they all agree that data should be collected using the Utstein style so that the results can be universally understood. It is important to recognise that the patients that have the best prognosis are those whose heart rhythms denote VF[8,9,11,12,16] and these are usually young males[8]. It goes without saying that with each minute that passes before resuscitation is carried out, the possibility of survival drops between 7 and 10%.

We believe that despite the efforts that are being made to improve and standardise CPR techniques and the protocol-based action that has been introduced, we have not achieved the improved results expected (most studies agree on this point). Although we have made significant progress, there is still a long way to go. Establishing Utstein style records is a task for medical professionals as well as management and quality control teams from the different hospitals, emergency medical services and health care systems. We encourage the readers of EMERGENCIAS to promote the development of more studies on the treatment of cardio-respiratory arrest with the aim of providing the international scientific community with more information to thereloy improve the results and subsequently lead to better patient care.

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