Impact of bystander early CPR on Out of Hospital ROSC Outcome

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Purpose of the study: early cardiopulmonary resuscitation (CPR) improves survival in out-of-hospital cardiac arrest; dispatcher-delivered CPR instructions can increase the number of victims receiving CPR before Emergency Medical Service (EMS) arrival. However, little is known about the impact of CPR phone instructions on the outcome of patients (pts) with return of spontaneous circulation (ROSC). The target of this study is to investigate the impact of phone instructions on short and middle term mortality, and on neurological outcomes of patients who survived.

Materials and Methods: we enrolled pts admitted to ICU after ROSC following out-of-hospital-cardiac-arrest, since 1/1/2008 to 30/06/2016; pts younger than 18, in-hospital cardiac-arrest-victims, those who underwent cardiac arrest in health facilities, and missing data records were excluded. Written informed consensus was obtained for all pts contacted for follow up. Data about comorbidity, mortality, neurologic outcome, CPR timing according to Utstein Style, complications during ICU stay, metabolic state on ER admission, were collected. Study population was divided into groups: pts ongoing immediate CPR and those who did not underwent immediate CPR by laic bystanders; immediate CPR pts were divided into Phone Instructions CPR and No-phone instructions CPR. Data were extracted from ICU and EMS databases, EMS phone calls registration, and processed using STATA software.

Results: 181 pts met study criteria. Laic bystander CPR was given in 55 cases, 30% of the study population. Phone CPR was given in 9 of these cases (16%) (Results are summarized in tables 1,2)

Variable	No Early CPR	Early CPR	p-Value
Age (years)	63 ± 16	61 ± 17	0,363
Male Sex (%)	63,63	69,84	0,488
Charlson Comorbidity Index	3,0 ± 2,60	2,32 ± 1,81	0,505
Cardiac Arrest-CPR interval (min)	11,57±7,76	5,62±4,75	<0,0001
Cardiac Arrest-ROSC interval (min)	30,11±13,37	24,30±9,53	0,0456
Shockable Rhythm on ALS arrival (%)	77,7	59,6	0,0249
Coronary Occlusion (%)	35,71	48,10	0,248
Coronary Reperfusion (%)	86,11	88,23	1,000
pH on ER admission	7,09±0,30	7,17±0,21	0,061
K ⁺ on ER admission (mmol/l)	3,91±0,92	3,65±0,60	0,055
Lactates (mmol/l)	7,16±3,91	7,26±6,75	0,894
Base Excess	-11,90±5,84	-10,49±6,25	0,146
Length of stay in ICU (days)	7,68±6,94	6,16±4,51	0,137
Days of Mechanical Ventilation	5,86±5,85	4,23±3,35	0,0554
Ventilator Associated Pneumonia (%)	43,63	40,47	0,743
Fever in the first 72h (%)	66,07	69,57	0,713
High Dose Vasoactive Agents (%)	59,78	67,65	0,536
ICU mortality (%)	39,68	23,63	0,0424
1 year after Cardiac Arrest Mortality (%)	56,34	38,18	0,0351
Good Recovery after 1 year (%)	60,71	91,66	0,0003
Severe Disability after 1 year (%)	11,9	7,41	0,696
Vegetative State after 1 year (%)	9,52	7,41	1,000

Variable	No Phone-CPR	Phone-CPR	p-Value
Age (years)	62±16	56±19	0,326
Male Sex (%)	66	63	1,000
Charlson Comorbidity Index	2,43±1,80	1,77±1,85	0,325
Cardiac Arrest-CPR interval (min)	5,75±5,06	5±2,78	0,667
Cardiac Arrest-ROSC interval (min)	24,66±9,48	22,8±9,50	0,702
Shockable Rhythm on ALS arrival (%)	75,5	88,8	0,665
Coronary Occlusion (%)	34,29	43,88	0,685
Coronary Reperfusion (%)	100	85,71	1,000
pH on ER admission	7,16±0,22	7,20±0,12	0,611
K ⁺ on ER admission (mmol/l)	3,69±0,61	3,46±0,51	0,300
Lactates (mmol/l)	7,02±4,50	8,52±13,87	0,546
Base Excess	-10,85±6,40	-8,67±5,43	0,344
Length of stay in ICU (days)	6,17±4,68	6,11±3,75	0,97
Days of Mechanical Ventilation	4,04±3,2	5,22±4,08	0,339
Ventilator Associated Pneumonia	45,6	33,3	0,504
Fever in the first 72h (%)	71,8	57,1	0,449
High Dose Vasoactive Agents (%)	69	60	1,000
ICU mortality (%)	23,92	22,22	1,000
1 year after Cardiac Arrest Mortality (%)	16,6	21,4	1,000
Good Recovery after 1 year (%)	88,8	92,3	1,000
Severe Disability after 1 year (%)	9,52	0	1,00
Vegetative State after 1 year (%)	4,77	16,67	0,402

Conclusions: early CPR significantly reduced CPR-free interval. This correlates with a significative increase in shockable rhythms on EMS arrival. There is a significative reduction in mortality and disability. The fact that early CPR is delivered by trained laics bystanders or by Phone-CPR instructions seems not to affect these findings. Phone-CPR is an effective tool to improve survival and disability in ROSC.