

A retrospective review of out-of-hospital cardiac arrest outcomes at the Royal Berkshire Hospital NHS Foundation Trust 2018 – 2021: Post-resuscitation care pathway drives improved patient survival



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Introduction

EMS attend approximately 60,000 patients with out of hospital cardiac arrest (OOHCA) in England per year; CPR is attempted in under half. In England, approximately 9% of patients survive to discharge.

Post-resuscitation care remains the least well-defined component of the crucial 'chain of survival', and was a focus of the 2013 Cardiovascular Disease Outcomes Strategy



Figure 1. Chain of survival, Resus Council UK

At the RBH we have built strong collaborative relationships with the emergency medical services (EMS), emergency department (ED), cardiology and critical care teams; working to ensure the right patients undergo timely angiography and percutaneous intervention (PCI) with subsequent admission to critical care.

Objectives

The aim of this review was to ascertain if survival outcomes following OOHCA, which were previously better than expected at 19.5%, have been maintained.

Methods

- A retrospective chart review of EMS data, ED records, Myocardial ischaemia National Audit Project (MINAP) and Trust coding data from 2018 to 2021.
- 5785 adult patients identified with spontaneous OOHCA in which CPR was commenced or continued by EMS.
- Outcomes for RBH compared to current national statistics and to our previous 2012- 2015 data.
- A chi-squared test to evaluate comparison of proportions was used.

Results

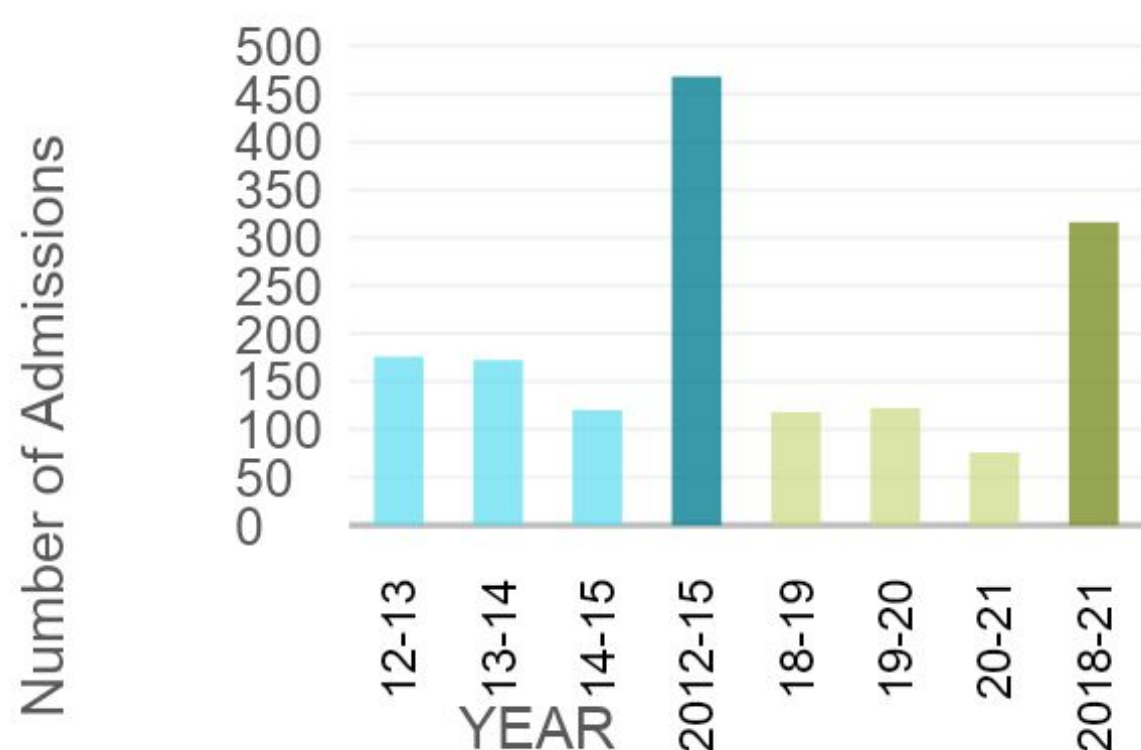


Chart 1. Number of patients transported to RBH with OOHCA

Case numbers:

