

Clinical Paper

Life after cardiac arrest: A very long term follow up



Anna-Eva Andersson, Hans Rosén, Katharina S. Sunnerhagen*

Department of Clinical Neuroscience and Rehabilitation, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Sweden

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ABSTRACT

Aim: To describe survival and causes of death after cardiac arrest (CA) and the life situation of very long term survivors.

Methods: Individuals with successful resuscitation treated at the Sahlgrenska university hospital during 1995–1999 and presented in former CA publications were studied. Survival time and causes of death data were extracted from the individuals who had died's records. Very long term survivors were offered a follow up visit at home. Mini Mental State Examination (MMSE) used to describe cognitive abilities and EQ-5D to assess quality of life. The life situation was also explored.

Results: 14 out of 104 possible participants had survived to follow up. The median time to follow up among the 8 who agreed to participation was 17 years. Out of the 8 participants, 4 failed to reach the cut off score of normal cognitive abilities in the MMSE and 7/8 participants did not reach the cut off score for normal cognitive function in the MoCA.

Overall the participants were content with their life situation and QoL. However, a tendency towards lower scores on the cognitive testing and a lower self-reported QoL was observed. No depression, post-traumatic stress disorder or anxiety disorder were found.

Conclusions: A CA may lead to permanent cognitive impairments and the risk of dementia may be higher because of the injuries sustained during the collapse. However, further studies with more participants are needed to fully determine the risk of cognitive impairment after a CA. Regarding life situation, there was a tendency of lower QoL with lower scores on the cognitive testing. With a new treatment paradigm, there is a need for long term studies regarding this new population.

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1. Introduction

Every year 275 000 people in Europe¹ and approximately 10 000 in Sweden suffer a cardiac arrest (CA), about 20% of which take place inside a hospital.² CA mortality is high, described in 2007 as, at one year after discharge to be 17% and 10 years after discharge to be 54–82%.^{3,4} Often survival after CA is defined as being alive 30 days post CA. The current treatment of CA, the chain of survival⁵ is widespread and has a success rate of 10–28% in Sweden. The definition of success, in the studies on survival after CA in Sweden, was discharging a living patient. The prognosis of these patients mainly depends on where the CA occurs and it is more favourable if the CA takes place inside a hospital rather than out-of-hospital.²

Survivors can be stricken by co-morbidities. The sudden cessation of blood flow during a CA and the loss of pulse lead to brain damage due to global cerebral ischaemia.⁶ It has been shown that many patients still suffer from cognitive deficits two years⁷ and

8 years after CA.⁸ It has also been shown that one year post CA patients have reduced independency in Activities in Daily Living (ADL)⁹ and only a few return to work. On the other hand, it has also been shown that cognitive function and quality of life (QoL) can improve with time.^{9,10}

Among other things, higher public access to automatic defibrillators and an increasing public knowledge how to perform basic Cardio Pulmonary Resuscitation (CPR) have resulted in more people surviving their CA.¹¹ This leads to a growing interest in the long-term effects of CA¹² coping with life after it and in the disabilities and rehabilitation of survivors.

The overall aim of this study was to describe the survival and cause of death after CA and to analyse the living situation of those still alive a very long time after CA.

2. Materials and methods

2.1. Participants

The participants for this study were extracted from studies following patients surviving an out-of-hospital cardiac arrest (OHCA) after successful resuscitation^{3,9,13} in 1995–99. In the original cohort

* Corresponding author at: University of Gothenburg, Rehabilitation Medicine, Per Dubbsgatan 14 3tr, S-41345 Gothenburg, Sweden.

E-mail address: ks.sunnerhagen@neuro.gu.se (K.S. Sunnerhagen).

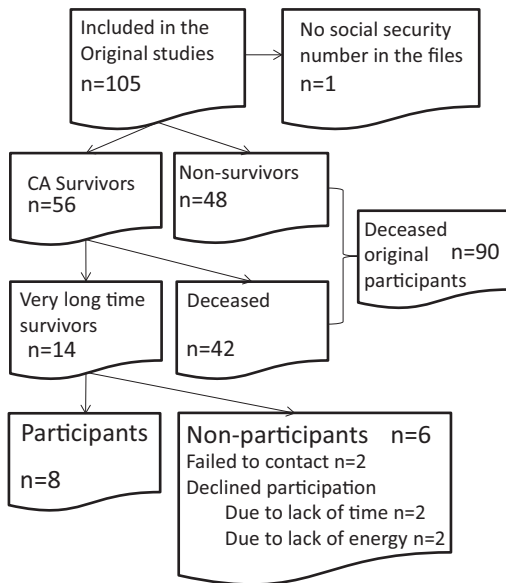


Fig. 1. The inclusion process. Failed to contact the participant = no phone number available and the participant did not contact the study leader after receiving the informational letter.

