Review

The epidemiology of out-of-hospital ‘sudden’ cardiac arrest

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Received 1 May 2001; received in revised form 4 May 2001; accepted 13 June 2001

Abstract

It is difficult to assemble data from an out-of-hospital cardiac arrest since there is often lack of objective information. The true incidence of sudden cardiac death out-of-hospital is not known since far from all of these patients are attended by emergency medical services. The incidence of out-of-hospital cardiac arrest increases with age and is more common among men. Among patients who die, the probability of having a fatal event outside hospital decreases with age; i.e. younger patients tend to more often die unexpectedly and outside hospital. Among the different initial arrhythmias, ventricular fibrillation is the most common among patients with cardiac aetiology. The true distribution of initial arrhythmias is not known since several minutes most often elapse between collapse and rhythm assessment. Most patients with out-of-hospital cardiac arrest have a cardiac aetiology. Out-of-hospital cardiac arrests most frequently occur in the patient’s home, but the prognosis is shown to be better when they occur in a public place. Witnessed arrest, ventricular fibrillation as initial arrhythmia and cardiopulmonary resuscitation are important predictors for immediate survival. In the long-term perspective, cardiac arrest in connection with acute myocardial infarction, high left ventricular ejection fraction, moderate age, absence of other heart failure signs and no history of myocardial infarction promotes better prognosis. Still there is much to learn about time trends, the influence of patient characteristics, comorbidity and hospital treatment among patients with prehospital cardiac arrest. © 2002 Published by Elsevier Science Ireland Ltd.

Keywords: Cardiac arrest; Out-of-hospital; Epidemiology

1. Definition

For many years, even before the deployment of emergency medical services, there has been a debate about the definition and nature of ‘sudden death’ or out-of-hospital cardiac arrest [1–7]. Issues of this debate have been the temporal definition of ‘sudden’, whether death was unexpected, whether death was witnessed and the etiology of the event.

The current definition describes death within 1 h after onset of symptoms [2], since this period seems to describe best patients with arrhythmic sudden cardiac death [8]. Furthermore, since many of these patients have known coronary heart disease, out-of-hospital cardiac arrest can be regarded as ‘unexpected’ only in about half of the cases [6–9]. As noted in the Framingham population, a considerable share of previous myocardial infarctions among these patients were silent and unexpected but resulted in the same increase in risk for sudden cardiac death [9].

Presently, in particular after the launch of the Utstein reporting template [10] and with the evolution of emergency medical services, efforts have been directed towards improving survival in relation to the initial arrhythmia. The best results after out-of-hospital cardiac arrest are found among patients in ventricular fibrillation with a witnessed cardiac arrest of cardiac origin and bystander cardiopulmonary resuscitation [11,12].

Perhaps, in the future sudden death will be replaced by ‘presumed ventricular fibrillation’, since from a treatment perspective of view these are the cases of primary interest. There are other weaknesses in the definition of sudden death. It is often very difficult to estimate the duration of the symptoms that preceded death. Among many patients found dead, there is a
complete lack of information about the occurrence of warning symptoms. Finally we must delineate sudden out-of-hospital cardiac arrest from sudden death. There are other causes of sudden death such as intracranial haemorrhage or ruptured aorta. When a patient suffers from an out-of-hospital cardiac arrest, this condition should be amenable to treatment with restoration of a pulse-giving rhythm. However, if not, then cardiac arrest becomes sudden death.

2. Incidence

The incidence of out-of-hospital cardiac arrest increases with age, and women have a lower incidence than men [13]. Becker et al. [14] noted the incidence of out-of-hospital cardiac arrest attended by Emergency Medical Services in 20 different communities to vary between 36 and 128/100,000 per year, and there was an association between a higher incidence and lower survival. The authors ascribed the differences to methodological differences and/or true variations between populations. In a population-based rather than emergency medical service-based report from Maastricht, the incidence of sudden out-of-hospital cardiac arrest was 97/100,000 per year in the age range 20–75 years [15]. During childhood and adolescents (age < 20 years), the incidence has been reported to be 1–4/year per 100,000 individuals [16–18]. It has been estimated that 30 sudden cardiac deaths per million inhabitants occur every week in industrial countries [19].

