Out-of-hospital cardiac arrest (OHCA) survival in rural Northwest Ireland: 17 years' experience

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Accepted 17 May 2010
Published Online First 2 August 2010

ABSTRACT

SAVES, the name used to describe a register of survivors of out-of-hospital cardiac arrest (OHCA), was established in rural Northwest Ireland in 1992. From 1992 to 2008, 80 survivors were identified (population 239 000 (2006)). Most incidents were witnessed (69/70) and all were in shockable rhythm at the time of first rhythm analysis (66/66). Of 66 patients who could be traced, 46 were alive in December 2008. Average survival rates appeared to increase over the lifetime of the database. SAVES has also contributed to the development of a national OHCA register.

INTRODUCTION

National or large regional registers of out-of-hospital cardiac arrest (OHCA), such as the Resuscitation Outcomes Consortium (ROC) study[1] have made important contributions to our understanding of these events but may not be the only way to provide insights into performance at local level.

In 2000, the SAVES register in Northwest Ireland recorded 22 survivors of OHCA from 1992 to 1998.[2] The objectives of the current study were to compile a complete record of survival to discharge to end 2008, describe the main characteristics of the survivor population and consider the impact of prehospital service changes over the 17-year period.

METHODS

Northwest Ireland is primarily rural with a population of 239 000 (2006). There are approximately 150 general practitioners (GPs) and 43% of practices are located over 30 miles from either acute hospital in the region.

The data collection methodology had four distinct phases:

- 1992 to 2003: real-time register maintained. Cases notified by ambulance personnel, GPs and hospital staff.
- 2003 to 2005: retrospective case identification by searching the Computerised Ambulance Dispatch (CAD) system.
- 2006 to October 2007: real-time registration resumed January 2006.
- November 2007 to December 2008: comprehensive Out-of-Hospital Cardiac Arrest Register (OHCAR); case identification using CAD system with systematic audit to capture false negative cases.

Data was collected on patients who survived to hospital discharge after experiencing a cardiac arrest in a location other than the two acute hospitals or in an ambulance en route to either hospital. Data items included patient age, gender, history, incident location, response, interventions and providers. Sources included ambulance control logs and patient care reports, hospital medical notes and Immediate Care schemes. Patients were not contacted directly; GPs were asked to confirm whether patients were alive or dates of death. Varying availability of data items is reported in the results section.

RESULTS

A total of 80 survivors were identified for the period January 1992 to December 2008. Details are outlined in table 1.

Survival duration data was available for 66 patients; 46 people were alive in December 2008. Of the deceased patients, survival periods ranged from <1 to >15 years (figure 1).

Table 2 summarises population survivor rates in 4 year bands for the period 1992–2007.

DISCUSSION

Northwest Ireland covers a large geographical area but is sparsely populated. Local personnel involved in prehospital resuscitation have a close network with which we maintain regular contact. For these reasons, it is suggested that little or no cases have been missed.

There is no record of a patient in an initial non-shockable rhythm surviving over the 17-year period. A low survival rate in this subgroup would be expected regardless of setting[4 5] but a particularly low survival rate has been observed in other rural settings with a similar population size.[6 7]

The rates of survival appear to have increased over the lifetime of the database however the numbers involved are not large enough to draw statistical inferences.

We feel prehospital service developments have contributed to survival. These developments include:

Ambulance services: equipping of ambulances with automated external defibrillators (AEDs) and improved training.

GP defibrillator programme: provision of AEDs, support equipment and training to general practices. This commenced in 1992 in more rural areas, and was extended from 2000 to all practices in the region. In a study of urban and rural outcomes from OHCA, Jennings *et al*[8] concluded that it may be impractical to attempt to reduce ambulance response times in rural areas and that other strategies should be investigated. Our study highlights the role of a GP defibrillation programme in