- Drop in presentations of OOHCA: Annual average 156 (2012-15) vs 105 (2018-21)
- Drop in percentage of OOHCA attended by EMS transported to RBH: 14.4% vs 5.09%

Survival:

- 21.7% survival for RBH vs 9.1% survival for the whole of England (P < 0.0001)
- 21.7% survival for RBH vs 10.0% for SCAS (P < 0.0001)
- 32.6% of patients went to the cathlab compared to 22% in 2012-15 (P = 0.008)
- 51.5% survival to discharge from hospital via cathlab vs 23.1% overall survival (P < 0.001)
- Overall reduction compared to 2012-15 (51.5% vs 62.4%)
- 73.3% survival if admitted direct to cathlab vs 47.7% if admitted via ED (P = 0.068 NS)
- 63.1% (65 patients) underwent PCI vs 38% who had angiography alone
- Non-significant trend towards survival in the PCI group (53.9% vs 47.4% P = 0.5262)

Background

Our 2016 analysis of 3428 patients presenting in-area with OOHCA between October 2012 and May 2015 found:

- Better than expected survival to discharge of 19.5% compared to overall survival in England of 8.4%
- Of those discharged from ED, 32.6% survived to hospital discharge
- 22% of patients went to the cathlab
- 62.4% overall survival irrespective of whether direct admission to the cathlab or via ED, compared to 7.3% survival otherwise (p < 0.001)

A local protocol for OOHCA was established in collaboration with EMS, ED, interventional cardiology and critical care.

