

Data collection

- Initial rhythm was recorded and determined by the EMS personnel on the scene.
- Patients were followed up until one-year after the event and researchers evaluated neurological function by use of the Glasgow-Pittsburgh Cerebral Performance Categories (CPC).
- CPC score of 1 or 2 was defined as good neurological function.

Prognostic factors of out-of-hospital cardiac arrests according to time period

	Time Period				
	1998/5 - 1999/3	1999/4 - 2000/3	2000/4 - 2001/3	2001/4 - 2002/3	2002/4 - 2003/3
	N=2736	N=2909	N=2672	N=2722	N=2731
Age, yr, Mean (SD)	69.4 (15.6)	70.0 (15.3)	70.5 (15.5)	71.3 (14.9)	71.8 (14.3)
Female, % (n)	40.5 (1101)	40.8 (1181)	40.3 (1058)	40.1(1093)	41.2 (1122)
Witnessed, % (n)	38.9 (1067)	41.5 (1210)	46.0 (1211)	41.8 (1269)	44.4(1204)
Bystander CPR, % (n)	16.2 (445)	19.5 (569)	22.8 (599)	26.1 (705)	29.1 (782)
Presenting rhythm VF, % (n)	8.8 (214)	10.5 (306)	9.1 (237)	10.2 (273)	10.8 (293)

SD, standard deviation; CPR, cardiopulmonary resuscitation; VF, ventricular fibrillation

Prognostic factors and outcome of out-of-hospital cardiac arrests according to time period

	Time Period				
	1998/5 - 1999/3	1999/4 - 2000/3	2000/4 - 2001/3	2001/4 - 2002/3	2002/4 - 2003/3
	N=2736	N=2909	N=2672	N=2722	N=2731
BLS response interval, min, median (IQR)	8 (6-10)	8 (6-10)	8 (6-10)	7 (6-10)	7 (6-9)
Defibrillation response interval, min, median (IQR)	16 (12-21)	14 (11-19)	14 (10-19)	13 (10-17)	12.5 (9-17)
One-year survival, % (n)	1.7 (49)	1.9 (58)	2.7 (73)	2.5 (69)	4.0 (111)
Good neurological function, % (n)	1.4 (40)	1.5 (45)	2.0 (53)	1.6 (46)	2.5 (70)

BLS response interval, the time interval from emergency call to the initiation of CPR by EMS personnel; Defibrillation response interval, the time interval from emergency call to the first defibrillation by EMS personnel; IQR, interquartile range

Prognostic factors of witnessed VF cases according to time period

	Time Period				
	1998/5 - 1999/3	1999/4 - 2000/3	2000/4 - 2001/3	2001/4 - 2002/3	2002/4 - 2003/3
	N=141	N=172	N=144	N=176	N=186
Age, yr, Mean (SD)	61.5 (14.4)	63.0 (13.2)	60.9 (15.2)	63.6 (14.6)	63.4 (12.8)
Female, % (n)	20.6 (29)	28.8 (49)	18.2 (26)	21.0 (37)	24.2 (45)
Bystander CPR, % (n)	28.4 (40)	35.5 (61)	36.1 (52)	38.6 (68)	33.9 (63)

SD, standard deviation; CPR, cardiopulmonary resuscitation; VF, ventricular fibrillation

Prognostic factors and outcome of witnessed VF cases according to time period

	Time Period				
	1998/5 - 1999/3	1999/4 - 2000/3	2000/4 - 2001/3	2001/4 - 2002/3	2002/4 - 2003/3
	N=2736	N=2909	N=2672	N=2722	N=2731
BLS response interval, min, median (IQR)	7 (5 - 9)	7 (5 - 8)	7 (5 - 8)	7 (6 - 8)	7 (5 - 8)
Defibrillation response interval, min, median (IQR)	15 (12 - 19)	13 (11 - 18)	12 (9 - 15)	12 (9 - 15)	11 (9 - 14)
One-year survival, % (n)	6.4 (9)	8.7 (15)	12.5 (18)	15.9 (28)	21.5 (40)
Good neurological function, % (n)	5.7 (8)	7.0 (12)	9.0 (13)	10.8 (19)	12.9 (24)

BLS response interval, the time interval from emergency call to the initiation of CPR by EMS personnel; Defibrillation response interval, the time interval from emergency call to the first defibrillation by EMS personnel; IQR, interquartile range

Summary

1. Average age of patients with out-of-hospital cardiac arrest of cardiac etiology gradually increased over time.
2. The proportion of cases with bystander initiated CPR markedly increased.
3. BLS response interval, which showed the time interval from collapse to the initiation of CPR by EMS personnel, did not change during this period. Although the time interval from emergency call to the first defibrillation became shorter over years, it was still too long.
4. The proportion of one-year survivor and patients with good neurological function were also increased during the observation period.

Conclusions

Although the proportion of one-year survivor and patients with good neurological function has gradually increased over time with the improvement of the chain of survival, the defibrillation response interval is too long and the outcome of patients with out-of-hospital cardiac arrests is still poor.

Further efforts to strengthen the link of chain of survival and increase survival of patients with out-of-hospital cardiac arrests should be needed.

Control/Tracking Number: 05-SS-A-17933-AHA

Activity: Abstract

Current Date/Time: 5/31/2005 2:56:07 AM

Outcome of Out-of-Hospital Cardiac Arrest in a Large Metropolitan Area in Japan: A 6-year Emergency Medical Services Perspective

Taku Iwami, Kazuhiro Sase, Hiroyuki Kakuchi, National Cardiovascular Center, Suita, Japan; Kentaro Kajino, Kentaro Shimizu, Osaka University Graduate School of medicine, Suita, Japan; Naohiro Yonemoto, Kyoto University School of Public Health, Kyoto, Japan; Yoji Nagai, Translational Research Informatics Center, Foundation for Biomedical Research and Innovation, Kobe, Japan; Takashi Kawamura, Kyoto University School of Public Health, Kyoto, Japan; Atsushi Hiraide, Center for medical education, Kyoto University Graduate School Faculty of Medicine, Kyoto, Japan; Hiroshi Nonogi, National Cardiovascular Center, Suita, Japan; J-PULSE investigators

