



## Clinical paper

# The relationship between chronic health conditions and outcome following out-of-hospital ventricular fibrillation cardiac arrest<sup>☆</sup>



Florence Dumas<sup>a,b,\*</sup>, Jennifer Blackwood<sup>c</sup>, Lindsay White<sup>c</sup>, Carol Fahrenbruch<sup>c</sup>, Xavier Jouven<sup>a</sup>, Alain Cariou<sup>a</sup>, Thomas Rea<sup>c</sup>

<sup>a</sup> INSERM U970, Parisian Cardiovascular Research Center, Paris Descartes University, Paris, France

<sup>b</sup> Emergency Department, Cochin/Hotel-Dieu Hospital, APHP, Paris, France

<sup>c</sup> Emergency Medical Services, Division of Public Health for Seattle and King County, University of Washington, Seattle, WA, USA

## ARTICLE INFO

## Article history:

Received 10 June 2017

Received in revised form 24 August 2017

Accepted 25 August 2017

## Keywords:

Cardiac arrest

Outcome

Comorbidities

## ABSTRACT

**Introduction:** The cumulative burden of chronic health conditions could contribute to out-of-hospital cardiac arrest (OHCA) physiology and response to attempted resuscitation. Yet little is known about how chronic health conditions influence prognosis. We evaluated the relationship between cumulative comorbidity and outcome following ventricular fibrillation OHCA using 3 different scales.

**Methods:** We performed a cohort investigation of persons  $\geq 18$  years who suffered non-traumatic OHCA and presented with ventricular fibrillation between January 1, 2007 and December 31, 2013 in a metropolitan emergency medical service (EMS) system. Chronic conditions were ascertained from EMS reports. The primary relationship between cumulative comorbidity and outcome (survival to hospital discharge) used the Charlson Index and two other scales. Analyses used logistical regression (LR), multiple imputation and inverse probability weighting.

**Results:** During the study period 1166/1488 potential patients were included. The median Charlson Index was 1 (25th–75th%: 0–2). Overall survival was 43.9%. Comorbidity was associated with a dose-dependent decrease in the likelihood of survival. Compared to Charlson Score of 0, the odds ratio of survival was 0.68 (0.48–0.96) for Charlson of 1, 0.49 (0.35–0.69) for Charlson of 2, and 0.43 (0.30–0.61) for Charlson of  $\geq 3$  after adjustment for Utstein predictors using multivariable LR. This inverse comorbidity-survival association was similar for the other 2 scales and was observed for different clinical outcomes (admission to hospital, functional survival, 30-day survival, and 1-year survival).

**Conclusion:** Based on these results, cumulative comorbidity can help explain survival variability and improve prognostic accuracy. Whether information about cumulative comorbidity or specific health conditions can inform resuscitation care is unknown though the results suggest comorbidity may influence acute pathophysiology and treatment response.

© 2017 Elsevier B.V. All rights reserved.

## Introduction

Out-of-hospital cardiac arrest (OHCA) is a leading cause of death worldwide [1]; The links in the chain of survival are important for successful resuscitation. However the Utstein data elements which include demographic, circumstance, and care characteristics only account for a modest portion of the variability in outcome [2]. Identifying other characteristics that influence prognosis can improve scientific understanding of resuscitation, help explain outcome dif-

ferences across populations or geographies, and potentially provide the basis to improve care.

The pathophysiology of OHCA is dynamic, with evidence suggesting a time-dependent physiology that ideally could be matched with specific therapies to maximize the chances of survival [3]. Although the Utstein elements such as early CPR and interval to defibrillation can affect this physiology [4], patient-specific clinical characteristics could influence the acute pathophysiology and in turn patient outcome. For example, persons who suffer OHCA have a range of clinically-recognized chronic health conditions. For some, the OHCA event is the initial manifestation of clinical heart disease, while others may have clinically-established cardiac and non-cardiac health conditions. This cumulative burden of chronic health conditions could potentially contribute to arrest physiology at the outset and during the evolution of attempted resuscitation.

