

Investigation of Outcome and Related Factors of Cardio-Pulmonary Resuscitation after In-Hospital Cardiac Arrest in Inpatients: A case study in a Taiwan Teaching Hospital

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Purpose

In-hospital cardiac arrest is a common and high risk patient safety issue in medical institutions. Previous literature has revealed that about 60%-70% of inpatients who suffered a cardiac arrest experienced clinical symptoms and deterioration of vital signs 6-8 hours prior to their arrest but only about 25% are able to be detected by doctors in advance. In fact, through emergency treatment, not only can resuscitation be reduced by 65% but death rates can also be reduced by 26%. In clinical practice, ways to detect signs of possible cardiac arrest early on and predict the outcome of cardio-pulmonary resuscitation (CPR) is an important issue that should not be overlooked. Therefore, the purpose of this study is to investigate the factors influencing the outcome of CPR after in-hospital cardiac arrest in inpatients at this hospital, to serve as a reference for establishing intervention measures in the future, to reduce the incidence of unexpected resuscitations, and to provide prognostic factors for the prognosis of resuscitation to avoid unnecessary first-aid measures which can result in a waste of medical resources, etc., thereby enhancing the quality of medical care.

Methods

This study used a retrospective study design. A total of 361 inpatients who suffered from in-hospital cardiac arrest were recruited as subjects from January 1, 2011~December 31, 2013. Using a structured in-hospital cardiac arrest resuscitation record format (Utstein style), data was collected for statistical analysis by reviewing medical records, including patients' basic information, characteristics of the emergency events, reasons for cardiac arrest and outcomes of CPR.

Results

The incidence of in-hospital cardiac arrest in inpatients was 0.37%. After CPR, 21% could return to spontaneous circulation, the duration of return of spontaneous circulation (ROSC) was more than 24 hours for 16.3% of the patients, and 9.7% survived until discharge. Further analysis found that factors affecting ROSC included female sex, surgery during hospitalization, history of diabetes, patients with an initial rhythm of ventricular fibrillation or pulseless ventricular tachycardia, cardiac arrest due to arrhythmia, and without respiratory failure. The rate of ROSC was high among these patients and results showed statistical differences.

