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**日本循環器学会**

## » Abstract 90811

\*denotes a mandatory field

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### Abstract Information

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Acronym Abbreviation:	J-RCPR
Acronym:	Japanese Registry of CardioPulmonary Resuscitation
Category:	Bedside
Options:	No Options

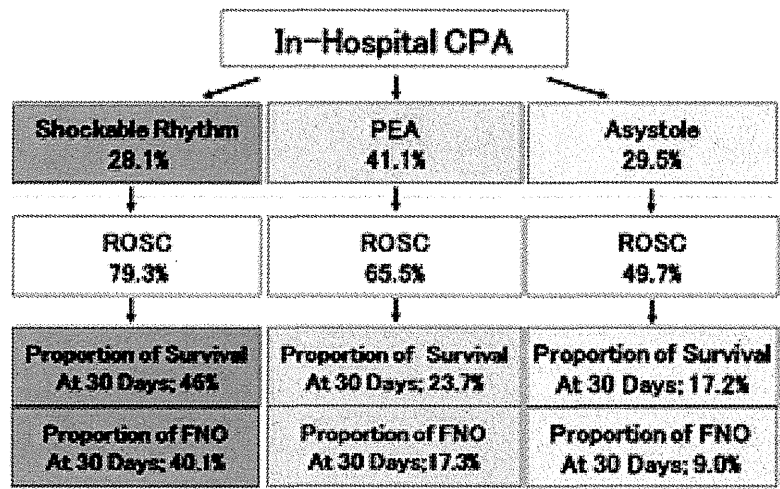
### Abstract Authors

H. Yokoyama<sup>1</sup>, H. Nonogi<sup>1</sup> - (1) National Cardiovascular Center, Suita, Osaka, Japan

### Abstract Content **99%**

[Backgrounds] In-hospital cardiopulmonary arrest (CPA) is an important matter. However, limited data are available in-hospital CPA in Japan. [Methods] Data was collected in 6 major categories of variables: facility data, patient demographic data, pre-event data, event data, outcome data, and quality improvement data in the J-RCPR. The patients with in-hospital CPA were registered prospectively from 12 hospitals, during January 2008 to December 2009 in Japan. All patients, hospital visitors, who experience a cardiopulmonary resuscitation event defined as either a pulselessness or a pulse with inadequate perfusion requiring chest compressions and/or defibrillation of ventricular fibrillation or pulseless ventricular tachycardia were registered with J-RCPR. [Results] 491 adults (71.0yo, M/F 310/180) enrolled. The prevalence of VF/VT as first documented rhythm was 28.3%, asystole was 30.0% and PEA was 41.7%. ROSC (return of spontaneous contraction) was 64.7%, rates of survival on 24 hr after CPA was 50.2%, and rates of good neurological outcome at 30 days after CPA was 21.4%. The rate of ROSC, the proportion of 30-day survival, and the proportion of favorable 30-day neurological outcome with a CPC score of 1 or 2 were 79.3%, 46.0% and 40.1%, respectively, in patients with pulseless VT/VF; 65.5%, 23.7%, and 17.3%, respectively, in patients with pulseless electrical activity; and 49.7%, 17.2%, and 9.0%, respectively, in patients with asystole. Immediate cause(s) of event were arrhythmia 31.0%, hypotension 15.9%, and acute respiratory insufficiency 26.3%. 67.1% of the patients were confirmed alive within 10 min before CPA. [Conclusion] This study reported of in-hospital CPA in Japan. These results were similar as the results reported from NRCPR in

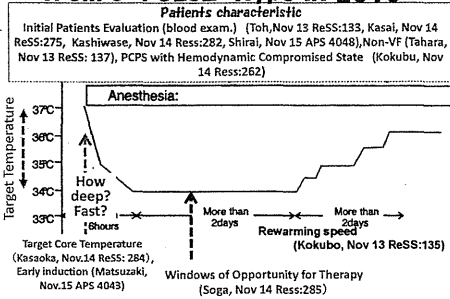
the United States.



Figure

The J-PULSE Hypothermia committee entrusted each hospital with the timing of cooling, cooling methods, target temperature, duration, rewarming rate and measurement of blood ammonia.

10 Clinical Questions  
from J-PULSE-Hypo in 2010



Study Endpoint

The primary endpoint was a favorable neurologic outcome\* at the time of hospital discharge.