Objectives: To evaluate the trend of outcome and prognostic factors of out-of-hospital cardiac arrests (OHCA). *Methods:* We evaluated a population-based cohort of emergency medical service (EMS)-treated adult patients (age ≥ 18) with OHCA of cardiac etiology (n=15,600) from May 1, 1998 to April 30, 2004 in Osaka Prefecture (population, 8.8 million), Japan, by means of the Utstein style. Time course was divided into the initial 11-month period and 5 successive one-year periods. We evaluated changes in demographical and CPR-related factors. *Results:* Average age and sex ratio gradually increased over time. The proportion of witnessed cases increased and subsequently decreased with the similar trend of cases with ventricular fibrillation. The proportion of cases with bystander initiated CPR markedly increased. Basic life support (BLS) response interval, which showed the time interval from collapse to the initiation of CPR by EMS personnel, did not change during this period but the time interval from emergency call to the first defibrillation by EMS personnel became shorter over years (In Japan, public access defibrillation program was not being promoted during this period). One-year survival was also improving during the observation period (data collection is still ongoing for the last year). *Conclusion:* Although one-year survival proportion of patients with OHCA gradually increased over time with the improvement of the chain of survival, it is still low. Further investigation and effort to increase survival of patients with OHCA should be needed.

Prognostic factors and outcome of out-of-hospital cardiac arrests according to time period							
	Time Period						
	1998/5 - 1999/4 1999/3 (n = 2370)	1999/4 - 2000/3 2000/3 (n = 2611)	2000/3 - 2001/3 2001/3 (n = 2375)	2001/3 - 2002/3 2002/3 (n = 2517)	2002/3 - 2003/3 2003/3 (n = 2946)	2003/3 - 2004/3 2004/3 (n = 2781)	
Age, Mean (SD)	70.1	70.6	71.0	71.5	71.3	71.8	

	(15.0)	(14.8)	(14.9)	(14.7)	(14.7)	(15.2)
Female, % (n)	40.8 (960)	40.8 (1059)	40.4 (957)	39.9 (1002)	41.2 (1211)	41.6 (1155)
Witnessed, % (n)	37.1 (879)	39.8 (1040)	44.3 (1052)	45.1 (1134)	42.5 (1253)	40.4 (1122)
Bystander CPR, % (n)	19.0 (449)	22.9 (597)	26.5 (629)	29.1 (733)	31.0 (913)	35.9 (999)
Presenting rhythm VF, % (n)	10.7 (254)	13.2 (345)	13.0 (308)	13.6 (343)	10.9 (322)	10.6 (296)
BLS response interval, min, median (quartile)	8 (6 - 10)	8 (6 - 10)	8 (6 - 10)	8 (6 - 10)	7 (6 - 9)	8 (6 - 10)
Defibrillation response interval, min, median (quartile)	16.5 (12 - 21)	14 (11 - 19)	14 (10 - 19)	13 (10 - 17)	13 (9 - 17)	11 (8 - 16)
One-year survival, % (n)	1.7 (40)	2.1 (56)	2.5 (60)	2.4 (61)	4.0 (118)	-

Category (Complete): Resuscitation, CPR, Emergency Cardiac Care, Critical Care, AED and Trauma (CPCC)

Keyword (Complete): Sudden death ; Cardiac arrest ; Cardiopulmonary resuscitation ; Ventricular fibrillation ; Ventricular defibrillation

Presentation Format Preference (Complete): Either

AHA Awards (Complete):

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Payment (Complete): Your credit card order has been processed on Friday 27 May 2005 at 1:30 AM.

The effect of Bystander Initiated Chest Compression-Only CPR on Cardiac Arrest of Non-Cardiac etiology

Kentaro Kajino, Osaka University Graduate School of medicine, Suita, Japan; Taku Iwami, National Cardiovascular Center, Suita, Japan; Kentaro Shimizu, Osaka University Graduate School of medicine, Suita, Japan; Kazuhiro Sase, Hiroyuki Kakuchi, Hiroshi Nonogi, National Cardiovascular Center, Suita, Japan; Naohiro Yonemoto, Chika Nishimoto, Takashi Kawamura, Kyoto University School of Public Health, Kyoto, Japan; Atsushi Hiraide, Center for medical education, Kyoto University Graduate School Faculty of Medicine, Kyoto, Japan; Hisashi Sugimoto, Osaka University Graduate School of medicine, Suita, Japan; J-PULSE investigators

Introduction

Recently there have been many reports that suggest the effect of chest compression-only CPR, but it is not clear that chest compression only CPR has an effect on patients with cardiac arrest of non-cardiac etiology such as stroke or respiratory arrest.

It is important to know the effectiveness of chest compression-only CPR on patients with arrest of non-cardiac etiology, because we cannot discriminate between arrest of cardiac etiology and non-cardiac etiology on scene.

Hypothesis

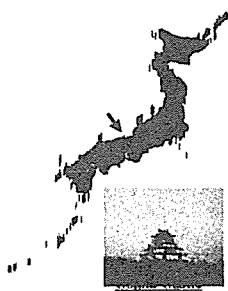
Bystander initiated chest compression-only CPR maintains ventricular fibrillation (VF) in patients with out-of-hospital cardiac arrest (OHCA) of non-cardiac etiology and contributes to the increase of survival.

Methods

- We collected data on out-of-hospital non-cardiac arrests including information about the type of bystander CPR from a large-scale population based Utstein style study.
- We analyzed data from 5 years in this presentation although the abstract consisted of data from 6 years, because we could not finish the follow-up survey for neurological function of one-year survivor of the last year.

Study period; from May 1st, 1998 to April 30th, 2003

Study area; Osaka prefecture, Japan



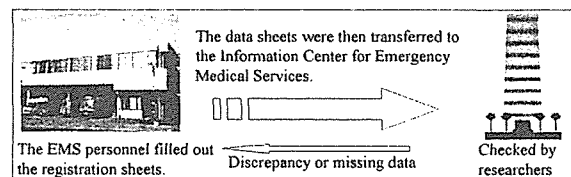
Population; 8.8 million
Area; 1894 km²
Including 35 fire stations

Emergency medical service (EMS) system

- Single-tiered system
- There is no program to teach CC CPR and citizens have been educated to perform standard (CC+RB) CPR.
- Public access defibrillation program had not promoted in this periods.