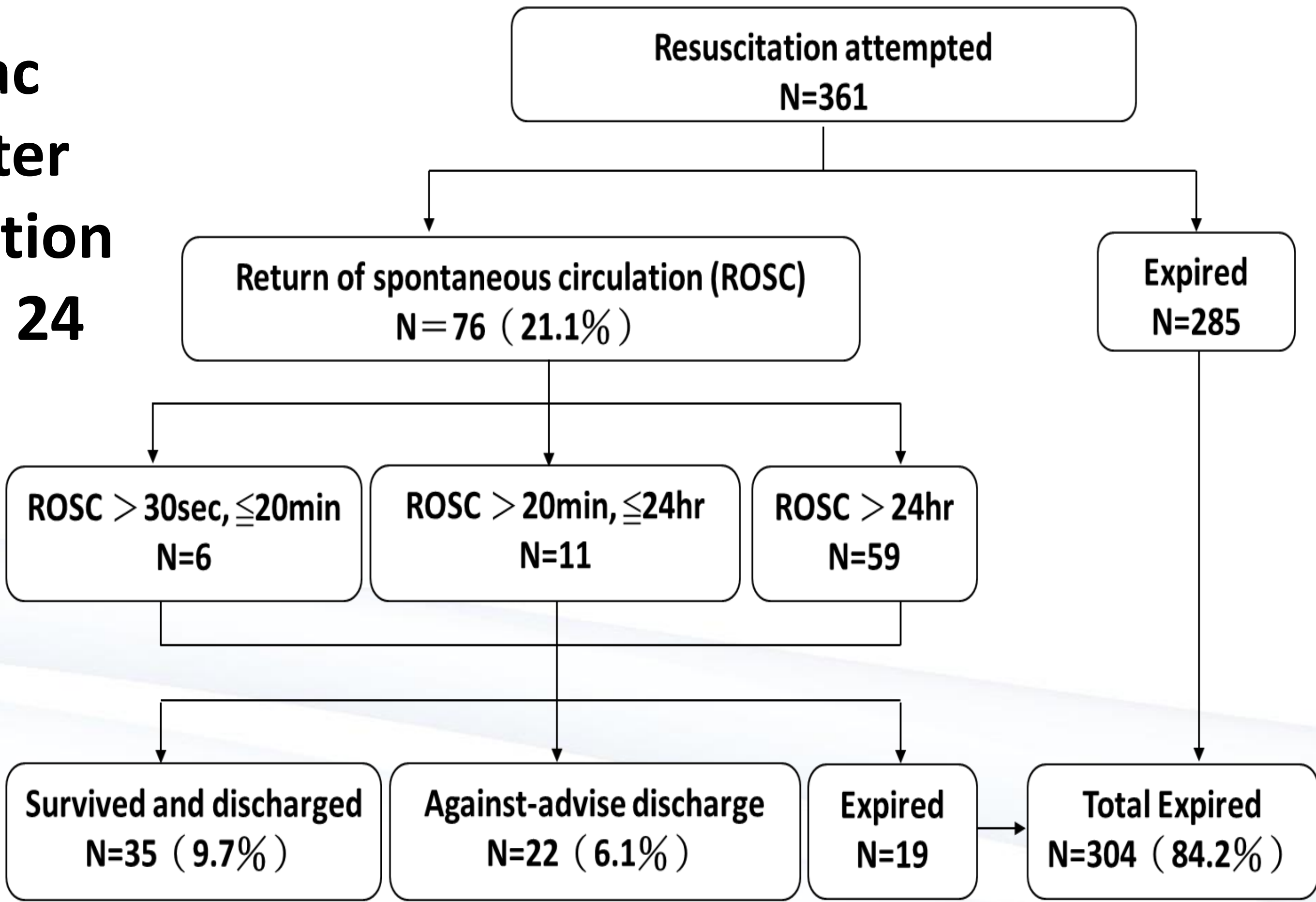


Figure 1. In-hospital cardiac arrest in inpatient after CPR results

Conclusion

This study mainly focuses on inpatients, analyzing the incidence of in-hospital cardiac arrest, to understand the outcomes of CPR in hospitalized patients and to further investigate the related influencing factors. It is recommended that future prospective studies be conducted to provide references for clinical intervention measures and to evaluate whether this hospital's early warning system can reduce the incidence of unexpected resuscitation and prognostic factors for prognosis.

Table 1. Related factors of cardio-pulmonary resuscitation after in-hospital cardiac arrest in inpatients

Variables		Return of spontaneous circulation				χ ²	P-value
		Unsuccessful CPR		Successful CPR			
		n	%	n	%		
Sex	Female	111	73.0	41	27.0	5.538	0.019*
	male	174	83.3	35	16.7		
Age	20-40	14	82.4	3	17.6	0.620	0.892
	41-65	95	79.8	24	20.2		
	66-79	84	80.0	21	20.0		
	≥ 80	92	76.7	28	23.3		
Undergo surgery		18	64.3	10	35.7	3.926	0.048*
Admission department	medical department	213	80.1	53	19.9	0.929	0.629
	surgical department	70	76.1	22	23.9		
	Gynecology	2	66.7	1	33.3		
Past history	Diabetes	96	73.3	35	26.7	3.970	0.046*
	Hypertension	151	78.6	41	21.4	0.022	0.881
	Heart disease	114	76.5	35	23.5	0.907	0.341
	Cancer	35	79.5	9	20.5	0.011	0.917
	Stroke	44	86.3	7	13.7	1.918	0.166
	Chronic Obstructive	8	66.7	4	33.3	1.126	0.289
	Asthma	18	90.0	2	10.0	1.556	0.212
	Liver Disease	9	90.0	1	10.0	0.756	0.695
Bedridden		86	79.6	22	20.4	0.043	0.835
Critical		216	80.6	52	19.4	1.703	0.192
Happened on holiday		85	81.0	20	22.1	0.358	0.550
Location of the incident	Medical intensive care unit	127	79.4	33	20.6	7.656	0.176
	Surgical intensive care unit	75	76.5	23	23.5		
	General ward	76	82.6	16	17.4		
	Operating room	3	100.0	0	0.0		
	examination room	4	57.1	3	42.9		
	Hemodialysis room	0	0.0	1	100.0		
First documented rhythm	Asystole	226	82.2	49	17.8	18.671	0.002*
	Ventricular tachycardia	10	50.0	10	50.0		
	Ventricular fibrillation	1	33.3	2	66.7		
	Pulseless electrical activity	32	82.1	7	17.9		
	Bradycardia	15	65.2	8	34.8		
	Perfusing rhythm	1	100.0	0	0.0		
cause of arrest of cardio-pulmonary	Arrhythmia	37	46.8	42	53.2	62.744	0.000*
	Sepsis	32	78.0	9	22.0	0.022	0.881
	Respiratory failure	93	93.9	6	6.1	18.447	0.000*
	Metabolic disease	5	71.4	2	28.6	0.243	0.622
	Myocardial infarction	24	92.3	2	7.7	3.009	0.083
	Stroke	10	100.0	0	0.0	2.743	0.098
	Gastrointestinal bleeding	19	76.0	6	24.0	0.140	0.708
	Others	13	92.9	1	7.1	4.274	0.233
	Cannot determine the reason i	51	83.6	9	16.4	0.959	0.328

* P < .05