ORIGINAL ARTICLE

Arrest Outcome Consortium Registry Analysis [AOCRA 2022]: Outcome Statistics of Cardiac Arrest in Tertiary Care Hospitals in India, Analysis of Five Year Data of Indian Online Cardiac Arrest Registry, www.aocregistry.com

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Abstract

Aim and background: To publish data with outcome statistics from our online cardiac arrest (CA) outcome consortium (AOC) online registry.

Materials and methods: Data on cardiac arrest (CA) from tertiary care hospitals were collected on the AOC registry online portal from January 2017 to May 2022. Survival endpoints from cardiac arrest events like ROSC, and survival at hospital discharge with neurological status at discharge were analyzed and presented. Studies of demographics, the association of outcome with age, gender, bystander CPR, low and no flow times, and admission lactate were also done along with suitable statistical analysis.

Results: Out of 2,235 CA, 2,121 received CPR (1,998 IHCA, 123 Out of hospital Cardiac Arrest (OHCA)) as 114 were DNR. The males-female ratio was 70:30. Average age at arrest was 58.7 years. 26% OHCA received bystander CPR but survival advantage was not significant. (with 16%, without 14% $p = 0.78$). Asystole (67.7%), Pulseless Electrical Activity (PEA) (25.6%), and VF/pVT (6.7%) as first rhythm significantly influence survival (4.9, 8.6 and 39.4%: $p < 0.001$) ROSC was achieved in 355 (16.7%), with 173 (8.2%) alive and 141 (6.6%) having good (CPC ≤ 2) neurological state at discharge. At discharge, survival as well as CPC ≤ 2 outcomes were significantly better in females. On multivariate regression analysis, first rhythm and low flow time influence survival at discharge. Admission lactate (available only in 102 OHCA) was lower in survivors than non-survivors 10.3 vs 11.5 mmol/L but the difference was not statistically significant ($p = 0.397$].

Conclusion: Data from our AOC registry shows poor overall survival from CA. The Female gender had a higher survival rate. Ventricular Fibrillation/Pulseless Ventricular Tachycardia (VF/pVT) as first rhythm and low flow time influence the survival to discharge (CTRI/2022/11/047140).

Keywords: Cardiac arrest, Cardiopulmonary resuscitation, In-hospital cardiac arrest, Online registry, Out-of-hospital cardiac arrest, Restoration of spontaneous circulation, Survival to discharge.

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Highlights

Arrest Outcome Consortium (AOC) is an online cardiac arrest (CA) registry from India with real-time data analysis capabilities.

AOC RA 2022 study is the first publication from the registry with survival statistics.

AOC registry has the potential to evolve as a large databank for research, which can form the basis for future Indian Cardio Pulmonary Resuscitation (CPR) guidelines as well as public health management.

Introduction

Sudden cardiac arrest (CA) accounts for 15–20% of all the deaths in the general population and timely CPR improves survival by three to four times.[1–5] We found nineteen studies reporting CA outcomes from India. The data were heterogeneous as most of them were from single-center studies and only one was from a multi-centric study.[6–20] Most of the studies were focused on In hospital code blue calls for CA (IHCA and Out of hospital Cardiac Arrest (OHCA)).[9,10,13,18] Few of them were covered out-of-hospital CA only (OHCA).[17,19] Two studies had included non-ICU-non OT patients and one study analyzed cardiac arrests of Medical ICU patients only.[9,10,16]

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Few studies published data from a single department, for example, the emergency department.[14,17] Cut-off age for inclusion varies between studies (from 12 to 18 years) and few included code blue calls from all the age groups. Most studies did not clarify on existence or implementation of the "DNR-Do not resuscitate" protocol in the institute. Patients left or discharged against medical advice (LAMA or DAMA) are either excluded or presumed to be dead in analysis. The time of CA in OHCA, often not noted by anyone and even if recalled, is inaccurate at its best. Therefore, no flow time elapsed before the beginning of CPR is often underestimated. These aspects are missing from most of the studies published to date from India.

Details of the level of training of the code blue team members, uniformity in documentation, code team response time and quality control of the CPR process are missing from most studies.

