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Clinical paper

Prevalence of advance directives and impact on advanced life support in out-of-hospital cardiac arrest victims

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ABSTRACT

Aim: To evaluate the prevalence of advance directives and their impact on the management of out-of-hospital cardiac arrest (OHCA) victims.
Methods: We analyzed data extracted from the French national registry of adult OHCA patients (RéAC). The data concerned the emergency medical services (EMS) of a Paris suburb over the period 01/01/2013 to 30/11/2015. The primary endpoint was the prevalence of advance directives. Secondary endpoints were the characteristics of the population, of cardiac arrest, and of basic life support as well as outcomes in patients with or without advance directives.
Results: Advance directives were available for 148/1985 (7.5%) of OHCA patients. Advanced life support was given to 35 patients with directives and 941 patients without (24% vs. 51%, p <0.0001) with no significant difference in the characteristics of the support provided. Spontaneous recovery of cardiac activity was observed in 5 patients with directives and in 217 patients without (14% vs. 23%, p = 0.3). Among patients with advance directives, only one was admitted to hospital. He/she died within 24 h of admission.
Conclusion: Advance directives were accessed by EMS for 7.5% OHCA patients. Despite their availability, advanced life support was provided to 24% of patients.

Introduction

The ethical principles governing the provision of patient care include respect for autonomy, non-maleficence, beneficence and distributive justice [1,2]. These principles apply to all situations encountered by clinicians including emergency situations. The principle of respect for patient autonomy involves taking patients' wishes into account and is clearly stated in the 2015 European Resuscitation Council guidelines [3].

According to the French law on advance directives passed in April 2005, all persons can convey their end-of-life wishes [4]. The implementation of these wishes is, however, a challenge in out-of-hospital cardiac arrest (OHCA) cases as this is one of the few instances when communicating with the patient is not possible [1].

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Enquiries about the patient's wishes need to be made to a family member or to an appointed proxy [4]. The time taken to access this information, however, can bias patient's management. Moreover, when no family member is present or when end-of-life wishes are not documented, the physician is left sole judge. Advanced life support inevitably carries the risk of extending life at all costs, especially in an out-of-hospital setting [5].

In many countries, prehospital care is provided by paramedics. The difficulty in finding out about an individual's end-of-life preferences in OHCA cases has meant that cardiopulmonary resuscitation (CPR) has become the norm [6]. However, in France, the prehospital ambulance team always comprises an emergency physician able to take decisions at the patient's bedside [9]. In cases of doubt and in order to comply more closely with regulatory requirements, he or she can call the family physician or, failing that, the emergency call centre doctor.

The impact of advance directives on the management of critically ill patients in an emergency setting has not been addressed in France and has seldom been addressed elsewhere [7,8]. The aim of this study was to evaluate the prevalence of advance directives and their impact on the management of OHCA cases.

Methods

Setting

The study was conducted from 01/01/2013 to 30/11/2015 in a suburb of Paris with a population of 1.5 million (Seine-Saint-Denis, France). In the French emergency medical services (EMS) system, all OHCA cases are handled by mobile intensive care units (MICU) manned by an emergency physician, specialist nurse and an ambulance driver trained in first aid [9].

Inclusions and exclusions

We included all OHCA patients handled by the 5 MICUs of Seine-Saint-Denis. All OHCA patients, whether life support has been initiated or not, are entered into a secure, web-based data management system that was initiated in 2009 and deployed in June 2012 (RéAC) [10]. The main goal of this registry is to improve the care and survival rate of OHCA patients. Data completeness is checked regularly. The local investigators (JMA, BH, DB, and PN) were responsible for data entry, verification, and updating. A declaration of the registry was filed with the French authorities (French Data Protection Agency (CNIL – *Commission nationale de l'informatique et des libertés*) and local Ethics Committee (CPP – *Comité de protection des personnes*)) [10].

All patients below 18 years of age were excluded from the analysis because minors are not included in French legislation on advance healthcare directives. All patients for whom there was no information recorded on the existence or not of an advance directive were also excluded.

Variables

The following variables were studied: demographics (age, sex), circumstances of cardiac arrest (caller, site, presumed time, presence of witnesses and presumed cause of cardiac arrest (medical or trauma)), basic life support (no-flow time between cardiac arrest and start of cardiac massage, resuscitation attempts by witnesses and defibrillation), advanced life support (low-flow time between cardiac arrest and recovery of cardiac activity or death, decision to resuscitate, initial rhythm, external cardiac massage, defibrillation, venous access, ventilation, epinephrine infusion, filling, family presence) and outcome (return of spontaneous circulation, transport to hospital and survival at 30 days).

Endpoints

The primary endpoint was prevalence of advance directives. Secondary endpoints were the characteristics of the population and outcomes in patients with or without advance directives.

Statistics

Data are expressed as numbers with percentages or medians with interquartile ranges (IQR). For categorical variables, differences were tested by the Chi-squared test or, if the validation criteria for this test were not met, by the Fisher Exact test. For quantitative variables, differences were tested by the non-parametric Mann–Whitney test. All tests were two-sided and Bonferroni's adjustment for multiplicity was used to interpret the type 1 error where multiple comparisons were being made. All analyses were performed using R version 3.1.0.

Results

A total of 2492 OHCA cases were handled by the 5 MICUs over the 23 months of the study. After exclusion of 59 (2%) patients under 18 years of age and 448 (18%) patients for whom it is unclear whether they had advanced directives or not throughout the intervention, data for 1985 OHCA patients (1254 (63%) male; 731 (37%) female) were analyzed. Median patient age was 68 [53–82] years. A family member called EMS in 1151 (60%) cases. Cardiac arrest occurred in the home in 1484 (75%) cases, in a public place in 248 (13%) cases, and in the presence of witnesses in 1172 (59%) cases. Immediate CPR by witnesses was initiated in 526 (27%) cases. There was a medical cause for the cardiac arrest in 1746 (88%) cases. The remaining 239 (12%) cases were due to trauma.

The median no-flow time was 7 [0–13] min. The initial recorded heart rate was asystole ($n = 1681$ (87%)), pulseless electrical activity ($n = 65$ (3%)) or ventricular rhythm disorder ($n = 62$ (3%)). The remaining seven percent had spontaneous circulation on arrival of the MICU. Advanced life support was given to 976 (49%) patients. Adrenalin was injected to 892 (91%) patients at a total dose of 7 [4–10] mg within 5 [3–8] min of MICU arrival. Advanced life support was performed in the family presence in 251 (30%) patients. Return of spontaneous circulation was observed in 222 (23%) patients. A total of 193 (20%) patients were taken to hospital and 45 (2.3%) were later discharged.

Advance directives were accessed for only 148 patients (prevalence 7.5% (95% CI 6.4–8.7)). Availability of advance directives was significantly more frequent for older and female patients experiencing cardiac arrest at home due to a medical cause and for whom a family member called the EMS (Table 1). The decision to provide advanced life support was taken for 35 (24%) patients with advance directives vs. 941 (51%) patients without ($p < 0.001$). Modalities of advanced life support did not significantly differ between the two groups (Table 2). Return of spontaneous circulation was observed in five (14%) resuscitated patients with directives and 217 (23%) patients without ($p = 0.3$). Outcomes for the two groups are compared in Table 3. Patients with advance directives were significantly more likely to die on site. Among patients with advance directives, only one was admitted to hospital. He/she died within 24 h of admission.