Gillum reported on certificates of death from 40 states in the US between 1980–1985. In 1985 56% of cardiac deaths among persons in the age range 35–74 years occurred out of hospital or in the emergency room [20]. The percentage that occurred out of hospital or in the emergency room declined with age, was higher in men than in women and was higher in blacks than in whites. Between 1980 and 1985 age-adjusted death rates in white men aged 35–74 years declined by 19% for cardiac deaths out of hospital and by 18% for cardiac deaths in hospital [20]. Norris [21] studied heart attacks by death certificates between 1994–1995 in three health districts in Britain. Seventy-four percent of all fatal events occurred outside hospital and the probability of having a fatal event outside hospital decreased with age.

More recent data indicate an overall 10% increase in sudden cardiac death from 1989 to 1996 in the United States [22].

In a study by Hinkle et al. [23] including 1839 cardiac deaths, 60% were defined as sudden (≤ 2 h after onset of symptoms). In the Yugoslavia Cardiovascular Disease Study [24,25] of 6614 men aged 35–64 years and free from coronary heart disease initially, there were 143 cardiac deaths during 15 years of follow-up, of which 75% were sudden cardiac deaths within 1 h after onset of symptoms.

In a study of the North Karelia County in Finland [26] it was found that the proportion of cardiac deaths that were sudden (within 1 h) was 57% for men and 45% for women.

3. Time trends

Very few centres have published data on changes over time among patients suffering from out-of-hospital cardiac arrest. Cobb and colleagues [27] reported on an improved long-term outcome over time among patients surviving out-of-hospital ventricular fibrillation during the period 1970–1987 in Seattle. The improvement is judged to depend on better medical and surgical therapies, lower incidence of smoking and maybe a less vulnerable population. These Seattle patients showed a significantly higher mean age over time but their cardiovascular history did not change with the exception for smoking, which decreased, and hypertension, which increased. The percentage of patients with no prior cardiovascular disease decreased significantly. Data from Göteborg [28] reveal a significantly increasing median age among patients treated for out-of-hospital cardiac arrest during 1981–1997 regardless of initial arrhythmia. There was also an increase in the proportion of females, but the total number of patients treated per year remained unchanged over the years [28]. We also noted a slight decrease in the proportion of patients found in ventricular fibrillation. Despite shorter ambulance activation intervals and improved initial survival, survival to hospital discharge tended to level off and decrease during the 1990s. A change in patient characteristics and comorbidity was thought to play a role in this negative development.

De Vreede-Swagemakers et al. [29] studied all patients with OHCA between 1991 and 1995 in the Maastricht region. They found no changes at all in baseline characteristics or in resuscitation factors during that period, although the study was conducted over a shorter time span.

Absalom et al. [30] compared outcome among patients suffering from an OHCA and admitted to the Norfolk and Norwich Hospital during 1991 and 1996. They noted an increase in the proportion of females and a decrease in provision of bystander CPR in 1996.

4. Initial arrhythmia

This information is lacking because most reports are from the ECG recordings made by the ambulance crew some time after the initial event. In such analyses the occurrence of ventricular fibrillation has varied between
23 and 71% [31]. However, this is a selected population of cardiac arrest patients who were reached by the ambulance crew and in whom cardiopulmonary resuscitation was attempted.

5. Ventricular fibrillation

The proportion of patients having ventricular fibrillation at the time of collapse has been estimated to be about 80–90% among patients who suffer from cardiac arrest of cardiac aetiology [32,33]. However, these data were also based on selected patient populations with out of hospital cardiac arrest observed by the ambulance crew [33] or suffering from in hospital cardiac arrest monitored at the time of collapse [32]. In the group with out-of-hospital cardiac arrest the occurrence of ventricular fibrillation was only roughly calculated since the ambulance crew arrived with the patients several minutes after collapse. So, in fact, the true occurrence of ventricular fibrillation at the time of sudden cardiac arrest is not known.