\*the Glasgow-Pittsburgh cerebral performance category of 1 (good performance) or 2 (moderate disability) on a five-category scale.

Patients

432 unconscious adult patients who were treated with therapeutic hypothermia (32°C to 34°C) after ROSC



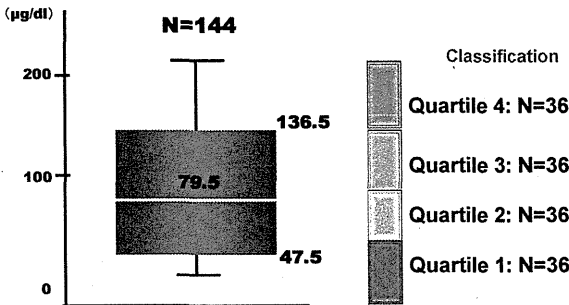
Exclusion criteria  
1. Age < 18 years  
2. A lack of blood sample  
3. Families refused to provide informed consent

144 patients whose NH<sub>3</sub> were measured on arrival at the emergency room

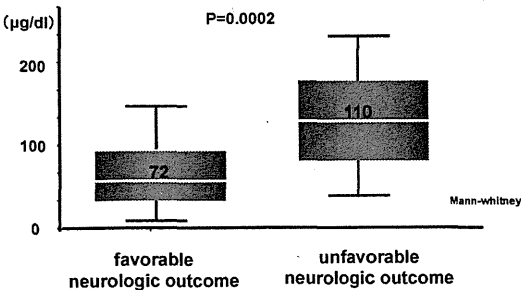


Age, median (range)	60 (51-69) year
Male	74%
Witnessed arrest	56%
Bystander CPR	24%
Call-to-Scene interval, median (range)	5 (4-7) min
Initial cardiac rhythm	
VF/VT	24%
PEA	25%
Asystole	51%

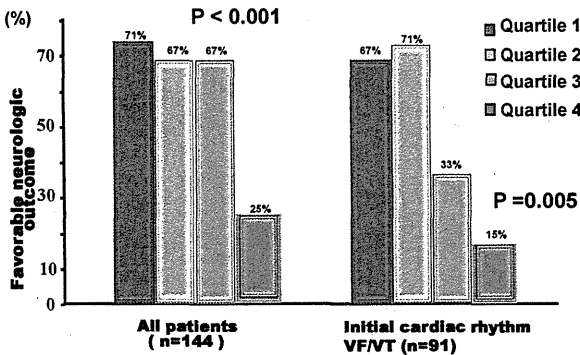
Blood Ammonia Levels on arrival at the ER



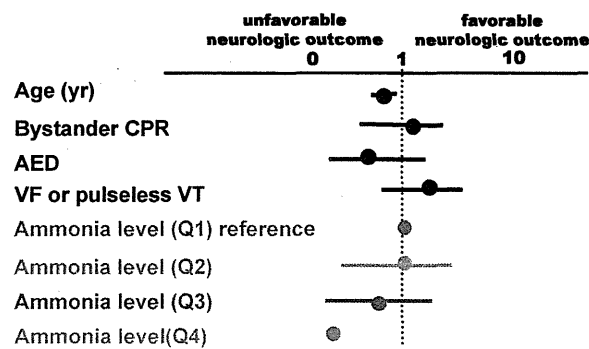
Association between the NH<sub>3</sub> levels and the Neurological Outcomes



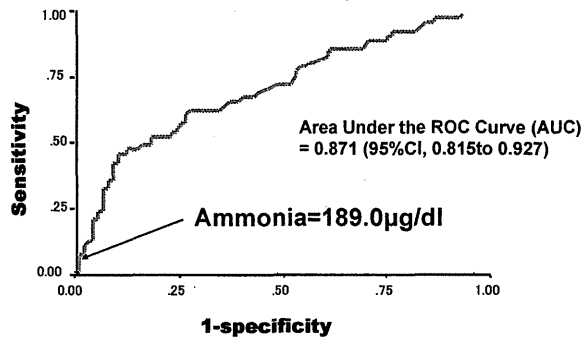
Association between the NH<sub>3</sub> Levels and the Ratio of Favorable Neurologic Outcomes