To have meaningful analysis we have to standardize the processes, right from the training of rescuers, method of resuscitation, uniform documentation, data pooling, and periodic audit of the data so collected. In, Indian resuscitation guidelines published in 2017, authors expressed "A major challenge was a lack of Indian CPR data and publications" Dr. Trichur from Chennai wrote on the dire need for Indian Data and called for an Indian CA Registry.[21,22]

To address this deficiency of a reliable database of CA, we created the "Arrest Outcome Consortium" in 2017. After initial teething troubles with software at our center, we enrolled NABH-accredited institutes to contribute their data on the www.aocregistry.com portal. Once we crossed the 2000 mark in our data collection on the AOC registry platform in 2022, we decided to publish our data.

Materials and Methods

To maintain standardization we started by adopting glossary and definition from Utstein guidelines on reporting CA. Each hospital enrolling data on the AOC registry ensured the following aspects. (1) Institutional ethics committee approval or permission from the hospital administrator in the form of a memorandum of understanding (MOU) with the AOC Registry Team; (2) Hospital has structured cardiac arrest management protocol (described in Table 1), with quality control as per NABH standards; (3) Data is collected in a standardized format called "AOC form A", designed as per international "Utstein template" for reporting cardiac arrests. Arrest Outcome Consortium (AOC) portal generated a unique identifier for each data at the time of entry on a portal to ensure the privacy of patients and rescuers (de-identification at source). Arrest Outcome Consortium portal is designed to accept data only after all the fields are filled, thus ensuring only completed datasets reach the analysis stage. The portal, then process the data and real-time displays graphs of descriptive analysis, which are downloaded and displayed in the manuscript. Multicenter data from January 2017 to May 2022 were collected, analyzed and published here. Different tertiary care hospitals joined AOC registry at different point in time and started feeding data and included accordingly. This study is approved by Institutional ethics Committee and registered as multi-centric observational study of CPR registry analysis with Clinical Trial Registry of India (CTRI no: CTRI/2022/11/047140).

Inclusion Criteria

All the adults and adolescents (Age >12 years) who suffered cardiac arrest (irrespective of activation of code blue or not) are taken into study.

Exclusion Criteria

Any patient who did not receive CPR due to "DNR-Do not resuscitate order" or obviously dead on arrival to hospital are labelled accordingly and excluded from outcome analysis. Code blue calls without cardiac arrest are labeled "false or non-arrest codes" and excluded from the study.

Table 1: Standards for hospitals to be AOC registry member

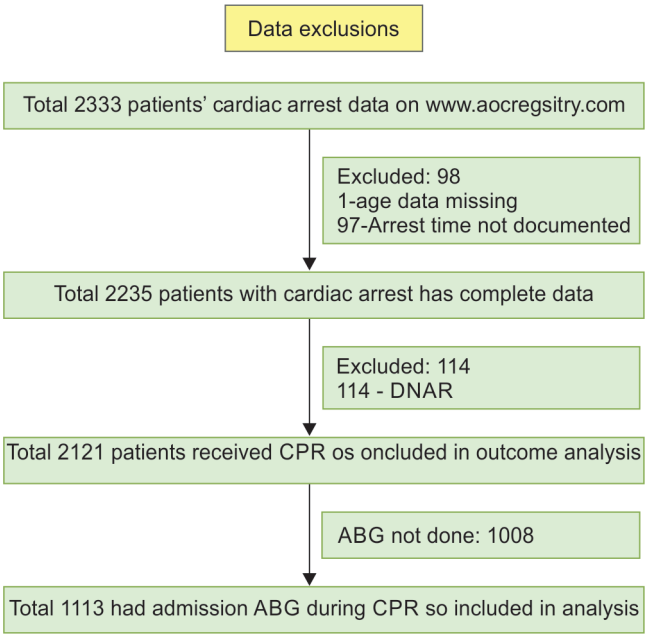
S.No	*Standards for hospitals to be AOC registry member*
1	Have NABH accreditation or at least fulfill its standards for CPR. • Have CPR policy [including DNR, BLS, ACLS and post arrest care protocols including TTM] • Have Code Blue system • Have Code form and its Registry • Have Code Blue Committee and its periodic meetings • Documented Corrective Action Preventive Actions
2	Periodic training of doctors, nursing and other support staff in BLS and code team in ACLS, including hands on sessions with its documentation
3	Code conducted by ACLS trained doctor who ensures quality of BLS and ACLS and its documentation and endorses the form
4	Code committee supervise the outcome of CPR and have documented CAPA exercise
5	Institutional Ethics Committee approves the participation and conduct in this registry and permits publication thereof
6	Institute appoints site coordinator to liaise with registry office
7	Standardize documentation in a CPR form having all the components of AOC format A
8	AOC Representative supervise the following: • Code entry is factual and complete • Long term follow up reminders attended • Upload AOC forms online • Preserve AOC forms in institute • In regular communication as needed for research and publication from the registry data