Table 1 Demographics of survivors of cardiac arrest

	n	%*
Age, mean (SD)	78	64 years (13)
Gender		
Male	62	77
Female	18	23
Location where cardiac arrest occurred		
Home	26	36
Ambulance	12	16
GP's surgery	9	12
Other	26	36
Missing data	7	–
Bystander CPR		
No bystander CPR	37	60
Medical/nursing	14	22
Public or fire service	11	18
Missing data	18	–
Initial rhythm		
Ventricular tachycardia	6	9
Ventricular fibrillation	60	91
Missing data	14	–
Initial shock		
Ambulance personnel	50	67
GP only	21	28
GP with ambulance personnel	2	2.5
Lay first responder	2	2.5
Missing initial shock data	5	–
Ambulance arrival time, median (range)	34	10 min (1–45 min)
Distance from acute hospital		
<10 miles	16	28
10–20 miles	8	14
20–30 miles	11	19
30+ miles	22	39
Missing data	11	–
Arrested in ambulance en route	12	–

*Data are expressed as a percentage of data available for each variable unless otherwise indicated.
CPR, cardiopulmonary resuscitation; GP, general practitioner.

a primarily rural region. Of the 75 survivors for whom data was available 21 were defibrillated by a GP prior to the arrival of an ambulance. Of these patients, 16 (76%) were located more than 20 miles from an acute hospital. Considering the median ambulance arrival time (10 min), it is almost certain that these patients would not have survived had attending GPs not been equipped with defibrillators.

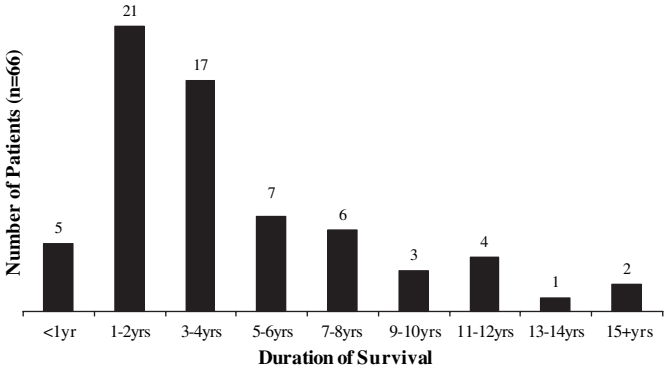

Figure 1 Duration of patient survival from date of arrest.

Table 2 Population survival rates 1992–2007 (4-year intervals)

Interval	Average no. of SAVES per year	Population	SAVES rate/1000 population*
1992–1995	3	209698	0.014
1996–1999	3.25	212826	0.015
2000–2003	5.25	220310	0.024
2004–2007	7	233331	0.030

Source: Public Health Information System, V.10 BETA[3]
*Population average over 4-year period.

Community cardiopulmonary resuscitation (CPR): in association with the Irish Heart Foundation, Community Resuscitation Officers trained 3660 people in CPR between January 2001 and September 2003.[9] Lay community first responders were involved in two SAVES cases.

SAVES was referenced in the Report of the Sudden Cardiac Death Task Force[10] in which the development of a national OHCA register was recommended. Funding was made available through the Pre-Hospital Emergency Care Council (PHECC) for the development of a register. Initially based in Northwest Ireland, OHCAR is now being extended to other regions of Ireland.

Conclusions

This study aimed to create a complete record of OHCA survivors in a region of rural Ireland over a 17-year period. It was found that many of the factors commonly attributed to survival were shared by this group. Finally, this study has demonstrated how longitudinal analysis of our data has contributed to national policy and has been an important factor in the establishment of a national out-of-hospital cardiac arrest register.

Acknowledgements We thank the doctors, nurses and ambulance staff who assisted in this study. We also wish to acknowledge the financial support of the Department of Health and Children, the Health Service Executive and the Pre-Hospital Emergency Care Council.

Funding This work was funded by the Health Service Executive Ireland and Pre-Hospital Emergency Care Council (both funded by the Department of Health and Children, Ireland).

Competing interests None to declare.

Ethics approval This study was conducted with the approval of the NUI Galway.

Provenance and peer review Not commissioned; externally peer reviewed.

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Emerg Med J 2011 28: 437-438 originally published online August 2, 2010
doi: 10.1136/emj.2009.082784

Notes