Data collection

- The data sheet was designed for this project using the Utstein style.
- We recorded 23,436 consecutive out-of-hospital cardiac arrest cases. Of these cases, 4,016 cases met the following criteria; 1) Age \geq 18 years old, 2) non-Cardiac etiology, 3) internal causes



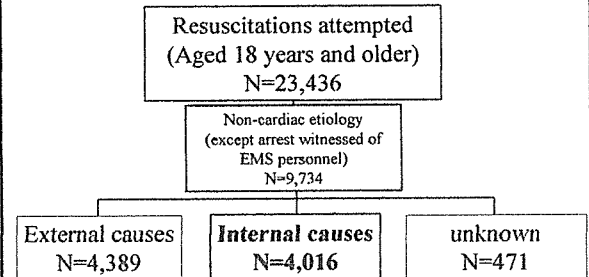
- Patients were followed up until one-year after the event.

Statistical analyses

- The chi-square test and one-way analysis of variance were used to analyze the statistical differences in characteristics of patients among groups according to the type of bystander CPR.
- Multivariate-adjusted odds ratios of the type of bystander CPR for VF were calculated using the logistic regression model, controlling for age, sex, witness status, and time interval between call and initiation of CPR by EMS personnel.

Arrests for analyses

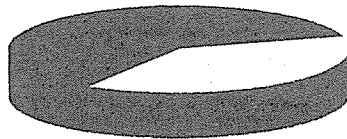
Inclusion criteria; 1) Age \geq 18 years old, 2) Non-cardiac etiology, 3) internal causes (stroke or respiratory diseases or other)



Cause of cardiac arrests of non-cardiac etiology

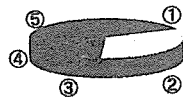
Five year's data (1998-2002)

Others; 41% (1653/4016) Stroke; 21% (835/4016)



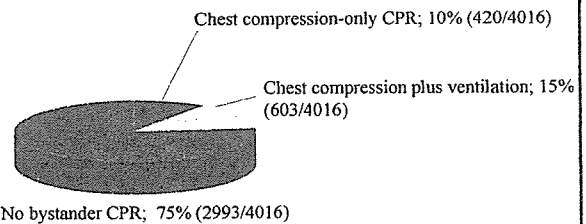
Respiratory disease; 38%
(1528/4016)

One year's data (2002)



- ① Stroke 18% (192/1047)
- ② Respiratory disease; 33% (342/1047)
- ③ Malignancy; 17% (177/1047)
- ④ Dissecting aneurysm; 7% (73/1047)
- ⑤ Others; 25% (262/1047)

Type of bystander CPR



Bystander initiated CPR was performed in 25% (1023/4016) of out-of-hospital non-cardiac arrests.

Patients' backgrounds by the type of bystander CPR

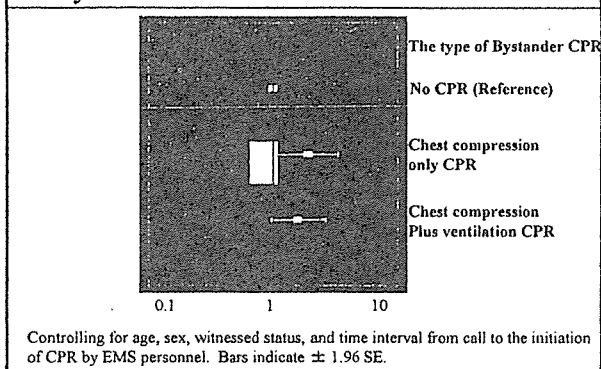
Background	No-CPR n = 2993	Chest compression -only CPR n = 420	Chest compression plus ventilation CPR n = 603	p value
age	71 \pm 15	72 \pm 16	70 \pm 16	0.399
Sex (male : female)	58 : 42	61 : 39	50 : 50	P < 0.001
Time interval from call to initiation of CPR by EMS personnel, min	7.9 \pm 3.2	7.8 \pm 3.3	8.1 \pm 3.2	
Time interval from call to defibrillation by EMS personnel*, min	18.0 \pm 7.5	16.5 \pm 7.2	19.3 \pm 8.4	

The proportion of ventricular fibrillation as initial rhythm by the type of CPR

	No-CPR	Chest compression -only CPR	Chest compression plus ventilation CPR
VF as presenting rhythm, % (no./total no.)	2.2(66/2973)	4(17/415)	3.7(22/594)
Odds ratio (95% CI)	1.0 (reference)	1.9(1.1-3.3)	1.7(1.0-2.7)

Data are means \pm SD unless indicated otherwise.
CI denotes confidence interval.

Multivariate-adjusted odds ratios of the type of bystander CPR for VF



Outcome by the type of bystander CPR

Outcome	No-CPR	Chest compression only CPR	Chest compression plus ventilation CPR
ROSC, % (N)	32.7(967/2960)	30(124/413)	33.5(200/597)
odds ratio (95% CI)	1.0 (reference)	0.8(0.7-1.1)	1.0(0.8-1.2)
Admit, % (N)	24.7(738/2993)	23.8(100/420)	25.5(154/603)
odds ratio (95% CI)	1.0(reference)	0.95(0.75-1.2)	1.0(0.9-1.3)
One month survival, % (N)	2.8(82/2945)	2.2(9/413)	3.2(19/593)
odds ratio (95% CI)	1.0(reference)	0.7(0.4-1.6)	1.1(0.7-1.9)

ROSC denotes return of spontaneous circulation.
CI denotes confidence interval.

The proportion of one year survival by the type of CPR

outcome	No-CPR	Chest compression only CPR	Chest compression plus ventilation CPR
One year survival % (no./total no.)	1.0(31/2993)	1.0(4/420)	1.7(10/603)
Odds ratio (95% CI)	1.0 (reference)	0.9(0.3-2.5)	1.6(0.7-3.2)

CI denotes confidence interval.

Conclusions

- Chest compression-only CPR increases VF in patients with OHCA of non-cardiac etiology.
- Outcome of patients with OHCA of non-cardiac etiology is very poor regardless of the types of bystander CPR.
- Bystander initiated chest compression-only CPR maintains VF in patients with OHCA of non-cardiac etiology, but bystander CPR regardless of the existence of ventilation did not contribute to an increase of survival.

