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Clinical paper

Bystander capability to activate speaker function for continuous dispatcher assisted CPR in case of suspected cardiac arrest☆

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ABSTRACT

Background: The European Resuscitation Council Guidelines 2015 recommend bystanders to activate their mobile phone speaker function, if possible, in case of suspected cardiac arrest. This is to facilitate continuous dialogue with the dispatcher including (if required) cardiopulmonary resuscitation instructions. The aim of this study was to measure the bystander capability to activate speaker function in case of suspected cardiac arrest.
Method: In 87 days, a systematic prospective registration of bystander capability to activate the speaker function, when cardiac arrest was suspected, was performed. For those asked, "can you activate your mobile phone's speaker function", audio recordings were examined and categorized into groups according to the bystanders capability to activate speaker function on their own initiative, without instructions, or with instructions from the emergency medical dispatcher. Time delay was measured, in seconds, for the bystanders without pre-activated speaker function.
Results: 42.0% (58) was able to activate the speaker function without instructions, 2.9% (4) with instructions, 18.1% (25) on own initiative and 37.0% (51) were unable to activate the speaker function. The median time to activate speaker function was 19 s and 8 s, with and without instructions, respectively.
Conclusion: Dispatcher assisted cardiopulmonary resuscitation with activated speaker function, in cases of suspected cardiac arrest, allows for continuous dialogue between the emergency medical dispatcher and the bystander. In this study, we found a 63.0% success rate of activating the speaker function in such situations.

Introduction

Sudden cardiac arrest affects 350,000–700,000 individuals annually in Europe, and it accounts for one of the leading causes of death [1]. Early bystander cardiopulmonary resuscitation (CPR) improves the survival rate from out-of-hospital cardiac arrests. The earlier, the bystander performs CPR, the higher survival rate is observed [2,3].

Emergency medical dispatchers (EMDs) are essential in supporting and giving CPR instructions to the bystander. Instructions to start CPR and improve CPR quality, given by EMDs via telephone (dispatcher assisted CPR (DA-CPR)) originated in the early 1970s [4]. Subsequently, DA-CPR has been shown in some studies to increase the rate of bystanders performing CPR from 16.7-32% to 26.4–54% [5–7]. Furthermore, DA-CPR seems to improve the quality of CPR, and increase the survival in sudden cardiac arrest [8]. This has led to the making of today's national and international protocols for DA-CPR [8,9].

The European Resuscitation Council Guidelines 2015 recommend bystanders to activate their mobile phone speaker function, if possible, in case of suspected cardiac arrest [1]. This will facilitate continuous dialogue with the dispatcher including (if required) CPR instructions.

To our knowledge, the bystander capability to activate speaker function has only been examined in test settings. The aim of this study is to examine the bystander's capability to activate speaker function for continuous DA-CPR, in case of suspected cardiac arrest, in a real-life situation.

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Materials and methods

Study design

Over a 87 day period, a systematic prospective registration of bystander capability to activate the speaker function was performed from November 15th 2015 to February 9th 2016. The registration occurred at Prehospital Emergency Medical Services, Region Zealand. Typical EMDs, who received and processed the calls, were mostly experienced nurses. The EMDs followed the Danish Index for Emergency Assistance (Dansk Indeks for Akuthjælp). During the 87 days of study, the question "can you activate your mobile phone's speaker function", was added to the protocol. The EMD registered the bystander's capability to activate speaker function in a flow diagram. The Danish Health and Medicines Authority and the Danish Data Protection Agency approved collection and handling of data (REG-107-2016). The ethical committee of the Region Zealand categorized the project as an observational quality and safety study (J.nr. 16-000014).

All calls of suspected cardiac arrests were included. Excluded from this study were cases, where it was not feasible to ask and cases where landline telephones were used. The cases where it was not feasible to ask were, for example, if the situation is deemed too stressful by the EMD, or if there are difficulties with language between the bystander and the EMD. We registered, whether or not the bystander succeeded in activating speaker function on the mobile phone.

Data collection and analysis

All audio recordings, where speaker activation was achieved, were examined and categorized into three groups:

1. Bystanders with a pre-activated speaker function, activated on own initiative.
2. Bystanders who were able to activate the speaker function without instruction from the EMD.
3. Bystanders who were able to activate the speaker function with instruction from the EMD.