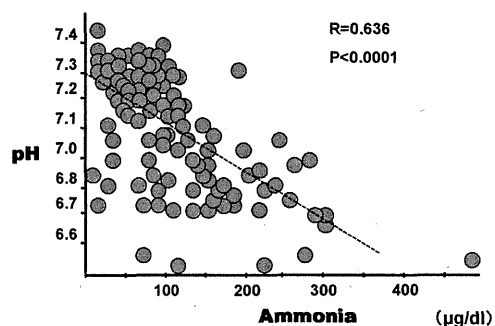
Adjusted odds ratio for Favorable Neurologic Outcome at Hospital Discharge



ROC curve for Various Cut off Levels of Ammonia to Differentiate Favorable Neurologic from Unfavorable Neurologic Outcome



Relationship between the Blood Ammonia Levels and arterial pH



Discussion No,1

The blood ammonia levels on arrival at the ER can be used to predict neurological outcome in patients with out-of-hospital cardiac arrest who were treated with hypothermia .

Elevated NH<sub>3</sub> levels were predictive of an increasing risk of unfavorable neurological outcome

Higher values were associated with negative predictive values. (An ammonia value of 189.0µg/dl, the negative predictive value was 100%) .

Therefore, we believe that early measurement of venous ammonia is needed to determine which patients should be treated with therapeutic hypothermia after cardiac arrest.

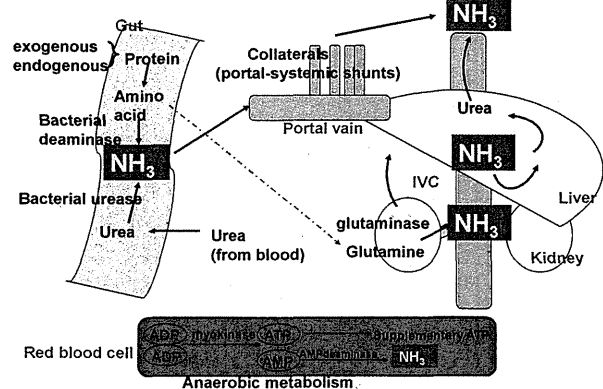
Discussion No,2

Ammonia metabolism involves primarily five organs, i.e. the gut, kidney, muscle, brain and liver. The causes of hyperammonemia can be divided into processes that increase in ammonia production or decrease in ammonia elimination. In the patients with out-of-hospital cardiac arrest, there was a correlation between the arterial ammonia level and the arterial lactic acid level at the time of ER arrival, and speculated that the ammonia was released from the red blood cells as a response to acidosis during cardiac arrest.

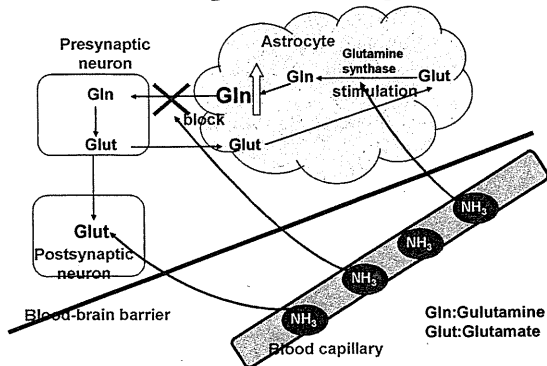
Hyperammonemia was associated with poor neurological outcome. These findings suggest that blood ammonia level on ER arrival is superior to other biochemical markers (NSE, end-tidal carbon dioxide ) at 24 to 72 hours after ROSC, in terms of a predictor of neurological outcome.

In addition, cerebral herniation has been shown to occur when the arterial ammonia level is more than 146µg/dl in patients with acute liver failure. In this study, no patients had favorable neurological outcome when the ammonia level on ER arrival was 189µg/dl or more. These findings suggest that hyperammonemia causes poor neurological

A production process of the ammonia



## A relationship between ammonia and astrocyte swelling in brain



## Study Limitation

1. It was multi-center study for cardiopulmonary resuscitation after out-of-hospital cardiac arrest. But there were a small number of patients who succeed to produce measurements of blood ammonia before induction of hypothermia.
2. We measured ammonia concentration at the time of ER arrival. If the ammonia was measured at the time of paramedic arrival at the patient's side or at the time of achievement of ROSC, the upper limit of ammonia level for neurological outcome might have been slightly different.