Care Hospitals in India, Analysis of Five Year Data of Indian Online Cardiac Arrest Registry, www.aocregistry.com. Indian J Crit Care Med 2023;27(5):322–329.

Source of support: Nil

Conflict of interest: None

Flowchart 1: Data inclusion flowchart



The data were analyzed to study survival from CA and described under subheadings of restoration of spontaneous circulation (ROSC), survival at discharge, and neurological status at the discharge of CA victims from OHCA and IHCA. Other Aspects analyzed were: the effects of various factors like age group, gender, first rhythm, CPR duration, and admission lactate level on the outcome, distribution of CA by locations, bystander CPR rates in OHCA, and neurological outcome at hospital discharge. Good neurological survival is judged by using the cerebral performance category where one and two represent conscious individuals, independent for activities of daily living (ADLs), and normal or limited working abilities respectively. Category three represents conscious individuals who are dependent on ADLs. Category four and five are unconscious individuals with or without the ability to breathe spontaneously respectively. Arrest Outcome Consortium (AOC) portal provides reminders for 6 and 12-month follow up for those patients, who are discharged alive. Results of telephonic follow-ups are included in the study.

Statistical Analysis

Depending upon the level of measurement of each variable and sample size, the researcher deployed two broad categories of tests, which include parametric and nonparametric. When the independent variable was on a categorical scale and the dependent variable on a continuous scale, the independent sample *t*-test or Mann-Whitney *U* test was used. When the independent variable was in the categorical and the dependent variable was in categorical scale, the Chi-square test was used. The confidence limit for all this was considered at 95%. We used multivariate statistics, namely logistic regression analysis in the study. SPSS by IBM was used for statistical analysis.

Results

Data from five tertiary care NABH-accredited hospitals were collected on online the registry portal from January 2017 to May 2022. Over 2,333 cardiac arrest patients were recorded in the study period, but 98 patients were excluded due to incorrect data (Flowchart 1). Out of these 98 exclusions, 67 were OHCA, where zero No flow time was calculated by the portal. This was due to, the time of arrest charted being the same as the time of starting CPR despite the victims were arrested before reaching to the hospital. This happened at one center as they misunderstood the time of arrest as the time of diagnosis of arrest rather than the time since the loss of responsiveness. As factual data on the time of arrest was not available for these 67 arrests, we decided to exclude them from the analysis. Out of 2,235 cardiac arrests (CA) with complete data, 2,121 received CPR, as 114 were DNR or obviously dead and therefore excluded from the study. Out of 2,121 patients who received CPR, 1,998 were IHCA and 123 were OHCA in the study population.

Table 2: Association of age and survival

AOC RA 2020	*Total*	*Died*	*Survived [% of Total]*	*Survived (discharged CPC ≤2] [% of total]*
Age group		Age <12 years excluded from Registry		
12–20	47	41	6 [12.7%]	6 [12.7%]
21–30	110	100	10 [9.0%]	9 [8.2%]
31–40	160	151	9 [5.6%]	8 [5.0%]
41–50	269	248	21 [7.8%]	16 [5.9%]
51–60	452	419	33 [7.3%]	26 [5.8%]
61–70	545	492	53 [9.7%]	45 [8.3%]
71–80	380	350	3o [7.9%]	21 [5.5%]
81–90	138	128	10 [7.25%]	9 [6.5%]
91–100	20	19	1 [5.0%]	1 [5·0%]
Total	2121	1948	173 [8.2%]	141 [6.6%]
p-value			0.697	0.595

Age and Gender

Average age of cardiac arrest victims was 58.7 years, with marginally higher in males (59.1 years) as compared to females (57.9 years). Survival at discharge and good neurological outcome (CPC = 2 or less) was higher in females (10.3 and 9.0% respectively) than in Males (7.2 and 5.6% respectively). This difference was noted to be statistically significant with *p*-value < 0.001 for Survival at discharge and 0.004 for good neurological outcome at discharge respectively (Table 2).