From the audio recordings of group 2 and 3, we registered the time delay, in seconds (s), between when the EMD asked the bystander to activate speaker function ("start"), and when the activation was confirmed ("stop"). The activation of speaker function was either confirmed verbally or by a clear change in the sound perception from the scene. In audio recordings, where the speaker function was not activated, we examined whether the EMD had instructed in how to activate speaker function. If the instructions were given, the time delay was measured.

Statistical analysis

In cases of successful speaker activation (group 2 and 3) time delays were calculated and validated in tabular form and depicted in the accompanying figures (Figs. 1 and 2). A hypothesis of equal distribution across the two groups was tested, using the chi-square test, and rejected at a significance of 5% with a probability below 0.0001. Differences in median time to activation of speaker function, between bystanders receiving instructions, and bystanders activating speaker function without instructions, were confirmed using a Wilcoxon two-sample test. Results are presented as median time [25% percentile, 75% percentile].

Results

The total population in Region Zealand is 828,640. In this period, the total number of calls to the Prehospital Emergency Medical Services, Region Zealand was 16,354 (Fig. 1). From these, 1.6% (262) of the cases were suspected cardiac arrest. Out of the 262 suspected cardiac arrests, the EMD assessed, that it was not feasible to ask the bystander to activate speaker function in 111 of the cases. In 13 of the cases, a landline phone was used.

58 of 138 (42.0%) bystanders were able to activate the speaker function without instructions, 4 (2.9%) with instructions, with median times 8 s [5,11] and 19 s [15,23], respectively (Wilcoxon two-sample test, p = 0.0062) (Fig. 2). 25 (18.1%) were pre-activated on own initiative, and 51 (37.0%) were unable to activate the speaker function (Fig. 1). Two bystanders (group 1) were already using a headset when calling, and DA-CPR were given successfully in these cases. Two bystanders lost connection during attempted speaker activation. In both cases, the EMD immediately re-called the bystander, and at that time, one of them had already pre-activated the speaker function (group 1). In the other case, no further speaker activation attempt was done.

In total, 87 (63.0%) bystanders were able to activate or had already activated the speaker function. In 51 cases (37.0%), the bystanders were unable to activate the speaker function. In the 51 cases, only one was instructed in how to activate the speaker function, with a time delay on 8 s. In the remaining 50 cases, it was not feasible to instruct.

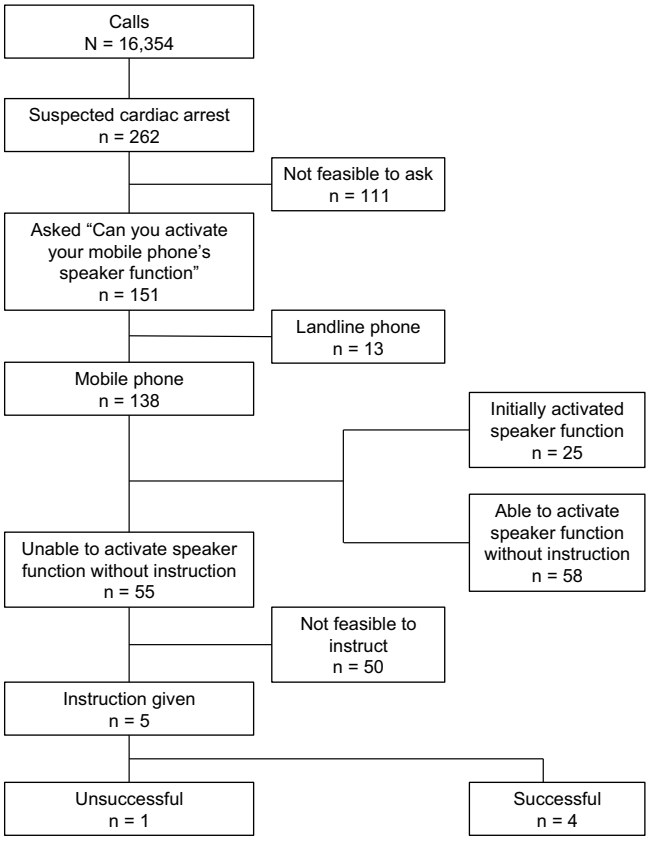

Fig. 1. Flow diagram illustrating the inclusion process for bystanders into the study, to examine, how many who succeeded in activating the speaker function. Cases, where bystanders succeeded in activating speaker function, are visualized in the right column.