Control/Tracking Number: 05-SS-A-19299-AHA

Activity: Abstract

Current Date/Time: 5/31/2005 3:42:34 AM

The Effect of Bystander Initiated Chest Compression-Only CPR on Cardiac Arrest of Non-Cardiac Etiology

Kentaro Kajino, Osaka University Graduate School of medicine, Suita, Japan; Taku Iwami, National Cardiovascular Center, Suita, Japan; Kentaro Shimizu, Osaka University Graduate School of medicine, Suita, Japan; Kazuhiro Sase, Hiroyuki Kakuchi, Hiroshi Nonogi, National Cardiovascular Center, Suita, Japan; Naohiro Yonemoto, Chika Nishiyama, Takashi Kawamura, Kyoto University School of Public Health, Kyoto, Japan; Atsushi Hiraide, Center for medical education, Kyoto University Graduate School Faculty of Medicine, Kyoto, Japan; Hisashi Sugimoto, Osaka University Graduate School of medicine, Suita, Japan; J-PULSE investigators

Introduction: Recently there have been many reports that suggest the effect of chest compression-only CPR, but it is not clear that chest compression-only CPR has an effect on patients with cardiac arrest of non-cardiac etiology such as stroke or respiratory arrest. It is important to know the effectiveness of chest compression-only CPR on patients with arrest of non-cardiac etiology, because we cannot discriminate between arrest of cardiac etiology and non-cardiac etiology on scene. *Hypothesis:* Bystander initiated chest compression-only CPR maintains ventricular fibrillation (VF) in patients with out-of-hospital cardiac arrest (OHCA) of non-cardiac etiology and contributes to the increase of survival. *Methods:* From May 1, 1998 to April 30, 2004, 31,557 consecutive OHCA cases in Osaka Prefecture, Japan (population, 8.8 million) were recorded. Of them, 7086 adult patients (age \geq 18) with nontraumatic OHCA of non-cardiac etiology, constitute this study cohort. We calculate multivariate adjusted odds ratios for VF and one-month survival in each group divided by the type of CPR (chest compression-only CPR, compression plus ventilation CPR, or no CPR), controlling for age, sex, witness status, and the cause of arrest. *Results:* There was a tendency that VF was frequent in those with bystander initiated compression-only CPR (OR, 1.4; 95% CI, 0.9 - 2.1) and compression plus ventilation CPR (OR, 1.4; 95% CI, 0.9 - 2.0) compared with those without CPR. The same tendency was observed concerning the odds for one month

survival (Table). *Conclusions:* Our results suggest that bystander initiated compression-only CPR could be effective on not only OHCA of cardiac etiology but also nontraumatic OHCA of non-cardiac etiology. We need to consider comprehensive approach to OHCA considering patients with arrest of non-cardiac origin.

Multivariate adjusted odds ratio for VF and survival by the type of bystander CPR			
	No CPR	Chest compression-only CPR	Chest compression plus ventilation CPR
Presenting rhythm VF, % (n)	3.3 (169/5136)	4.2 (26/615)	4.3 (35/819)
Odds ratio for VF (95% CI)	1.0 (reference)	1.4 (0.9 - 2.1)	1.4 (0.9 - 2.0)
One-month survival, % (n)	3.5 (194/5498)	2.5 (16/647)	3.1 (27/870)
Odds ratio for one-month survival (95% CI)	1.0 (reference)	1.3 (0.8 - 2.2)	1.2 (0.8 - 1.8)

Category (Complete): Resuscitation, CPR, Emergency Cardiac Care, Critical Care, AED and Trauma (CPCC)

Keyword (Complete): Cardiopulmonary resuscitation ; Cardiac arrest ; Ventricular defibrillation ; Sudden death

Presentation Format Preference (Complete): Either

AHA Awards (Complete):

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Efficacy of Bystander Initiated Chest Compression-only Cardiopulmonary Resuscitation on Ventricular Fibrillation as initial rhythm in Patients with Out-of-Hospital Cardiac Arrest;

A large-scale population-based cohort study in Osaka, Japan

J-PULSE investigators
Japanese Population-based Utstein-style study with defibrillation and basic / advanced Life Support Education

Introduction

- Bystander-initiated cardiopulmonary resuscitation (CPR) is one of the major elements in the "chain of survival" for the treatment of patients in cardiac arrest.
- Previous studies have shown that bystander CPR, with chest compression plus ventilation (CC+RB), maintains ventricular fibrillation (VF) and contributes to a better outcome.
- However, the proportion of patients to whom bystander perform CPR has remained disappointingly low.

Introduction

- Chest compression-only CPR (CC CPR) is attractive because it is simpler than standard CPR with chest compression plus ventilation (CC+RB) and easier to teach, learn, and perform.
- A randomized study from Seattle, US has indicated that CC CPR is as effective as CC+RB CPR for the first few minutes of cardiac arrests. (N Engl J Med. 2000;342:1546-53)
- But there has been few clinical data that shows the effectiveness of CC CPR and it is unclear how long it works well.

Hypothesis

Bystander initiated CC CPR maintains VF in patients with out-of-hospital cardiac arrest of cardiac etiology, especially in early phase of cardiac arrest and contributes to a better neurological outcome.

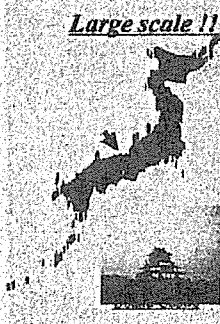
Methods

- We collected data on out-of-hospital cardiac arrests including information about the type of bystander CPR from a large-scale population based Utstein style study.
- We analyzed data from 5 years in this presentation although the abstract consisted of data from 6 years, because we could not finish the follow-up survey for neurological function of one-year survivors of the last year.
- First, we evaluated the association between the type of bystander CPR and the proportion of patients with VF and survival. Then, we analyzed odds ratios of the type of CPR for VF, by the time interval from collapse to the initiation of CPR by emergency medical service (EMS) personnel.

Study period: from May 1st, 1998 to April 30th, 2003

Study area: Osaka Prefecture, Japan

Large scale !!



Population: 8.8 million
Area: 1894 km²
Includes 35 fire stations

Emergency medical service (EMS) system

- Activated by dialing 119 / Three-person unit
- There is no program to teach CC CPR and citizens have been educated to perform standard (CC+RB) CPR.
- Public access defibrillation program was not promoted during this periods.

