



Clinical Paper

Out-of-hospital cardiac arrest phone detection: Those who most need chest compressions are the most difficult to recognize[☆]



S. Travers^{*}, D. Jost, Y. Gillard, V. Lanoë, M. Bignand, L. Domanski, J.P. Tourtier,
the Paris Fire Brigade Cardiac Arrest Work Group¹

Fire Brigade of Paris, Emergency Medical Department, Paris, France

ARTICLE INFO

Article history:

Received 6 June 2014

Received in revised form 21 August 2014

Accepted 19 September 2014

Keywords:

Out-of-hospital cardiac arrest

Dispatcher-assisted cardiopulmonary resuscitation

Agonal breathing

ABSTRACT

Dispatcher-assisted cardiopulmonary resuscitation increases the likelihood of survival and thus is highly recommended. However, the detection rate of out-of-hospital cardiac arrest (OHCA) is very different from one system to another, and early recognition of cardiac arrest in the dispatch centre remains challenging. The aim of this study was to assess the provision of dispatcher-assisted cardiopulmonary resuscitation in the main French dispatch centre.

Methods: In the Paris Fire Brigade, each patient over 15 years of age who presented an OHCA from 15 to 31 May 2012 was prospectively included. Field data and tape recordings of emergency calls were studied by three experienced physicians, to assess the rate (and delay) of OHCA recognition and chest compression initiation, and identify the causes of unrecognized OHCA.

Results: Among 82 consecutive calls for detectable cardiac arrest, the dispatcher recognized 50/82 (61%). The median times from call to OHCA recognition and from call to chest compression initiation were, respectively, 2 min 23 s (1 min 51 s to 3 min 7 s) and 3 min 37 s (2 min 57 s to 5 min). The main causes of non-recognition of OHCA were the absence or incomplete assessment of breathing and the presence of agonal breathing. No cardiac arrest was missed when the dispatcher followed the local dispatching algorithm; this included the gesture of putting the hand on the abdomen and measuring the breathing frequency. Hospital admission with a beating heart was paradoxically 18% for detected cardiac arrest and 47% for undetected cardiac arrest ($p = 0.007$). This paradox could be explained by the relation between agonal breathing and, on the one hand, good prognosis of OHCA and, on the other hand, difficulties in recognizing OHCA.

Conclusion: The improvement of cardiac arrest recognition in the dispatch centre seemed mandatory, as the cardiac arrests of better immediate prognosis were not well detected. The measurement of OHCA recognition and CPR initiation by phone should be encouraged in dispatch centres as a key to initiating corrective measures.

© 2014 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

In out-of-hospital cardiac arrest (OHCA), dispatcher-assisted cardiopulmonary resuscitation (CPR) has been shown to significantly decrease the time to start CPR^{1,2} and increase the likelihood

of survival.^{3–5} The European Resuscitation Council,⁶ the American Heart Association,⁷ and many authors^{1–4} thus recommend providing CPR via telephone (t-CPR). Despite these recommendations, more than half of the calls for cardiac arrest (CA) are not followed by CPR, either in France⁸ or in other countries,^{9,10} notably because OHCA is difficult for the emergency dispatchers to recognize early.^{1,3,11}

The main objective of this study was to measure prospectively the rate of OHCA recognition in the main French dispatch centre (Paris firefighter (FF) dispatch centre). The secondary objectives were to assess the rate of t-CPR, to measure the delays necessary for OHCA recognition and t-CPR initiation and to identify the causes of unrecognized OHCA.

[☆] A Spanish translated version of the summary of this article appears as Appendix in the final online version at <http://dx.doi.org/10.1016/j.resuscitation.2014.09.020>.

^{*} Corresponding author.

E-mail address: travers.stephane@gmail.com (S. Travers).

¹ O. Bon, F. Briche, P. Cocault, P. Dang Minh, B. Frattini, N. Galinou, N. Genotelle, F. Lemoine, O. Maurin, and A. Mendibil.

2. Materials and methods

2.1. Study setting

The FFs of Paris cover a population of 6.5 million inhabitants in Paris and its suburbs. The incidence of OHCA was 53 per 100,000 inhabitants in 2012. In the same year, the FF dispatch centre received more than two million calls. One of the challenging issues remains to detect daily 8–10 calls for OHCA among 5500 other calls. An algorithm (Fig. 1) is used to help CA recognition and early t-CPR initiation.

The emergency medical system is a two-tiered response system. The first tier consists of basic life support (BLS) and is served by 200 teams of three to five professional rescuers, deployed in 77 stations of FF. The advanced life support (ALS) tier is served by 44 ambulance teams, each comprising an emergency physician, a nurse and a driver. The ALS teams depend either on the Service d'Aide Médicale Urgente (SAMU) or on the FF. If CA is suspected, both levels are simultaneously sent. In this emergency system, the median time between the beginning of the phone call and the automated external defibrillators' (AED) switch-on by BLS teams is historically about 9 min (6–12), and ALS teams arrive in 15 min (11–23).¹²

2.2. Study design

This prospective observational study included patients over the age of 15 years who presented an OHCA with the use of AED and for whom a tape recording of the emergency call was available.