Maximum arrests were in the 6th decade (61 to 70 years) (25.7% of total). Maximum survival occurs for arrests in the second decade 12–20 years (12.7%) with the good neurological outcome (CPC ≤2) (12.7%). However, we found no association between age and survival among cardiac arrest victims in our dataset.

Location

Out of 2,121 CA, 1,998 (94.2 %) were IHCA and the rest 123 (5.8 %) were OHCA. Out of 1,998 IHCA, 1,712 (85.7 %) were in ICU, 118 (5, 9%) in ward, and 108 (5.4%) in ER. The great majority of OHCA occurred at Home 87 (70.7%) and only 20 (16.2 %) in public places.

Bystander CPR

Bystander CPR rate among OHCA was 26 % (32 out of 123) but only 5 victims survived till discharge and one had the good neurological outcome. Rest 91 persons with OHCA, received CPR only after reaching a hospital. A positive effect of bystander CPR on an outcome is seen (16% vs 14%) but the difference in outcome failed to reach a statistical significance level ($p = 0.78$) possibly due to a small sample size. Automated external defibrillator (AED) was never used in CPR at any location.

Table 3: Demographics and survival statistics of AOC Database

Parameter	*No./Total [%]*	*p-value*
Total patients with cardiac arrest	2121	
Total	1998/2121 [94.2%]	
OHCA	123/2121 [5.8%]	
IHCA		
Gender	1491/2121 [70%]	
Male	630/2121 [30%]	
Female		
Average age	58.7 years	
Total	59.1 years	
Male	57.9 years	
Female		
Survived to hospital discharge	173/2121 [8.2%]	$p < 0.001$
Total	108/1491 [7.2%]	
Male	65/630 [10.3%]	
Female		
Neurologically good survival	141/2121 [6.6%]	$p = 0.004$
[CPC ≤ 2] at discharge	84/1491 [5.6%]	
Total	57/630 [9.0%]	
Male		
Female		
Outcome of CPR	355/2121 [16.7%]	
ROSC	173/2121 [8.2%]	
Survived to hospital discharge	141/2121 [6.6%]	
Survived with CPC ≤ 2		
First Rhythm	142/2121 [6.7%]	
VF/pVT	1435/2121 [67.6%]	
Asystole	544/2121 [25.8%]	
PEA		
First rhythm and survival to	56/142 [39.4%]	$p < 0.001$
discharge	70/1435 [4.9%]	
VF/pVT	47/544 [8.6%]	
Asystole		
PEA		
First Rhythm and survival with	45/142 [31.7%]	$p = 0.24$
CPC ≤ 2	54 /1435 [3.7%]	
VF/pVT	42/544 [7.7 %]	
Asystole		
PEA		