Data collection

- The data sheet was designed for this project by using the Utstein style and data were prospectively collected.
- The presence and the type of bystander-initiated CPR were determined by the EMS personnel on the scene. Initial rhythm was recorded and determined by the EMS personnel on the scene.
- Patients were followed up until one-year after the event and researchers evaluated neurological function by use of the Glasgow-Pittsburgh Cerebral Performance Categories (CPC).
- CPC score of 1 or 2 was defined as good neurological function.

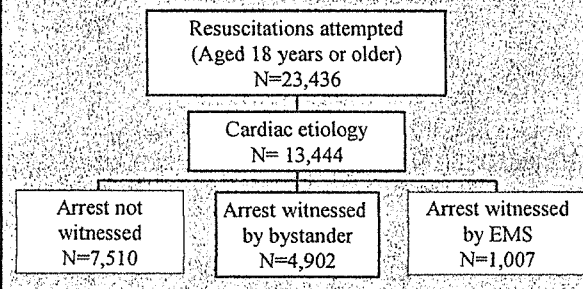
Statistical analyses

- The chi-square test and one-way analysis of variance were used to analyze the statistical differences in characteristics of patients among groups by the type of bystander CPR.
- Age and sex adjusted odds ratios of the type of CPR for VF were calculated using the logistic regression model.

We changed the time by which we divided cases for analyses (from 10 min after collapse as shown in the abstract to 5 and 15 min after collapse) according to the 3-phase, time-dependent concept of cardiac arrest due to VF. (JAMA. 2002;288:3035)

Cases for analyses

We recorded 26,172 consecutive out-of-hospital cardiac arrest cases.

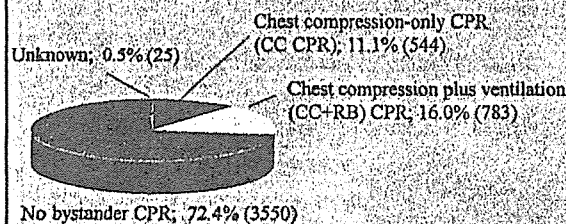


Characteristics of witnessed arrest cases of cardiac etiology

Age, year	70.0 ± 15.2
Male, % (n)	63.2 (3,098)
Initial rhythm, % (n)	
VF/VT	17.0 (834)
Asystole	61.5 (3,016)
Pulseless electrical activity	15.7 (771)
Collapse to initiation of CPR by EMS personnel, min	11.4 ± 7.3
Collapse to defibrillation [†] , min	16.8 ± 7.5

Data show means ± SD unless indicated otherwise.
VF, ventricular fibrillation; VT, ventricular tachycardia; CPR, cardiopulmonary resuscitation; EMS, emergency medical services. [†]849 cases were available for analysis.

Types of bystander CPR



Bystander initiated CPR was performed for 27.1% (1327/4902) of out-of-hospital cardiac arrests.

※Patients with ventilation alone CPR were included in the "No bystander CPR" group.

Characteristics of cases according to the type of bystander CPR

	No CPR N = 3530	CC CPR N = 544	CC+RB CPR N = 783	P value
Age, year	70.0 ± 15.0	68.2 ± 15.3	69.1 ± 15.1	0.01
Male, %	63.3	66.2	61.8	0.25
VF or VT, %	15.4	22.9	21.4	<0.001
Collapse to initiation of CPR, min [†]	11.4 ± 7.4	11.3 ± 7.2	11.6 ± 6.9	
Collapse to defibrillation ^{††} , min	16.6 ± 7.6	16.3 ± 7.0	17.8 ± 7.4	
One year survival with good neurological function, %	2.1	3.5	3.6	0.01

VF, ventricular fibrillation; VT, ventricular tachycardia; CC CPR, compression-only CPR; CC+RB CPR, chest compression plus ventilation CPR.

Data show means ± SD unless indicated otherwise. [†]849 cases were available for analysis.

Odds ratios of the type of CPR for VF and one-year survival with good neurological function

VF	Types of bystander CPR	Survival†
1.0	No CPR (Reference)	1.0
1.6	CC CPR	1.7
1.5	CC+RB CPR	1.7

Decreased VF Increased VF Decreased survival Improved survival

0.1 1 10 0.1 1 10

†: One year survival with good neurological function (CPC score = 1 or 2)
 CC CPR, compression-only CPR; CC+RB CPR, chest compression plus ventilation CPR

Age and sex adjusted odds ratios of the type of CPR for VF, by the time interval from collapse to the initiation of CPR by EMS personnel

	Time interval from collapse to the initiation of CPR by EMS personnel					
	≤ 5 min N = 623		6min ~ 15min N = 3265		16 min ≤ N = 864	
	OR for VF	95% CI	OR for VF	95% CI	OR for VF	95% CI
No CPR	1.0 (reference)	-	1.0 (reference)	-	1.0 (reference)	-
CC CPR	1.7	0.9 - 3.0	1.4	1.1 - 1.9	2.6	1.2 - 5.9
CC + RB CPR	1.2	0.6 - 2.1	1.4	1.1 - 1.7	4.4	2.3 - 8.1

CPR, cardiopulmonary resuscitation; EMS, emergency medical service; CI, confidence interval
 CC CPR, compression-only CPR; CC+RB CPR, chest compression plus ventilation CPR

Summary

1. The odds ratios of bystander initiated CC CPR for VF were significantly higher than that of no CPR and as high as that of CC+RB CPR in the early phase (~ 15 min after collapse) of out-of-hospital cardiac arrests.
2. The odds ratios of CC CPR for VF was also significantly higher than that of no CPR in the late phase, but CC+RB CPR may be better than CC CPR in the late phase.
3. Bystander initiated CC CPR was associated with an increase of one year survival with good neurological function as CC+RB CPR. But there are many complex confounding factors such as sex or quality of CPR that we could not evaluate sufficiently in this analysis.

Conclusions

CC CPR, as CC+RB CPR, maintains VF rhythm in patients with cardiac arrests especially during the early phase after collapse and contributes to a better neurological outcome.

It is very worthy to know that CC CPR has an effect during the early phase after collapse because most EMS systems can arrive at the scene within 10 minutes after call receipt.