Ventricular fibrillation seems to convert to asystole relatively slowly over time. Thus, 20 min after collapse, about 25% of patients are still in ventricular fibrillation [33]. Unfortunately, patients found late after collapse out-of-hospital still in ventricular fibrillation have a low chance of survival [34,35].

6. Asystole

Asystole is often regarded as a sign of a dying or a dead heart rather than an arrhythmia when the patient is an adult, but in connection with non-cardiac aetiology there is a still a chance of resuscitation, although bleak. In some studies [36], asystole is the first recorded ‘rhythm’ in more than half of patients with cardiac arrest outside hospital, but again, patient selection, EMS activation intervals and proportion of bystander cardiopulmonary resuscitation result in notable variations [37]. Asystole is more common in cardiopulmonary collapse among infants and children [37]. Very few studies have tried to assess the underlying aetiology of out-of-hospital asystole, but some studies indicate that in these patients more often there is a non-cardiac origin to the cardiac arrest compared with patients found in ventricular fibrillation [38,39].

7. Pulseless electrical activity (PEA)

PEA is characterized by ‘absence of a detectable pulse and the presence of some type of electrical activity other than VT or VF’ [40]. This state was earlier referred to as electromechanical dissociation (EMD). A variety of cardiac and non-cardiac diseases can generate PEA [41]. A few studies have stated that myocardial wall motion and measurable blood pressure in fact are present in many cases with PEA [42,43], which suggests that the clinical discrimination between PEA and severe cardiogenic shock is difficult. The aetiology behind PEA has rarely been studied, but existing data indicate that nearly half of the cases are of cardiac origin [38,44,45]. In patients without heart failure and hospitalised for their first myocardial infarction, death in hospital with PEA seems to be strongly related to left ventricular free wall rupture [46].

8. EMS-witnessed out-of-hospital cardiac arrest

Several papers have reported data on cardiac arrest in the presence of an ambulance crew [47–53]. As suggested for instance in the Utstein template [10], these patients should be reported separately. The two main reasons are that data from these patients regarding time intervals and bystander cardiopulmonary resuscitation are not representative, and the fact that these patients experienced symptoms that urged them to call for an ambulance before the collapse maybe suggests a different aetiology. Two conclusions from studies on these patients are somewhat surprising, as reported from Gallagher et al. [31] and Kuisma et al. [49]: firstly, there is a considerable variation between 16% [49] and 77% [54] in the reported incidence of VF as first recorded arrhythmia even in this subset of patients. Secondly, there is also a marked variation in survival from EMS-witnessed cardiac arrest, even after adjusting for initial rhythm [31]. Patient selection might explain some of these variations, but other explanations such as differences in baseline characteristics between populations are possible.

Several of these studies also have identified subgroups of patients, often divided by the character of the symptoms which prompted them to call for help and also by initial arrhythmia [48,49,51–53]. Eisenberg and colleagues [48] reported that ventricular fibrillation was more often connected to absence of prodromal symptoms before collapse. Several papers have reported on a connection between chest pain before collapse and initial arrhythmia of ventricular fibrillation [51–53], and there is also a similar connection between dyspnoea before collapse and bradyarrhythmic cardiac arrest [53].

9. Aetiology

Among all patients who die outside the hospital, 56–66% have a cardiac aetiology [55–57] which seems to be more common among men [56,58].
For patients who suffer a cardiac arrest outside hospital and are reached by the ambulance crew and in whom resuscitation is considered possible the proportion having a cardiac etiology has been reported to vary from 65% [59] to 89% [12]. In Table 1 is listed the most frequent cardiac causes of sudden cardiac arrest outside the hospital. The predominant cause is coronary artery disease. The most frequent causes of sudden cardiac arrest of non-cardiac etiology are listed in Table 2.