## Conclusions

High level of ammonia on ER arrival was associated with poor neurological outcome for patients treated with therapeutic hypothermia.

Ammonia provides useful predictive neurological information before induction of hypothermia.

## **Impact of Underlying Diseases on the Prognosis in Patients with Inhospital Cardiac Arrest; from the Japanese Registry of CPR for Inhospital Cardiac Arrest (J-RCPR)**

**Author Block** Taro Sasaoka, Natl Cerebral and Cardiovascular Ctr, Osaka, Japan; Naohiro Yonemoto, Natl Ctr of Neurology and Psychiatry, Tokyo, Japan; Hiroyuki Yokoyama, Hiroshi Nonogi, Natl Cerebral and Cardiovascular Ctr, Osaka, Japan; J-RCPR Investigators

### *Abstract:*

**Background:** In-hospital cardiopulmonary arrest (IHCPA) is an important factor of all cause of death. Although National Registry of Cardio Pulmonary Resuscitation (NRCPR) from United States has reported the rate of discharge was 18%, the impact of underlying disease on IHCPA remains unknown.

**Method:** A total of 491 consecutive adults with IHCPA were registered in J-RCPR as a multicenter trial. They were divided into two groups according to the underlying diseases; cardiovascular disease (Group C, n=265, including ACS/Arrhythmia/Heart failure/Aortic diseases), and non-cardiovascular disease (Group N, n=226).

**Result:** Baseline characteristics of sex, age did not show significant difference in Group C and Group N. In group C (Group N), the prevalence of Vf/VT as first documented rhythm was 38.5% (16.4%,  $p<0.0001$ ), asystole was 20.8% (39.8%,  $p<0.0001$ ), and pulseless electrical activity was 39.6% (41.2%, N.S.). The prevalence of witnessed IHCPA was significantly higher in Group C than Group N (85.7% vs. 66.4%,  $p<0.0001$ ). The percentage of IHCA within 2 days of hospitalization was significantly higher in Group C (46.0% vs. 30.1%,  $p<0.001$ ). The place and the direct cause of IHCPA were different in each group. In group C, the rate of survival on 24 hours and 30 days after IHCPA was significantly higher than Group N (57.0%, 36.6% vs. 42.5%, 18.6%,  $p<0.001$  respectively.), even though the rate of return of spontaneous circulation (ROSC) was not significantly different. The rate of the favorable neurological function (CPC 1-2) among patients survived at 30 days after IHCPA was also higher in Group C (82.4% vs. 45.9%,  $p<0.001$ ).

**Conclusion:** Group C showed higher incidence of IHCPA in the early period of hospitalization and VT/Vf as first documented rhythm. Also, they showed better survival and neurological outcome from IHCPA. These results suggest the importance of intensive care in the early period of hospitalization in patients with cardiovascular disease.

Clinical characteristics			
	Cardiovascular disease (Group C)	Non-Cardiovascular disease (Group N)	p-value
N	265	226	
Witness of IHCPA	85.7%	66.4%	<0.0001
First documented rhythm at IHCPA			
Vf or VT	38.5%	16.4%	<0.0001
Asystole	20.8%	39.8%	<0.0001
IHCPA within 2 days of hospitalization	45.0%	30.1%	<0.001
Place of IHCPA confirmed			
General Ward	41.1%	65.9%	<0.01
Intensive Care Unit	28.3%	18.1%	<0.0001
Outcomes 30 days after IHCPA			
Death	63.4%	81.4%	<0.0001
Discharge	26.8%	18.1%	<0.0001
Favorable Neurological outcome (among pts survived at 30 days)	82.4%	45.9%	<0.001





# Impact of Underlying Diseases on the Prognosis in Patients with In-hospital Cardiac Arrest; from the Japanese Registry of CPR for In-hospital Cardiac Arrest (J-RCPR)

Taro Sasaoka<sup>1</sup>, Naohiro Yonemoto<sup>2</sup>, Hiroyuki Yokoyama<sup>1</sup>, Hiroshi Nonogi<sup>1</sup> and J-RCPR investigators

<sup>1</sup>Department of Cardiovascular Medicine, National Cerebral and Cardiovascular Center, Suita, Japan