Table 4: Demographics and survival statistics of OHCA database

OHCA Parameter	*No./Total [%]*	*p-value*
Total OHCA Patients	123/2121 [5.8%]	
Male	83/123 [67.5%]	
Female	40/123 [32.5%]	
Location of Arrest	87 [70.7%]	
Home	20 [16.2%]	
Road	16 [13.0%]	
Other		
Survived to Hospital discharge	18/123 [14.6 %]	
Total	12/83 [9.8 %]	
Male	6/40 [15.0 %]	
Female		
Neurologically good survival [CPC ≤ 2]	7/123 [5.7%]	
at discharge	4/83 [4.8%]	
Total	3/40 [7.5 %]	
Male		
Female		
Outcome of CPR	44/123 [35.8%]	
ROSC	18/123 [14.6%]	
Survived to hospital discharge	7/123 [5.7%]	
Survived with CPC≤2		
Bystander CPR	31/123 [25.2%]	
Bystander CPR	25/31 [77.5%]	
Chest compression only	6/31 [22.5%]	
CC-ventilation	92/123 [74.8%]	
No bystander CPR	78/92 [84.8%]	
No Bystander CPR	14/92 [15.2%]	
No information on Bystan. CPR		
AED use	0/123 [0%]	
AED use		
Survival to discharge and its relation to	18/123 [14.6%]	$p = 0.78$
Bystander CPR	5/31 [16%]	
Total	13/92 [14%]	
with Bystander CPR		
without Bystander CPR		
Survival to discharge with CPC ≤ 2	7/123 [5.7%]	$p = 0.49$
and its relation to Bystander CPR	1/31 [3%]	
Total	6/92 [6%]	
with Bystander CPR		
without Bystander CPR		
First Rhythm	15/123 [12.2%]	
VF/pVT	95/123 [77.2%]	
Asystole	13/123 [10.6%]	
PEA		
First rhythm and survival to discharge	8/15 [53.3%]	$p < 0.001$
VF/pVT	9/95 [9.5%]	
Asystole	1/13 [7.7%]	
PEA		
First Rhythm and survival with CPC ≤ 2	3/15 [20.0%]	
VF/pVT	3/95 [3.1%]	
Asystole	1/13 [7.7%]	
PEA		

Outcome

Return of spontaneous circulation (ROSC) rates in the overall dataset, OHCA, and IHCA were 16.7, 35.8, and 15.6% respectively. Overall survival at discharge was 8.2% (173 out of 2,121), out of which 81.5% (141 out of 173) patients had good (CPC ≤ 2) neurological survival. Out of hospital Cardiac Arrest (OHCA) and IHCA survival at discharge were 7.7% and 14.6% respectively. Survival at discharge with good neurological (CPC ≤ 2) in OHCA and IHCA was 5.7% (7 out of 123) and 6.7% (134 out of 1,998) respectively (Table 3).

First Rhythm

Asystole was the most common first rhythm in 1,435 (67.6%) arrests followed by 544 (25.8%) PEA and 142 (6.7%) VF/pVT. Survival at discharge and with good neurological survival were highest among arrests with VF/pVT as first rhythm (39.4 % and 31.7%). This pattern of survival was similar in arrests of both locations, OHCA and IHCA (Tables 4 and 5). Percentage survivors with CPC ≤2 with first rhythm as VF/pVT, PEA, and asystole were 31.7, 7.7, and 3.7% respectively. VT/pVF as first rhythm has statistically significant more survival to discharge than the other two rhythms ($p < 0.01$) and better neurological outcome as well ($p = 0.24$).

Admission Lactate and Outcome in OHCA

Out of 123 OHCA patients, admission lactate was available in only 102 patients. Average admission Lactate levels were higher