### 10. Risk factors for sudden death

Factors which increase the risk of sudden death are recognized. Coronary disease is by far the most common underlying etiology [7,60,61], accounting for up to 80% of all sudden cardiac deaths [7,62]. Approximately 20% of coronary disease has sudden cardiac death as the first clinical manifestation [63]. A substantial proportion of these deaths occurs outside the hospital, but the proportion of sudden cardiac deaths occurring outside hospital decreases with age [20,21]. From another perspective, population based studies from Framingham [9] and Maastricht [15] reported sudden cardiac death to be the first manifestation of heart disease among 40–60% of all patients. Similar figures are reported from the UK [21]. Patients with documented coronary heart disease are at much higher risk for out-of-hospital cardiac arrest. In the Framingham population, 42% of patients who suffered from out-of-hospital cardiac arrest among men and 52% among women were recruited from the top decile of multivariate risk [13]. Altogether, this means that primary prevention of sudden cardiac death is very difficult with current knowledge and methods.

Another risk group are persons with congestive heart failure. A low ejection fraction is strong risk factor for sudden death and this is a common mode of death among these patients [64,65]. However, the proportion of sudden deaths appears to be higher among patients in NYHA functional class II and III than in Class IV [68].

Very promising results have been reported from studies using implantable defibrillators in certain subgroups [66,67]. Certain ECG abnormalities have an association with sudden cardiac death among patients with and without known coronary disease, but very few of them can be treated. Other patients with an increased risk are those with left ventricular hypertrophy [69], those with a family history of sudden death [70], patients with diabetes mellitus [71], high blood pressure [72], obesity [72], cigarette smoking [72,73], low vital capacity [74], high hematocrit [74] and increased resting heart rate [75].

Once clinical manifestations of coronary disease have occurred, these risk indicators seem to play a less important role for the risk of sudden cardiac death. Then the extent of myocardial damage becomes more important.

### 11. When does sudden death occur

Various manifestations of ischaemic heart disease, including acute myocardial infarction, silent myocardial ischaemia and sudden death have been shown repeatedly to have a diurnal rhythm, with a more frequent occurrence in the morning hours [76–79]. Patients found in ventricular fibrillation are also reported to peak in the afternoon or early evening [80]. This evening peak is reported to be of the same magnitude as the morning peak [80]. A more marked diurnal variation is reported among survivors of cardiac arrest than for non survivors [80]. Recurrent cardiac arrests, do not occur at the same time of the day [80]. Such data indicate that it is the patients activity or an environmental influence that triggers the arrest. The increased risk of sudden death in the first hour after rising may be due in part to the morning increase in blood pressure and heart rate, increased vascular tone, changes in heart rate variability, elevated blood viscosity and platelet aggregability [81,82]. Intake of toxic substances such as alcohol may trigger sudden death, as well as the first cigarette in the morning [83]. Mental or psychological stress may also trigger sudden death as observed during the Iraqi missile attacks on Israel [84].

Exposure to cold is considered to be one of the main factors influencing morbidity and mortality from cardiovascular disease, including sudden death. However,
since seasonal variation of sudden death has also been found in areas with less extreme changes between summer and winter, the variation in sudden death may depend more on relative than on absolute changes in the climate [85,86]. It has been suggested that the circadian variation and the seasonal variation are more pronounced in the elderly whereas the day of week differences are not influenced by age [79]. The observation that sudden deaths occur more frequently on Mondays has been interpreted as caused by work induced stress [79].

12. Where does sudden death occur

It is reported in cases where advanced cardiac life support was initiated by ambulance crew that more than 2/3 of all cases occurred in the patient’s home [35,87–90]. As reported from a survey of 7185 patients with out-of-hospital cardiac arrest in Seattle [89], the largest location category of out-of-hospital cardiac arrest in public places was outdoors. When all patients who suffer sudden cardiac arrest out of hospital are included, regardless of whether cardiopulmonary resuscitation was initiated or not, about 80% occur in the patients home [15]. In a Finnish forensic study of sudden unexpected death, 63% of unwitnessed deaths occurred in the patients home [91]. Three studies have indicated an increased survival among patients having an out-of-hospital cardiac arrest in a public place, [36,87,88] which is probably due to higher rates of bystander cardiopulmonary resuscitation, higher rate of witnessed arrests and less comorbidity.