<sup>2</sup>Department of Epidemiology and Biostatistics, National Center of Neurology and Psychiatry, Kodaira, Japan

No Conflict of Interest to Disclose

## Background

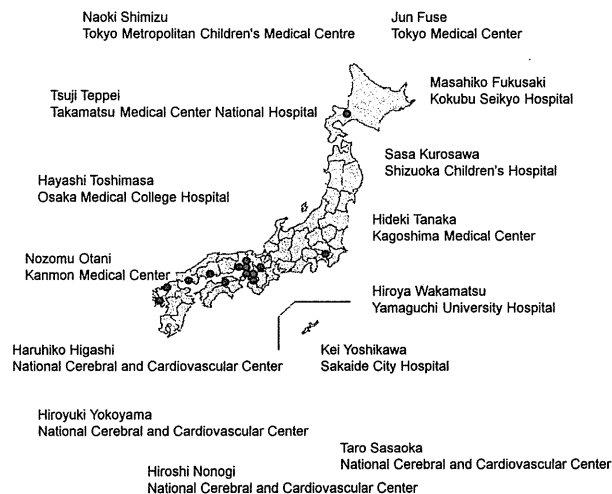
- In-hospital cardio pulmonary arrest (IHCPA) is an important factor of all cause of death.
- Although National Registry of Cardio Pulmonary Resuscitation (NRCPR) from United States has reported the rate of discharge was 18%, the impact of underlying disease on IHCPA remains unknown.

## Purpose

- The purpose of this study was to investigate whether there are differences in survival rate between cardiovascular disease and non-cardiovascular disease in patients with IHCPA.

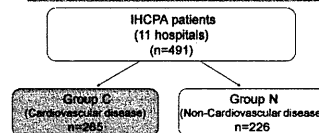
## Methods

- A total of 491 adults with IHCPA were registered prospectively from 11 hospitals in JRCPR from January 2008 to December 2009.



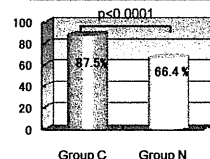
- They are divided in two groups according to the underlying disease, hospitalized for the treatment of cardiovascular disease (Group C, n=265, including ACS/Arrhythmia/Heart failure/Aortic diseases), and non-cardiovascular disease (Group N, n=226).

## Results

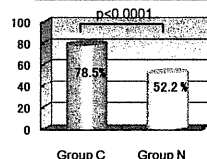


- Baseline characteristics of sex, age were not significantly different in Group C and Group N.

### Witnessed IHCPA (%)

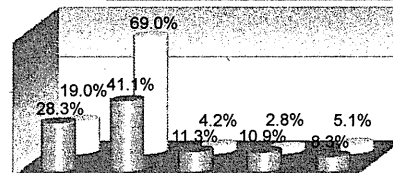


### ECG monitored (%)



- Percentages of witnessed IHCPA and ECG monitored were significantly higher in Group C than Group N.

### Place of IHCPA confirmed (%)



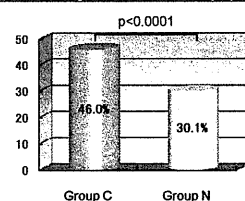
ICU: Intensive care unit, GW: General ward, OC: Outpatient clinic, OR: Operation room, CL: Catheter laboratory

Group C  
Group N

\* p<0.05

- Patients in Group C showed significantly higher prevalence of IHCPA confirmed in ICU, OC, OR or CL. On the other hand, Group N showed higher rate of IHCPA confirmed in GW.

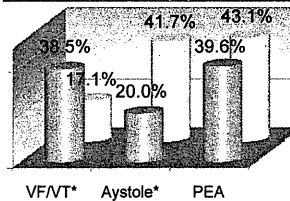
### IHCPA occurrence within 2 days of admission (%)



PEA: pulseless electrical activity, \* p<0.001

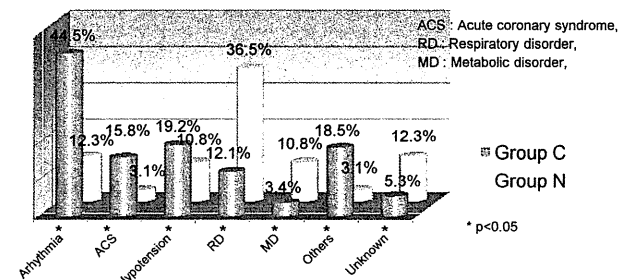
- The percentages of IHCPA occurrence within 2 days of hospital admission was significantly higher in Group C than Group N.
- Patients in Group C showed higher prevalence of VF/VT as first documented rhythm, lower prevalence of Asystole than Group N, whereas there was no difference in PEA.