Table 5: Demographics and survival statistics of IHCA Database

IHCA Parameter		*No./Total [%]*	*p-value*
Total IHCA Patients		1998/2121 [94.2%]	
Gender vise IHCA	Male	1408/1998 [70.5%]	
	Female	590/998 [29.5%]	
Survived to Hospital discharge	Total	155/1998 [7.7%]	
	Male	96/1408 [6.8%]	
	Female	59/590 [10%]	
Neurologically good survival [CPC ≤ 2] at discharge	Total	134/1998 [6.7%]	
	Male	80/1408 [5.7%]	
	Female	54/590 [9.2%]	
Outcome of CPR	ROSC	311/1998 [15.5%]	
	Survived to hospital discharge	155/1998 [7.7%]	
	Survived with CPC ≤ 2	134/1998 [6.7%]	
First Rhythm	VF/pVT	127/1998 [6.3%]	
	Asystole	1340/1998 [67.1%]	
	PEA	531/1998 [26.6%]	
First Rhythm and survival to Discharge	VF/pVT	48/127 [37.8%]	$p < 0.001$
	Asystole	61/1340 [4.6%]	
	PEA	46/531 [8.7%]	
First Rhythm and survival with CPC ≤ 2	VF/pVT	42/127 [33.1%]	
	Asystole	51/1340 [3.8%]	
	PEA	41/531 [7.7%]	
Average Admission Lactate level	Survived [mmol/L]	10.3	$p = 0.397$
	Died [mmol/L]	11.5	
Location of arrest	Cath-lab	32/1998 [1.6%]	
	ER	108/1998 [5.4%]	
	ICU	1712/1998 [85.7%]	
	OPD	6/1998 [0.3%]	
	OT	3/1998 [0.1%]	
	OTHER	19/1998 [9.5%]	
	Ward	118/1998 [5.9%]	
Location of arrest and survival at discharge	Cath-lab	18/32 [56.2%]	
	ER	17/108 [15.7%]	
	ICU	83/1712 [4.8%]	
	OPD	3/6 [50%]	
	OT	1/3 [33.3%]	
	OTHER	8/19 [42.1%]	
	Ward	25/118 [21.2%]	
Location of arrest and survival at discharge with CPC ≤ 2	Cath-lab	18/32 [56.2%]	
	ER	15/108 [13.9%]	
	ICU	73/1712 [4.3%]	
	OPD	3/6 [50%]	
	OT	0/3 [0.0%]	
	OTHER	8/19 [42.1%]	
	Ward	18/118 [15.3%]	

in nonsurvivors (11.5 mmol/L) than survivors (10.3 mmol/L), but the difference did not reach statistical significance. Data of OHCA patients do not show the correlation between no flow time and admission lactate level (Pearson correlation *R*-value 0.083 *p*-value 0.404) (Table 6).

Multivariate Logistic Regression

Analysis of variables influencing Survival was done. In overall data, first rhythm and low flow time influence survival but age and gender do not. In OHCA, No flow time, First Rhythm influence the survival but admission lactate, age or gender do not. In IHCA, first Rhythm and Low flow time influence survival but age and gender do not.

No Flow Time in OHCA Patients (Aarrest Time)

Median arrest time before CPR could be started was 14 minutes Average 25 min (range 0 to 140 min) (See Table 6).

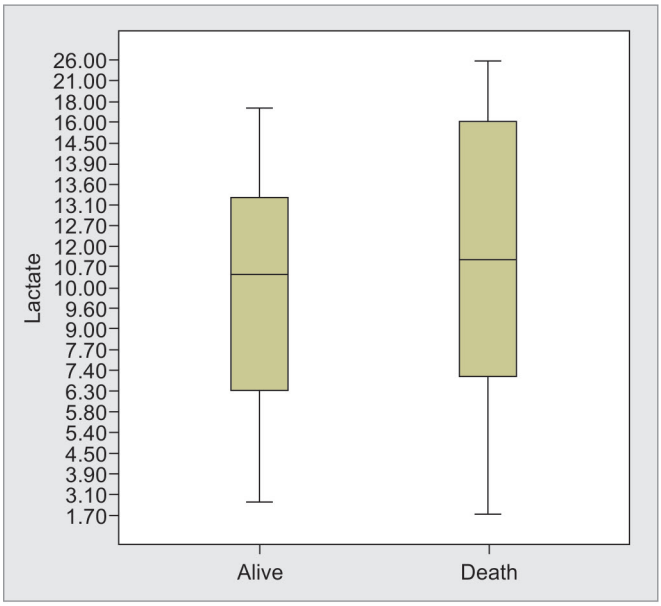
Low Flow Time (CPR Time)

Median duration of CPR was 30 minutes (range from 1 to 229) and averaged 33.8 minutes. Low flow time amongst survivors' median 10 minutes (average 14.2 minutes, range from 1 to 170 min) is much lower than non-survivors' median 30 minutes (averaged 35.5 minutes range from 1 to 229 min). When OHCA data were plotted on the scatter diagram, no survival was noted once the no flow time exceeds 40 minutes and survival seems unlikely if the low flow time exceeds 60 minutes (except one outlier) (Figs 1 and 2).