13. Pathophysiology

It has been difficult to determine the exact pathophysiology behind sudden cardiac death. This is partly due to the lack of a uniform definition of sudden death and by other factors [6,61]. Above all, temporal and patient selections and different study techniques have made it difficult to reach uniform results [92]. The often-cited works of Davies et al. [61,93,94] have proposed that there are at least two pathophysiological mechanisms behind sudden cardiac death, namely (1) arrhythmia from ischemia caused by acute coronary thrombosis and (2) arrhythmia arising from a chronic myocardial scar. To some extent, these two groups can be identified clinically [95].

Many autopsy studies [61,92,94,96,97] which applied postmortem coronary angiography followed by transversal cutting of epicardial arteries (different length of segments in different studies) have reported on active coronary lesions in more than half of the patients studied. Active coronary lesions mainly represent occlusive or non-occlusive coronary thrombi, or plaque fissuring.

However, coronary artery disease is prevalent in as much as 12% of control patients dying from non-cardiac causes [98]. Farb et al. [92] noted disrupted plaque, luminal fibrin and platelet thrombosis or both twice as often among patients with evidence of acute AMI. Histopathological signs of acute myocardial infarction are found only in a minority of patients autopsied after sudden cardiac death, mainly because circulatory standstill occurs before development of myocardial necrosis [96]. There is probably a difference between men and women with regard to aetiology and pathophysiology. Women have been suggested to less likely have underlying coronary artery disease and more likely to have other forms of heart disease or structurally normal hearts [65]. Spaulding et al. [99] reported significant coronary artery disease in 71% of 84 patients resuscitated after cardiac arrest when immediate coronary angiography was performed. However, this group of patients was somewhat selected with regard to age. It has been suggested that patients with fatal unstable angina have more extensive coronary narrowing than patients who die from AMI or sudden cardiac death [100]. It is also observed that the frequency of intraluminal thrombus in sudden cardiac death is similar to that found in fatal unstable angina (29%), but significantly lower than in fatal AMI (69%) [100]. However, these results were based on a total of only 67 patients in all three categories [101].

14. Autonomous nervous system

14.1. Heart rate variability (HRV)

Heart rate changes are the consequence of the interplay at the sinus node level between acetylcholine released by vagal nerves and norepinephrine released by sympathetic nerves. It has been shown that there is a strong association between the standard deviation of the normal RR intervals (SDNN) and all cause mortality after AMI [102]. In animal experiments, it was found that heart rate variability distinguished effectively between high and low risk for ventricular fibrillation after myocardial infarction but not before [103]. Thus it seems unlikely that HRV has any predictive value if the patient has not suffered an AMI.

14.2. Baroreflexor sensitivity

Baroreflexor sensitivity is expressed in milliseconds of increase in the RR interval consequent upon a one mm increase in arterial blood pressure. In 1982 it was demonstrated that baroreflexor sensitivity was a predictor of an increased risk of ventricular fibrillation in
conscious dogs with a healed myocardial infarction [104]. Baroreflexor sensitivity was significantly lower in susceptible than in resistant dogs. The demonstration of this relationship was expanded in 1988 [105] when baroreflexor sensitivity was shown to predict ventricular fibrillation prior to but not after AMI.

Based on the above findings the Atrami (autonomic tone and reflexes after myocardial infarction) study was designed to evaluate the role of heart rate variability and baroreflexor sensitivity after AMI. Here both depressed heart rate variability and baroreflexor sensitivity were independent predictors for an adverse prognosis. However, data were presented on total mortality and not separately on sudden death. Therefore, there is still a lack in the understanding of how these tests can predict the risk of sudden death.

15. Predictors of immediate survival

Survival after cardiac arrest where resuscitation efforts were attempted has been shown to vary considerably [106,107]. This is to a major extent caused by patient selection, various factors at the arrest, the resuscitative efforts performed and perhaps differences between the populations studied [31].