<sup>☆</sup> A Spanish translated version of the abstract of this article appears as Appendix in the final online version at <http://dx.doi.org/10.1016/j.resuscitation.2017.08.239>.

\* Corresponding author at: 27 rue du Faubourg Saint Jacques, 75014, Paris.

E-mail address: [florence.dumas@aphp.fr](mailto:florence.dumas@aphp.fr) (F. Dumas).



Fig. 1. Cumulative comorbidity scales.

The few studies that have evaluated the relationship between chronic health conditions and OHCA outcome have provided inconsistent results – some reporting an inverse relationship between increasing chronic comorbidity and a lower likelihood of outcome and others observing a null relationship [5,6]. In this investigation, we evaluated the relationship between pre-existing, clinically-recognized, chronic health conditions using different scales to assess the relationship between cumulative comorbidity and resuscitation outcome following ventricular fibrillation cardiac arrest. We hypothesized that cumulative comorbidity would be independently associated with outcome even after accounting for traditional Utstein data elements.

## Methods

### Study population and setting

We performed a cohort investigation of all persons 18 years or older who suffered non-traumatic OHCA presenting with ventricular fibrillation between January 1, 2007 and December 31, 2013 in a large metropolitan emergency medical service (EMS) system. The EMS system serves a population of approximately 1.3 million persons residing in urban, suburban, and rural settings covering an area of about 2000 square miles. The EMS is a two-tiered system. Basic life support is provided by emergency medical technician-trained firefighters who are equipped with automated external defibrillators. Advanced life support is delivered by paramedics who are trained in rhythm recognition and provide intubation, manual defibrillation, and intravenous medications. Resuscitation care is based on the American Heart Association guidelines [7]. Patients who are resuscitated are transported to area hospitals, each equipped with coronary catheterization and intensive care services. Hospital-based care is at the discretion of the treating physician [8,9]. The institutional review boards at the University of Washington and Public Health – Seattle & King County approved the study.

### Data collection and definitions

The EMS system maintains an ongoing registry of all EMS-treated cardiac arrests. Information about demographics,

circumstances, care, and outcome is ascertained using emergency dispatch, EMS, defibrillator, hospital, and death records. The information is organized according to the Utstein Guidelines for reporting OHCA [10].

### Chronic health conditions, symptoms, and cumulative comorbidity

We collected information about pre-existing, clinically-recognized, chronic health conditions and pre-arrest symptoms from the EMS reports. Ascertainment of health conditions and symptoms used a uniform abstraction form (Appendix). Abstraction was performed without knowledge of hospital survival status.

Chronic health conditions were characterized as present, absent, or unknown. We classified a condition as absent when the particular condition was not noted in the report but information was available about other chronic health conditions and/or chronic medication treatments. We classified chronic health conditions as missing when there was no information available about any chronic health conditions and when the record did not explicitly note the absence of prior clinical health history.

We modeled chronic health conditions and symptoms using different scales to assess the relationship between cumulative comorbidity and resuscitation outcome (Fig. 1). We considered a simple model of any pre-existing cardiac condition or non-cardiac condition. We subsequently evaluated the relationship using the Charlson Index given its common use in other conditions, and a previously-published comorbidity scale (Scale 2) used specific to resuscitation [5,11]. Finally we evaluated a new scale that incorporated information about comorbidity and symptoms to assign a condition/symptom specific score to assess whether this condition-specific scoring could improve prediction (Scale 3). In the new scale, we weighted individual conditions that achieved a  $p$ -value of  $<0.2$  in the multivariable regression according to their beta coefficient.

### Outcome

The primary outcome was vital status at hospital discharge. Secondary outcomes included Cerebral Performance Category at discharge, 30-day mortality, and 1-year mortality. Cerebral Performance Category (CPC) provides an assessment of functional status

Download English Version:

<https://daneshyari.com/en/article/5619802>

Download Persian Version:

<https://daneshyari.com/article/5619802>

[Daneshyari.com](https://daneshyari.com)