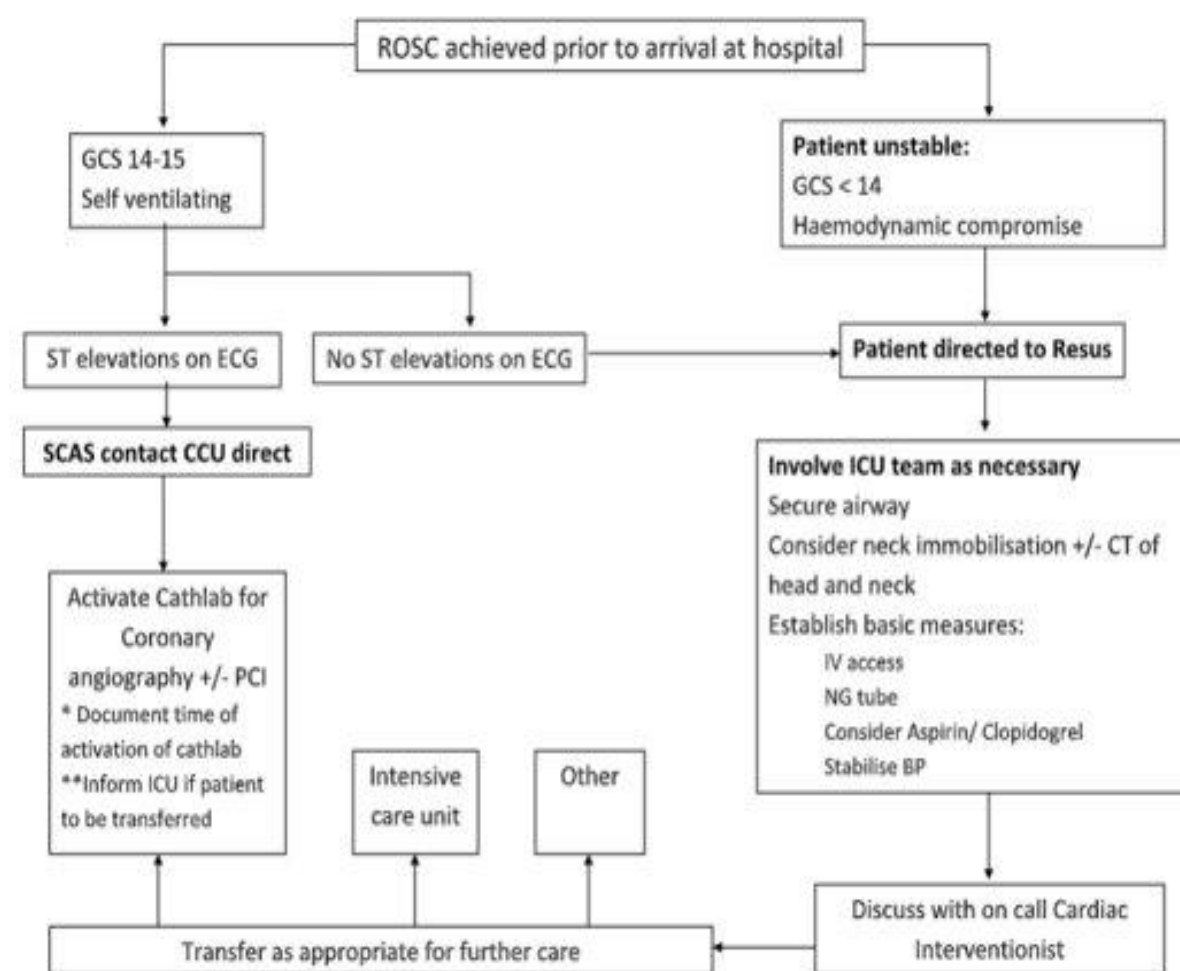


Figure 2. OOHCA SOP, RBH 2016

Results

	OOHCA 2012- '15		OOHCA 2018 – '20			
	Cases	Survival Data	Cases	Survival Data		
	N	%	N	%		
England	79618	6672	8.4	82166	7506	9.1
S. Central Ambulance (SCAS)	3428	595	17.4	5875	614	10.9
Royal Berkshire Hospital (RBH)	493	96	19.5	299	65	21.7

Table 1. Survival to discharge of all patients.

	2012-'15	Survival to discharge		2018-'21	Survival to discharge	
	N	N	%	N	N	%
Direct to cathlab	46	31	67.4	15	11	73.3
ED d/c to cathlab	63	37	58.7	88	42	47.7
Total to cathlab	109	68	62.4	103	53	51.5
ED d/c no cathlab	82	28	34.1	70	20	28.6

Table 2. Survival to discharge in subgroup of patients attending the cathlab

Discussion

- The RBH has maintained its high survival rates for patients following OOHCA
- Patients presenting to RBH with OOHCA have a higher chance of receiving coronary intervention since the introduction of our triage protocol, however this has not translated into increased survival to discharge.
- Patients that are appropriate for coronary intervention have a 5-fold increase in survival to discharge.
- The need for stabilisation in ED prior to coronary intervention and any delay this produces does not confer a statistically significant reduction in survival.

Conclusions

- Patients who survive to the Cathlab are a self-selecting group who, with current care have the best chance of survival
- This protocol is only one component of good collaborative post-resuscitation care
- This review did not take into consideration morbidity data which would be an important follow-up piece of work

The authors declare no conflicts of interest

References

- Cardiovascular disease outcomes strategy (DoH 2013)
- MedCalc Software Ltd. Comparison of proportions calculator. https://www.medcalc.org/calc/comparison_of_proportions.php (Version 20; accessed May 28, 2021)
- G.D. Perkins, et al., European Resuscitation Council Guidelines 2021: Executive summary, Resuscitation (2021), <https://doi.org/10.1016/j.resuscitation.2021.02.003>
- Out of Hospital Cardiac Arrest Outcomes Registry. www.warwick.ac.uk/go/ohcao
- G.D. Perkins, et al., (2021) *Epidemiology of cardiac arrest Guidelines*. From <https://www.resus.org.uk/library/2021-resuscitation-guidelines/epidemiology-cardiac-arrest-guidelines#references>
- Statistics (2019). *Statistics» A&E Attendances and Emergency Admissions*. [online] England.nhs.uk. Available at: <https://www.england.nhs.uk/statistics/statistical-work-areas/ae-waiting-times-and-activity/>.
- Johnson, S., Horne, S., Realey, T., Keating, L. and Orr, W. (2016). 106 Cardiovascular Disease Outcomes Strategy Drives Improved Survival for Patients with Out-of-hospital Cardiac Arrest. *Heart*, 102(Suppl 6), pp.A75–A76.