Well designed study will be needed to prove the efficacy of CC CPR for survival. We (J-PULSE investigators) will continuously analyze clinical data concerning compression-only CPR to improve the outcome of out-of-hospital cardiac arrest cases.

Appendix: Odds ratios for survival by the types of CPR in male and female

		Odds ratio	95% CI	p value
male	No CPR	1.0	reference	-
	CC CPR	1.6	1.0 - 2.6	0.03
	CC + RB CPR	1.4	0.9 - 2.2	0.12
female	No CPR	1.0	reference	-
	CC CPR	0.7	0.2 - 1.9	0.49
	CC + RB CPR	1.9	1.0 - 3.6	0.04

Age and sex adjusted odds ratios for VF by the type of CPR and the time interval from collapse to the initiation of CPR by EMS personnel

	Time interval from collapse to the initiation of CPR by EMS personnel			
	< 10 min		10 min ≤	
	OR for VF	95% CI	OR for VF	95% CI
No CPR	1.0 (reference)	-	1.0 (reference)	-
CC CPR	1.3	1.0 - 1.8	1.8	1.3 - 2.5
CC + RB CPR	1.2	0.9 - 1.7	1.8	1.5 - 2.6

Control/Tracking Number: 05-SS-A-16412-AHA

Activity: Abstract

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Efficacy of Bystander Initiated Chest Compression-only Cardiopulmonary Resuscitation on Ventricular Fibrillation as initial rhythm in Patients with Out-of-Hospital Cardiac Arrest; A large-scale population-based cohort study in Osaka, Japan

Taku Iwami, Kazuhiro Sase, Hiroyuki Kakuchi, National Cardiovascular Center, Suita, Japan; Kentaro Kajino, Kentaro Shimizu, Osaka University Graduate School of medicine, Suita, Japan; Naohiro Yonemoto, Kyoto University School of Public Health, Kyoto, Japan; Yoji Nagai, Translational Research Informatics Center, Kobe, Japan; Takashi Kawamura, Kyoto University School of Public Health, Kyoto, Japan; Atsushi Hiraide, Center for medical education, Kyoto University Graduate School Faculty of Medicine, Kyoto, Japan; Hiroshi Nonogi, National Cardiovascular Center, Suita, Japan; J-PULSE investigators

Introduction: Chest compression-only CPR is more feasible than standard CPR with ventilation, and have a potential to spread bystander initiated CPR for patients with out-of-hospital cardiac arrest (OHCA). *Hypothesis:* Bystander initiated chest compression-only CPR maintains ventricular fibrillation (VF) in patients with OHCA of cardiac etiology, especially in early phase of cardiac arrest. *Methods:* From May 1, 1998 to April 30, 2004, 31,557 consecutive OHCA cases in Osaka Prefecture, Japan (population, 8.8 million) were recorded by means of the Utstein style. Of these cases, 6563 cases which met the following criteria: 1) age \geq 18 years old, 2) cardiac etiology, 3) arrest witnessed by bystander, were extracted for the study. We calculated age- and sex-adjusted odds ratios of the type of CPR for VF as initial rhythm in each group divided by the time interval from collapse to initiation of CPR by emergency medical service (EMS) personnel ($<$ 10 minutes or \geq 10 minutes). *Results:* Bystander initiated compression-only CPR and compression plus ventilation CPR was performed in 9.7% and 14.0% of OHCA cases, respectively. VF were significantly more common (OR, 1.5; 95% CI, 1.1 - 2.0) in patients with bystander initiated compression-only CPR than those without CPR, when EMS personnel's CPR was performed within 10 minutes after collapse. VF was also frequent in those with bystander initiated compression-only CPR (OR, 1.5; 95% CI, 1.1 - 2.1) and compression plus ventilation CPR (OR, 1.8; 95% CI, 1.4 - 2.3) compared with those without CPR when EMS personnel's CPR was delayed (Table). *Conclusions:* Bystander initiated compression-only CPR, as compression plus ventilation CPR, maintains VF rhythm in patients with OHCA of cardiac etiology especially during the early phase after collapse

and may contribute to the improvement of their survival. Data collection for one-year survival continues down to the present time and we will discuss survival and neurological outcome at the conference.

Age and sex adjusted odds ratio for ventricular fibrillation by the type of bystander initiated CPR.				
	Patients in whom emergency medical service personnel started CPR less than 10 min after collapse		Patients in whom emergency medical service personnel started CPR 10 min or more after collapse	
	odds ratio for VF	95% confidence interval	odds ratio for VF	95% confidence interval
no CPR	1.0 (reference)	-	1.0 (reference)	-
compression-only CPR	1.5	1.1 - 2.0	1.5	1.1 - 2.1
compression plus ventilation CPR	1.2	0.9 - 1.5	1.8	1.4 - 2.3

Category (Complete): Resuscitation, CPR, Emergency Cardiac Care, Critical Care, AED and Trauma (CPCC)

Keyword (Complete): Cardiopulmonary resuscitation ; Cardiac arrest ; Ventricular fibrillation ; Acute Coronary Syndromes ; Sudden death

Presentation Format Preference (Complete): Either

AHA Awards (Complete):

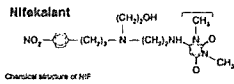
Yes, I am interested in an Early Career Investigator /AHA Council Award. I know I must complete a separate application at: [Application Link](#) True

Please consider my abstract for the Resuscitation Science Symposium ReSS (ReSS Nov 11-12): True

: C. E-mail invitation

Payment (Complete): Your credit card order has been processed on Thursday 26 May 2005 at 1:58 PM.

Prevention of Life-threatening Ventricular Tachyarrhythmia by a Novel and Pure Class III Agent, Nifekalant hydrochloride: Potential Alternative to Amiodarone
Junko Ohashi, Satoshi Yasuda, Shunichi Miyazaki, Kazuhiro Satomi, Isao Morii, Takashi Kurita, Wataru Shimizu and Hiroshi Nonogi
National Cardiovascular Center, Osaka, Japan



Nifekalant hydrochloride (NIF) as a pure K⁺ channel blocker

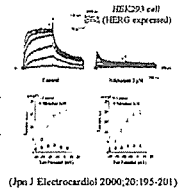
- NIF is a class III antiarrhythmic agent having a pirimidinedione structure.
- NIF inhibited HERG channels, suggesting the selective inhibition of the rapid component of the delayed rectifier K⁺ current (I_{Kr}).