Among patients who suffer an out of hospital cardiac arrest, overall survival rates have been reported to vary between 1.4% in New York [50] and 23% in Stavanger [107]. In the latter study the sample size was small and only helicopter transported patients were included. A marked variability in survival rate has been reported from 5% [108] to 35% [109] in patients with an in hospital cardiac arrest.

Again, patient selection probably plays a major role since the proportion of cases in whom resuscitative efforts were attempted varies markedly (10–50%) [108].

The true proportion of patients who survive a cardiac arrest in a community has never been reported. The best estimate comes from a study in Maastricht, where 32 out of 515 patients (6%) in the age range 20–75 years survived sudden out of hospital arrest [15]. Although this study included all cases of sudden cardiac arrest regardless of whether cardiopulmonary resuscitation was attempted or not it focused on the out-of-hospital situation in a specific age group.

For all patients who suffer from out of hospital cardiac arrest the most important predictors of survival are:

1. whether the arrest was witnessed or not [12,34,110,111];
2. whether the patient was found in ventricular fibrillation or not [12,34,110,111];
3. whether bystander cardiopulmonary resuscitation was performed or not [11,12,110–115].

For patients found in ventricular fibrillation the most important predictors of survival are: (1) the interval between collapse and defibrillation [34,35]; and (2) bystander initiated cardiopulmonary resuscitation [34,115].

For patients found in asystole, predictors of survival are less frequently described in the literature. However, it was recently reported that for patients found in asystole, the arrest being witnessed and a younger age were predictors of an increased chance of survival [39]. In patients with a witnessed cardiac arrest found in asystole two predictors of survival were found (1) the interval between collapse and arrival of the mobile coronary care unit and (2) no use of atropine, which probably indicates indirectly successful initial resuscitation among these patients [39].

Few reports on predictors of survival are available regarding patients found in pulseless electrical activity. Organised atrial activity and normal QRS morphology on first ECG recording in PEA has been reported to predict a better outcome in some studies [116,117] but not in others [118]. In one recently published report, bystander initiated cardiopulmonary resuscitation was a strong predictor of survival [119].

16. Predictors of long-term survival

There is a considerable amount of data on long term survival after successful resuscitation from out-of-hospital cardiac arrest [64,65,120–131]. Unfortunately, there are often very different patient selection factors in these reports and the results are not always comparable. Five year-survival has varied between 77% [128] and 41% [122]. Many studies report on a better long-term outcome if cardiac arrest was in connection with acute myocardial infarction [120–122,124,126, 131]. Other frequently reported independent predictors for death after discharge includes increased age [121,124,125,128,131], low ejection fraction or other signs of heart failure [64,65,121,122,124] and a history of myocardial infarction [122,124,25].

17. Gender

Women differ from men in the characteristics and outcome after out of hospital cardiac arrest. The incidence of out-of-hospital cardiac arrest is lower among women in all age groups [9]. In a report on sudden cardiac death in the US, the age adjusted decline in mortality rates were greater in men than in woman [22]. Women have myocardial ischemia as the underlying etiology less commonly [65]. They are found less frequently in ventricular fibrillation [58,132], and more rarely receive bystander cardiopulmonary resuscitation...
In a multivariate analysis it has been reported that female sex is associated with an increased immediate survival (patients being hospitalized alive) but not with survival to discharge from hospital [58,132].

These data agree with other observations that mortality in cardiac disease out of hospital is higher in men than in women but in hospital mortality is higher in women than in men [133]. In patients hospitalized after out of hospital cardiac arrest, survival to discharge is higher in men than in women [134]. There are also some data suggesting that women have a worse long-term prognosis when discharged alive after successful resuscitation with out-of-hospital cardiac arrest [128].

Thus it seems women may be protected from immediate death when suffering a cardiac arrest. The mechanisms behind this observation can only be speculated. In animal studies it has been reported that female gender is associated with an increase in vagal tone when a coronary artery is occluded. This might be one protective mechanism [135]. Others suggest women are more likely to seek treatment when symptoms occur [136,137]. On the other hand, female gender has been shown to be associated with longer delay from symptom onset to admission to hospital when suffering from AMI [138].