Table 6: No flow and low flow time and survival statistics

No flow time = Duration of cardiac arrest before CPR				
No flow time	Median	Average		Range
OHCA - Average	14 min	25 min		(0 min to 140 min)
IHCA	Not applicable	Not Applicable		Not applicable
Low flow time = Duration of CPR				
Low flow time	Median	Average		Range
IHCA	30 min	33.43 min		1 min to 229 min
OHCA	30 min	40.17 min		1 min to 215 min
IHCA+OHCA	30 min	33.82 min		1 min to 229 min
Low flow time in minutes	All patients	Survivors at discharge	Non-survivors	*p*-value
Median	30 min	10 min	30 min	$p < 0.001$
Average	33.8 min	14.2 min	35.5 min	
Range	1–229 min	1–170 min	1–229 min	

Admission s. LACTATE And Outcome at discharge in OHCA



	Died	Survived	*p*-value
Data of 102 of 123 available	85	17	
S lactate average	11.5 mmol/L	10.3 mmol/L	0.397

There was no association found between admission lactate and survival in our data

Fig. 1: Association between Admission Lactate and Survival

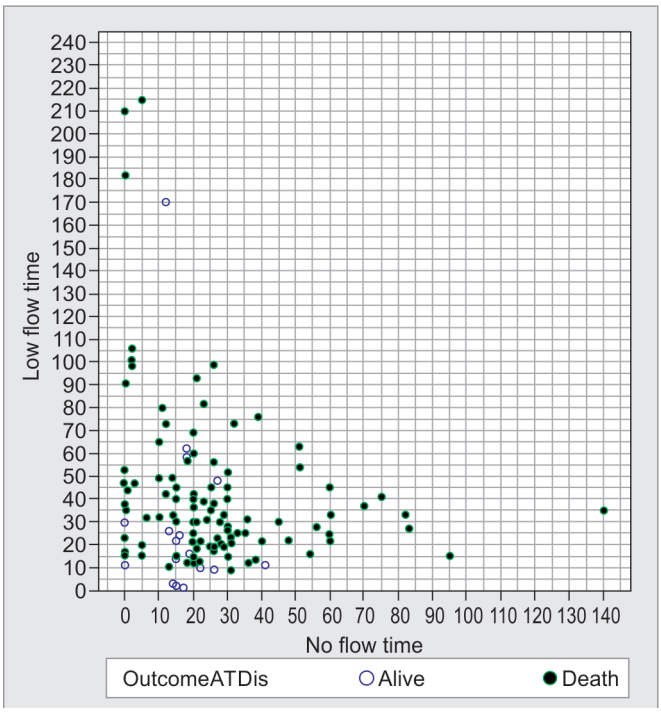


Fig. 2: No flow, low flow, and survival

Long-Term Follow-up of Survivors

Out of 173 survivors who were discharged alive, 35 victims were alive for 6 months and among them, 32 were alive till 12 months follow up. About 80 patients' data were not available as they were yet to complete 6 and 12 months or are lost to follow-up at the time of preparing this manuscript.

Discussion

Uniform documentation and analysis as per Utstein guidelines published in 2004 for CPR registries, is followed in this documentation.[23] All the cardiac arrests of the hospital were accounted for and outcomes analyzed.

The average age in this study is 58.7 years which is comparable to another study from India published in 1999 (58 years) and lower than in studies from the western world (66 years).[7,26–28]

The bystander CPR rate of our data showed 26% but the fidelity of this information remains open for scrutiny as the majority of OHCA patients are brought by family members and the reliability of their quality of CPR is doubtful. Three Indian studies reported these rates which are 4.4, 7.4, and 1.3 %, which remains substantially lower than Western world like 51.1% in Sweden, 48% Stockholm, UK and 80.6% in Denmark emphasizing the dire need for public awareness and training in Basic Life Support sciences in our country.[7,14,17,29–31] As no OHCA patient received analysis by AED, the first rhythm could be recorded only after arrival at hospital. Suboptimal pre-hospital resuscitation measures (diagnosis and treatment) may account for high non-shockable rhythm, especially asystole (95 out of 123, 77.2%) among OHCA patients at the time of arrival to the hospital. In this study, OHCA patients had non-shockable first rhythm in 87.8

% (108 out of 123) of cases which concurrent with Western literature, where 81% arrest had PEA or Asystole as the first rhythm.[27]