- Amiodarone is multi channel blocker (different action by short and long term)
- Nifekalant is pure K⁺ channel blocker

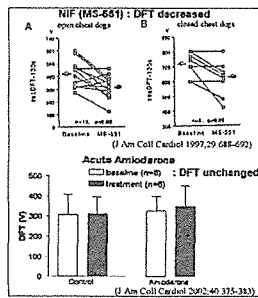
Pharmacological action of Class III

DRUG	CHANNELS		RECEPTORS					PUMPS	
	Na	Ca	K	H	β	M	A	Na/K ATPase	
Nifekalant			○						
Amiodarone(Short-term)	△	△	○						
Amiodarone(Long-term)	○	○	△					○	

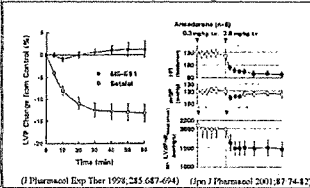
Relative potency of block: ○low; △moderate; ●high



NIF has different characteristics from amiodarone in experimental studies

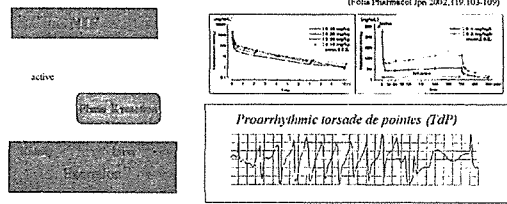


- NIF decreases the defibrillation threshold (DFT), whereas amiodarone does not.
- NIF is characterized by minimum negative inotropic effect, which amiodarone has a βblocking action.



Pharmacokinetics and adverse effect of NIF

	T _{1/2} β(hr)	Vc (L/kg)	Cl (L/hr/kg)	AUC _{0-∞} (ng · hr/mL)
single	1.53±0.23	0.13±0.01	0.85±0.09	321±37
infusion	1.15±0.08	0.14±0.04	0.78±0.05	3766±345



Purpose

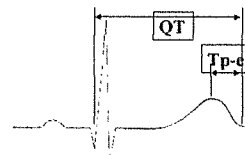
The present study was designed to investigate the efficacy of NIF for refractory ventricular tachycardia / fibrillation (VT/VF).

Methods

- Thirty patients, who were hospitalized between May 1999 and May 2004 in National Cardiovascular Center and were treated with NIF for refractory VT/VF, were studied.
- If original VT/VF was suppressed and disappeared without proarrhythmia and hemodynamic deterioration, administration of NIF was defined to be effective.

Measurement of ECG Parameters

Electrophysiological effect of NIF was assessed by the following ECG measurements.



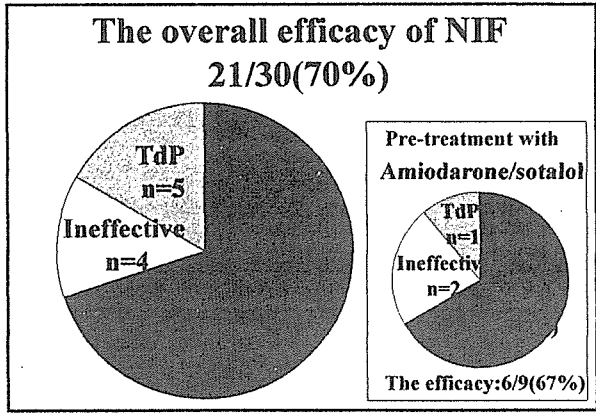
- QT interval
- Corrected QT (QTc): QT/√RR
- Tpeak-end (Tp-e) interval: the index of transmural dispersion
- Corrected Tp-e (Tpe-c): Tp-e/√RR

Study Patients

M/F 26/4, age 62 ± 16 years old
 LVEF $28 \pm 9\%$
 refractory to conventional treatment
 (Class Ia, Ib and/or III drugs)

- Acute Coronary Syndrome (ACS): n=16
- Chronic Heart Disease (Chr-HD): n=14
 - DCM/HCM: n=8
 - Old myocardial infarction: n=4
 - Valvular disease: n=2

Pre-treatment with
 Amiodarone/sotalol n=9
 ICD implantation n=7



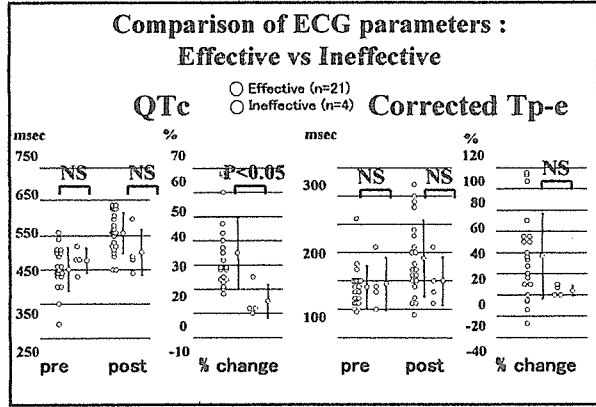
A 28-year-old woman with VT resistant to amiodarone

Before NIF infusion (QTc 0.48sec)

Sustained VT (rate: 150/min) during amiodarone administration *blood levels of amiodarone at $4.0 \mu\text{g/ml}$

During NIF infusion at a dose of 0.4mg/kg/hr (QTc 0.66sec)

AMI: LMT 100% (giant coronary aneurysm and dense calcification)
 ⇒ PCI failed
 ⇒ CABG (postcardiotomy LOS)
 ⇒ VAD
 ⇒ Incessant VT



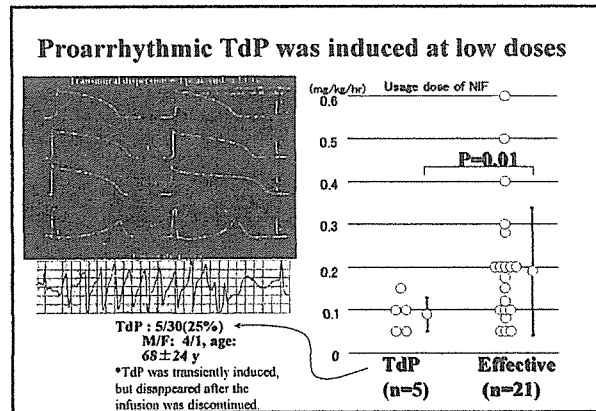
**QT prolongation is important for
 antiarrhythmic effect of NIF**