105 individuals were followed and the inclusion process of the participants is shown in Fig. 1.

Information on survival was gathered through medical charts and the population register and was analysed with regards to gender and age at CA. Date and cause of death were confirmed through the Swedish cause of death register.

Cognitive abilities were assessed with Mini Mental State Examination (MMSE),¹⁴ cut off score of <27 p (0–30 p) and Montreal

Cognitive Assessment (MoCA)¹⁵ cut off score <26 p (0–30 p). Co-morbidities were assessed with the self-reported co morbidity questionnaire (SCQ).¹⁶ Health related quality of life (QoL) was assessed with EuroQol-5 dimensions (EQ-5D),¹⁷ cut off score <0.82 for the EQ-5D index and <80 for the visual analogue scale (VAS).

Dependence in ADL was assessed with the Barthel index^{18,19} cut off score $t \leq 95$ p, major dependence at <75 p. To search for post-traumatic stress disorder (PTSD) and to evaluate the mental health of the participants the PTSD Checklist–Civilian version (PCL-C)²⁰ and hospital anxiety and depression scale (HADS)²¹ was used. Possible PTSD was registered at a PCL-C score of ≥ 50 p and possible anxiety or depression was registered at a HADS score of >10 p. A score of 7–10 p was used to indicate mild anxiety/mild depression.

The study was approved by the Regional Ethical Review Board in Gothenburg. Written and informed consent was obtained from all the study participants or their next of kin.

2.2. Statistical methods and data treatment

The SPSS v21 was used for statistical calculations and descriptive statistics with median and range were used.

Kaplan–Meier diagrams were used to calculate cardiac arrest survival over time. When calculating the number of lost years, the actual age at death was subtracted from the expected life span based on general population life expectancy at the time.

3. Results

3.1. Study population

Of the original 104 individuals with CA, 56 (53.8%) survived the first 30 days, 14 women and 42 men (CA survivors). Long term survival is presented in Fig. 2 for the men (data not shown for

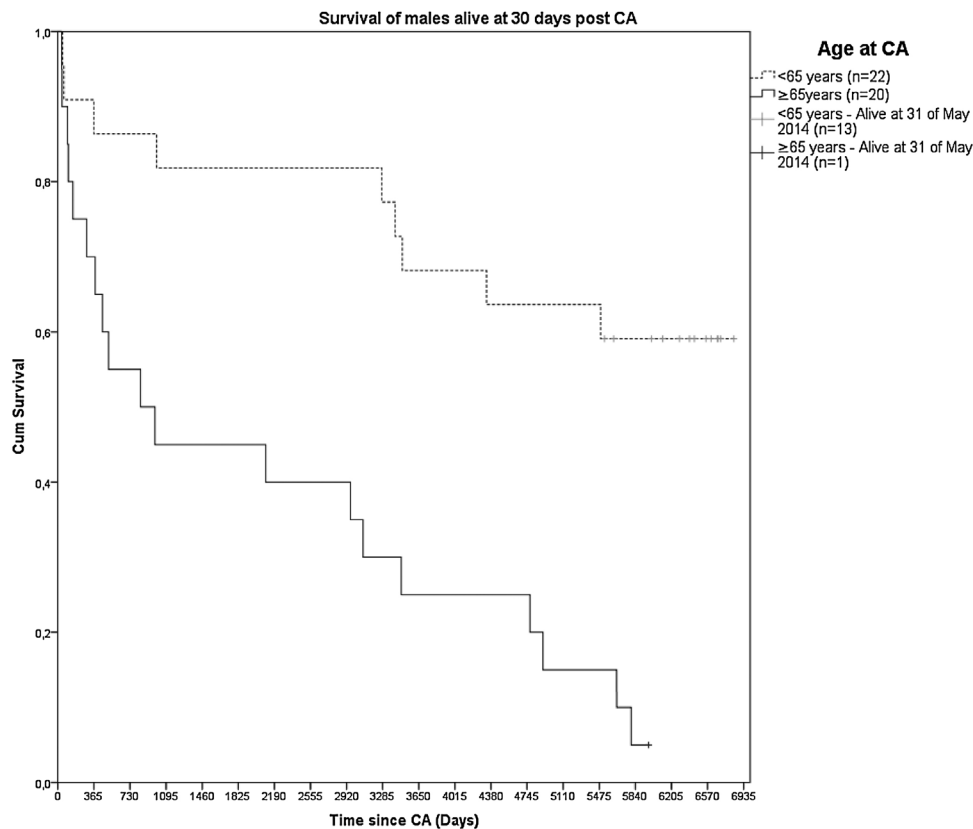


Fig. 2. Kaplan Meier curve for the survival rates after CA for the men (after 30 days). Solid lines show older survivors (≥ 65 years of age) and dotted lines younger (<65 years of age).

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