These recordings were successively assessed by an experienced BLS instructor and two emergency physicians.

CAs were classified as 'not detectable' and then excluded for any of the following: (1) the CA occurred after the call (victim still speaking during the call), (2) the caller was not on the scene and not able to reach the victim and (3) the call was transferred by another institution that had already estimated the situation (police, Red Cross or SAMU) without the possibility of the BSPP dispatcher's communicating directly with the bystander.

The main end point was successful CA detection by the FF dispatcher. Detection was considered successful as soon as the dispatcher stated the terms 'cardiac arrest', 'cardiac massage' or 'CPR'.

The other end points were the realization of t-CPR, the median time from the beginning of the call to the statement by the dispatcher of the terms validating the detection, the median time from the beginning of the call to the beginning of chest compression, the causes of nondetection or non-t-CPR and the way to assess ventilation status. This last evaluation was considered either complete, when ventilation assessment was realized with a request to put the hand on the abdomen in search of a ventilator movement and breathing frequency, or incomplete, when ventilation assessment was realized without the associated gesture (Fig. 1).

Other variables that were collected by the field teams' reports, according to the Utstein style, were the following: epidemiological variables (age, gender, location of OHCA and medical past), variables specific to the rescue system (time from first call to AED switch-on) and variables specific to the field management (CPR actually in progress at the time of BLS team arrival, rhythm of AED at the time of BLS team arrival, AED's first shock success rate, number of shocks administered by AED during the first 10 min, recovery of pulse and heart-beating transport to the hospital).

2.3. Statistics

Quantitative variables were compared by the Student test or the median test. Comparisons of the qualitative variables were based on the chi-squared test or Fisher's exact test, according to enrolments. We made a logistic regression to calculate each variable's predictive

value for OHCA detection. All of the calculations were realized from STATA/SE 12.

2.4. Ethical considerations

The study was authorized by the committee of the institution.

3. Results

3.1. Inclusion and CA recognition

From 15 to 31 May 2012, 144 CAs were treated by FF BLS ambulances. A tape-recording assessment identified 82/144 (51%) OHCA as detectable in the dispatch centre. Among them, the dispatcher recognized 50/82 (61%) (Fig. 2).

3.2. Comparison of detected and undetected CA

The comparison between detected and undetected CAs highlights a difference concerning the way to assess ventilation status and victim outcome (Table 1): the presence of agonal breathing and the absence or incomplete ventilation status assessment decreased the likelihood of recognizing CA (Fig. 3). Regarding the way to assess the absence of ventilation, there was a link between the request to put the hand on the abdomen and correct CA recognition ($p = 0.001$).

3.3. Bystander behaviour

Less than 16% of detectable CAs (13/82) had been preliminarily identified by the bystander (Fig. 2). Among them, CPR was started in one case (1.2% of the calls). When the question was asked by the dispatcher, only 5/37 (13.5%) of the bystanders declared that they knew how to perform CPR.

3.4. Dispatcher-assisted CPR

The median time and the interquartile range from the call to CA recognition was 2 min 23 s (1 min 51 s to 3 min 7 s). Among the 50 detected CAs, 27 received dispatcher-assisted CPR.

The median interval from the call beginning to the CPR initiation was 3 min 37 s (2 min 57 s to 5 min).

The identified circumstances that explained the absence of t-CPR were mainly the absence of cooperation from the bystander ($n = 9$) and isolated reasons, such as the physical impossibility of the bystander's performing CPR because of advanced age or because of the excessive weight of the patient and the premature arrival of the ambulance. Finally, in a few cases, the death of the victim was certain during the call, and no t-CPR advice was delivered.

3.5. Bystander CPR at the time of ambulance arrival

In addition to the tape-recording assessments, reports from ambulance teams were analyzed to assess if bystander CPR was ongoing at the moment when rescuers arrived on the scene.

Nine victims had not received bystander CPR at the time of ambulance arrival even though t-CPR had been realized on a tape recording; on the other hand, seven victims benefited from bystander CPR at the time of ambulance arrival even though CA had not been recognized by the dispatcher and while no t-CPR advice had consequently been delivered (Fig. 2).

In total, 25/82 patients (30% of the CAs) had benefited from bystander CPR at the time of ambulance arrival. Out of these 25 CPR instances, 14 (56%) were executed further to t-CPR instructions from the dispatcher.

Download English Version:

<https://daneshyari.com/en/article/5997892>

Download Persian Version:

<https://daneshyari.com/article/5997892>

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