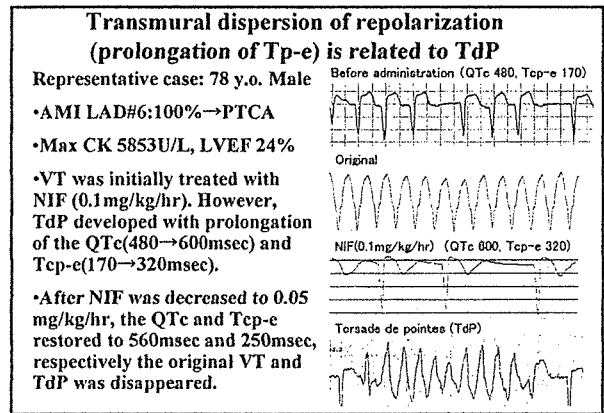
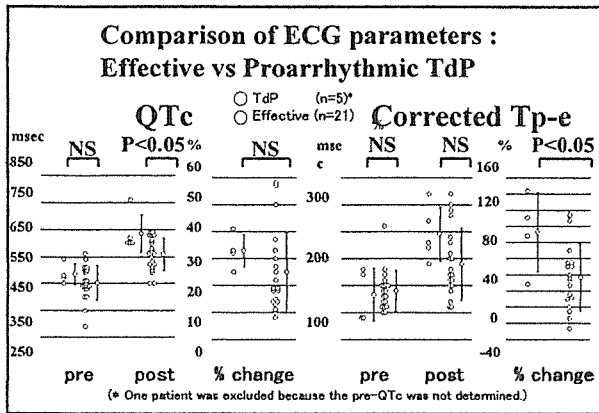
Effective:
 VT suppressed

Ineffective:
 VT not suppressed

Male, 69 y.o.
 AMI (LVEF 33%)
 VF, Sustained VT
 NIF 0.1mg/kg/hr
 QTc $450 \rightarrow 590\text{msec}$ (+28%)
 Tpe-e $100 \rightarrow 210\text{msec}$ (+110%)

Male, 64 y.o.
 MR (LVEF 21%)
 Sustained VT
 NIF 0.2mg/kg/hr
 QTc $480 \rightarrow 490\text{msec}$ (0%)
 Tpe-e $140 \rightarrow 150\text{msec}$ (+7%)





Conclusions

- These results indicate intravenous administration of NIF is useful in the emergent treatment of drug-refractory or counter-shock resistant VT/VF.
- NIF has the unique feature exclusively blocking K⁺ channels with minimizing cardiac depression and therefore may be a potential alternative to amiodarone.

Prevention of Life-threatening Ventricular Tachyarrhythmia by a Novel and Pure Class III Agent, Nifekalant hydrochloride:

Potential Alternative to Amiodarone

Junko Ohashi, Satoshi Yasuda, Shunichi Miyazaki, Takashi Kurita, Wataru Shimizu, Shiro Kamakura, Hiroshi Nonogi, National Cardiovascular Center, Osaka, Japan

Background: Nifekalant hydrochloride (NIF) is a novel intravenous class III antiarrhythmic agent with a pyrimidinedione structure and purely blocks the K⁺ channel without inhibiting β -adrenergic receptors. The present study was designed to investigate the efficacy of NIF for refractory ventricular tachycardia/fibrillation (VT/VF).

Methods: We studied 30 patients treated with NIF (M/F 26/4, age:

63 ± 17 [mean \pm SD] years) at a dose of 0.19 ± 0.14 mg/kg body weight/hr: 16 patients with acute coronary syndrome (ACS) and 14 patients with chronic structural heart disease (Chr-HD).

Amiodarone and sotalol had been already given in 9 patients with Chr-HD before administration of NIF. The QT interval was measured and corrected by Bazett's method (QTc).

Results: The left ventricular ejection fraction was severely depressed to $28 \pm 9\%$. Regarding efficacy in prevention of VT/VF without proarrhythmia and hemodynamic deterioration, NIF was effective in 70% of patients (12: ACS, 9: Chr-HD), but ineffective in four patients (all: Chr-HD). The QTc prolongation in the responders was more pronounced than that in the non-responders (22 ± 12 vs $5 \pm 7\%$ increase; $p < 0.05$). In the remaining five patients, proarrhythmic torsade de pointes (TdP) was transiently induced, but disappeared after the dose was decreased.

Conclusions: These results indicate intravenous administration of NIF is useful in the emergent treatment of drug-refractory or counter-shock resistant VT/VF. NIF has the unique feature exclusively blocking K⁺ channels with minimizing cardiac depression and therefore may be a potential alternative to amiodarone.

院外心停止症例に対する单相性及び 二相性AEDの除細動成功率、転帰に 関する検討

～ウツタイン大阪プロジェクトより～

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 - 2.京都大学予防医療学
 - 3.京都大学医学教育センター
 - 4.国立循環器病センター
 - 5.大阪府立泉州救命救急センター
 - 6.行岡病院
- J-PULSE investigators

(背景)

二相性波形のAEDの有用性が示唆されているが、国内外を問わず、臨床例から除細動成功率、転帰、至適エネルギー量を検討した報告は少ない。

(目的)

院外心停止症例に対する单相性および二相性AEDの除細動成功率、転帰を検討するとともに、至適エネルギー量を明らかにすること。

対象

地域: 大阪府下6消防の担当地区
(担当地区総人口 476万7652人、総面積 645Km²)

期間: 平成15年12月1日～平成16年4月30日の5ヶ月

心原性心停止例(18歳以上)

N = 811

目撃のある心原性心停止

N = 366

救急隊初期心電図で心室細動(VF)を認めたもの

N = 74

方法

- ウツタイン様式に基づき、救急隊が関与した病院外心停止症例の記録を前向きかつ地域網羅的に集計。
- 心電図や除細動データはAEDから抽出した。全てのウツタイン・心電図データは2名の研究者でチェックした。
- AEDの除細動波形により2群に分け、除細動成功割合、転帰を比較検討した。
- 群間の差異については χ^2 検定、1元配置の分散分析を用いて算出した。