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Portuguese Abstract and Keywords

É difícil conseguir dados da paragem cardíaca extra-hospitalar uma vez que falta frequentemente informação objectiva. A verdadeira incidência da paragem cardíaca subita fora do hospital não é conhecida uma vez que muitos destes doentes não são socorridos pelos serviços de emergência médica. A incidência da paragem cardíaca subita fora do hospital aumenta com a idade e é mais frequente nos homens. De entre os doentes que faleceram verificou-se que a probabilidade de terem um evento fatal fora do hospital diminui com a idade; ou seja os doentes mais jovens falecem de forma inesperada mais frequentemente e fora do hospital. Nos doentes com paragem de causa cardíaca o ritmo de fibrilação ventricular é o mais comum das diferentes arritmias iniciais. A verdadeira distribuição das arritmias iniciais não é conhecida uma vez que frequentemente decorrem vários minutos desde o colapso até à avaliação do ritmo. A maioria das paragens cardíacas fora do hospital tem etiologia cardíaca. As paragens cardíacas fora do hospital ocorrem mais frequentemente no domicílio, mas o prognóstico parece ser melhor quando estas ocorrem num local público. São importantes factores predictivos para a sobrevivência imediata, o facto de a paragem ser presenciada, de a arritmia inicial ser a fibrilação ventricular e de serem iniciadas precocemente manobras de reanimação cardiopulmonar. Numa
perspectiva a longo termo são sinais de melhor prognóstico, a paragem cardíaca associada a enfarte agudo do miocárdio, fração de ejeção do ventrículo esquerdo elevada, idade moderada, ausência de sinais de insuficiência cardíaca e de história prévia de enfarte agudo do miocárdio. Ainda há muito a aprender sobre doentes com paragem cardíaca pré-hospitalar, influência das características dos pacientes, de comorbilidades e do tratamento hospitalar.

**Palavras chave:** Paragem cardíaca fora do hospital; Epidemiologia.

**Spanish Abstract and Keywords**

Es difícil reunir datos de paro cardíaco extrahospitalario porque frecuentemente no hay información objetiva. La real incidencia de muerte súbita de origen cardíaco extrahospitalario no es conocida, ya que la gran mayoría de estos pacientes son atendidos por servicios de emergencias médicas. La incidencia de paro cardíaco extrahospitalario aumenta con la edad y es más común en los hombres. Entre los pacientes que mueren, la probabilidad de tener un evento fatal fuera del hospital disminuye con la edad, es decir, pacientes más jóvenes tienden con más frecuencia a morir inesperadamente y fuera del hospital. Entre las diferentes arritmias iniciales, la fibrilación ventricular es la más común entre los pacientes de etiología cardíaca. No se conoce la verdadera distribución de las arritmias iniciales, ya que casi siempre pasan varios minutos entre el colapso y la evaluación de ritmo. La mayoría de los pacientes con paro cardíaco extrahospitalario tienen etiología cardíaca. El paro cardíaco extrahospitalario con mayor frecuencia ocurre en el hogar del paciente, pero el pronóstico ha mostrado ser mejor cuando ocurre en un sitio público. El paro presenciado, la fibrilación ventricular como arritmia inicial y la resucitación cardiopulmonar son predictores importantes para la sobrevida inmediata. En la perspectiva a largo plazo, el paro cardiorespiratorio relacionado con infarto agudo de miocardio, fracción de ejección de ventrículo izquierdo alta, edad moderada, ausencia de insuficiencia cardíaca, ausencia de historia de infarto de miocardio es de mejor pronóstico. Aun hay mucho que aprender acerca de las tendencias, la influencia de las características del paciente, comorbilidad y tratamiento hospitalario en pacientes con paro cardiorespiratorio extrahospitalario.

**Palabras clave:** Paro cardiorespiratorio; Extrahospitalario; Epidemiología