Overall survival to hospital discharge rates 16.2%, was 14.2% in study from Chennai.[7] Survival at hospital discharge is 14.6% OHCA, which range from 3.3 to 8.8 % in Indian studies and better than 10.8% of CARES (cardiac arrest registry to enhance survival) database.[7,17,19,27]

Survival from IHCA was not that promising as the majority of patients are from ICU with PEA as pre-terminal rhythm. In this study, 7.7% of patients with IHCA survived while this rate in other Indian studies ranges from 6.9 to 27.5%.[11,12,15,20] Though it appears much lower than Western world, for example, get with the guideline registry 2016 (26.4% IHCA), the comparison depends upon case mix in the hospital, which varies widely from hospital to hospital.[27] Due to limited data, comment on admission lactate and its association with survival could not be made. Arterial vs venous, timing of sample collection after a few CPR cycles, and sampling errors are confounding variables that need to be accounted for before any conclusion can be made. It is well known that the longer the no flow time and the longer the CPR duration (Low flow time) less the survival.[32] Information like no survival after 40 minutes of no flow time and 60 minutes of low flow time in the future will help us to know the limits of the futility of resuscitative efforts in our temperate climate and will help to create evidence-based Termination of Resuscitation (TOR) rules for our country.

Being first of it's a kind online registry of cardiac arrest we face many teething troubles which we overcome gradually as participating units get used to document and upload on an online portal. However, we want to acknowledge a few major limitations of these data at present as follows: (1) Date base is Retrospective with its limitations. Though the registry was commenced in January 2017 with single center data, more CPR data were added as new centers joined later on. Thus, the total number of datasets seems less than what is expected from the sum total of complete data from 5 tertiary care institutes over 5 years. (2) Very few OHCA data, as many OHCA go to government institutes and all units on AOC registry as private institutes. (3) Nomenclature conflict: OHCA named IHCA as arrest diagnosed on arrival to the hospital. This had misclassified 67 datasets from one unit which required corrective actions. (4) As arrest time is unknown in 'brought arrested' patients of OHCA. Staffs tends to enter guesstimates. We found as "Zero" no flow time in 67 patients of OHCA and required it to be deleted. This could have limited the inference of no flow time-based conclusions. (5) Incomplete entries were mostly OHCA and so the proportion of OHCA in the total database appears small. (6) Low flow time (CPR duration) was noted "Zero" in 30 patients, so these data were excluded. This had an effect on average low flow time. Later on, this was traced on a software glitch and rectified. Large countries like India desperately need cardiac arrest registries and the AOC registry has the potential to become the holy grail of research once its database expands with its widespread acceptance by large a number of hospitals.

Conclusion

A cardiac arrest registry like AOC can create much needed large-scale database in India. Our five hospital data over five years has made us believe that it is possible to pool data from various institutes spread over wide geographical locations with the use of an online portals like www.aocregistry.com. It has the potential for evolving into a large database on cardiac arrest, which can not only be used for research, and health care planning [allocating CPR training hours in curricula, simulation centers, AED placements, etc.] but also to bring a wave of standardized treatment and documentation of CPR. Female Gender, VF/pVT as the first rhythm is associated with a better outcome. We will be able to conclude on various observations, like the effect of bystander CPR, admission lactate, and no flow-low flow time, once the database is large. Once the registry is large and proves its potential, government authorities can embody such registry data into their essential national healthcare information.

Glossary of Short Forms Used in the Article

CA-Cardiac arrest, OHCA-Out of hospital Cardiac Arrest, IHCA-In Hospital Cardiac Arrest, CPR-Cardio Pulmonary Resuscitation, DNR-Do Not Resuscitate, CPC-Cerebral Performance Category, PEA-Pulseless Electrical Activity, VF/pVT-Ventricular Fibrillation/ Pulseless Ventricular Tachycardia, ICU-Intensive Care Unit, OT-Operation Theater, OPD-Out Patient Department, NABH-National Accreditation Board for Hospitals and Health care institutions, ER-Emergency Department, AED-Automated External Defibrillator, BLS-Basic Life Support, ACLS-Advanced Cardiac Life Support, TTM-Targeted Temperature Management.

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