The occurrence of refibrillation during out of hospital cardiac arrest: Results of the Heart for Limburg study

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Abstract

Introduction: The incidence of an out of hospital cardiac arrest (OHCA) is approximately 1/1000, i.e. around 15.000-16.000 events per year in the Netherlands. 66% of the OHCA occur in domestic areas whereas 33% in public places. During a cardiac arrest 4 types of rhythm can be monitored on the ECG: Ventricular fibrillation (VF), ventricular tachycardia (VT), pulseless electrical activity (PEA) and asystole. VF and VT are shockable rhythms and carry the best prognosis (in the Heart for Limburg Study, 40,8% for the year 2012). Refibrillation, i.e. another episode of fibrillation after electroshock however is reportedly frequent (60%) and worsens the outcome. In this study we wanted to assess the incidence of refibrillation and related outcome.

The aim of this study is to analyze the occurrence of refibrillation in patients with out of hospital cardiac arrest (OHCA) and compare the survival between different groups. We try to identify patient characteristics in which refibrillation occurs more often.

Methods: Data of all patients with an OHCA between April 2011 and April 2014 are being collected in the "Heart for Limburg Study". The study is part of an ongoing research about effectiveness of resuscitation network volunteers of SCA in the province of Limburg. All patient characteristics are based on the Utstein recommendations, and the update of the Utstein templates. From this cohort we collected continuously recorded AED data of 102 patients during the resuscitation attempt before arrival of emergency medical services. These data are collected from AED's that have been used during a resuscitation attempt by resuscitation volunteers, laymen or policemen. From these AEDs we recorded time of different events during resuscitation (connection of pads, start of the analysis, time of shock etc.) as well as rhythms that were recorded by the AED. Refibrillation was defined as the occurrence of ventricular fibrillation after a defibrillation attempt.

Results: A total of 102 AED recordings have been included in the study. 76% in our study population were males, the mean age was 65 years. 35,3% of the patients had a cardiovascular history and the overall survival was 29,4%. In 69% of the recordings, VF or VT were the first monitored rhythms. 50% had at least one episode of refibrillation. The occurrence of refibrillation was classified as either spontaneous (43%), failed shock (return of fibrillation <5sec after shock) (26%) or during chest compressions (31%). The first shock efficacy was 50%. The mean number of refibrillation episodes was 1,09. Outcome did not differ between the different groups. (χ^2= 0,767). We could not identify any association between patient characteristics and refibrillation. Duration of the VF was not associated with the outcome.

Conclusions: Refibrillation occurs frequently during an OHCA. Studies showed a worse outcome when refibrillation occurs. This study however, was not able to identify an association between refibrillation occurrence and the outcome. We could not identify any patient characteristic that showed a relation with the chance of refibrillation.