### First documented rhythm of IHCPA (%)



VF/VT: Ventricular fibrillation/ventricular tachycardia, \* p<0.001

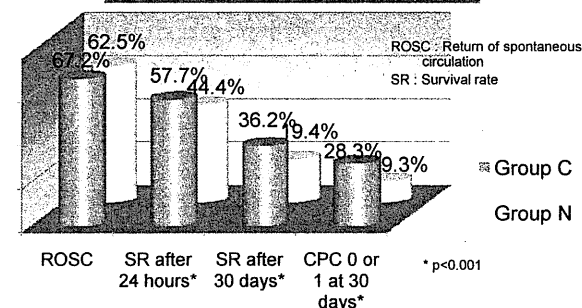
### Direct cause of IHCPA (%)



\* p<0.05

- Direct causes of IHCPA were significantly different in Group C and Group N.

### ROSC and SR after IHCPA (%)



\* p<0.001

- In group C, the rate of survival on 24 hours and 30 days after IHCPA was significantly higher than Group N, even though the rate of return of spontaneous circulation was not significantly different.
- The rate of the favorable neurological function (CPC 1-2) among patients survived at 30 days after IHCPA was also higher in Group C (82.4% vs. 45.9%, p<0.001).

## Conclusion

- Patients in Group C showed higher incidence of IHCPA in the early period of hospitalization and VF/VT as first documented rhythm.
- Also, they showed significantly better survival and neurological outcome from IHCPA.
- These results may suggest the importance of intensive care in the early period of hospitalization in patients with cardiovascular disease.

**Control/Tracking Number:** 2010-SS-A-15932-AHA

**Activity:** Abstract

**Current Date/Time:** 6/6/2010 6:10:29 PM

**Survival From In-Hospital Cardiac Arrest During Nights and Weekends From Japanese Registry of CPR (JRCPR)**

**Author Block:** Haruhiko Higashi, Natl Cerebral and Cardiovascular Ctr, Suita, Japan; Naohiro Yonemoto, Natl Ctr of Neurology and Psychiatry, Kodaira, Japan; Hiroyuki Yokoyama, Hiroshi Nonogi, Natl Cerebral and Cardiovascular Ctr, Suita, Japan

*Abstract:*

[Backgrounds] It has been reported that survival rates from in-hospital cardiac arrest were lower during nights and weekends from the National Registry of Cardiopulmonary Resuscitation (NRCPR). However, available data about in-hospital cardiac arrest is extremely limited and has not been investigated from aspects of time of day and day of week in Japan.

[Methods] The patients with in-hospital cardiopulmonary arrest (CPA) were registered prospectively from 11 hospitals, between January 2008 and December 2009 in Japan. We divided into two groups (Day/evening group and night group) based on the onset time of CPA. Day/evening was defined as 7:00 AM to 10:59 PM and night as 11:00 PM to 6:59 AM. Rate of return of spontaneous circulation (ROSC), survival at 24 hours, and favorable neurological outcomes were compared.

[Results] A total of 358 cases of in-hospital cardiac arrest occurred during day/evening hours (including 274 on weekdays and 84 on weekends), and 133 cases occurred during night hours (including 103 on weekdays and 30 on weekends). Rate of ROSC (70.2% vs. 49.6%;  $p<.0001$ ), survival at 24 hours (55.3% vs. 36.8%;  $p<.001$ ), and favorable neurological outcomes (20.9% vs. 8.2%;  $p<.001$ ) were significantly lower during the night compared with day/evening. Incidence of witnessed CPA and percentage of monitored patients were not significantly different between day/evening and night. However, the prevalence of asystole at first documented pulseless rhythm was higher in night group. During day/evening hours, in contrast to NRCPR, rate of ROSC (71.9% vs. 64.6%;  $p=0.22$ ), survival at 24 hours (55.8% vs. 53.6%;  $p=0.80$ ) and favorable neurological outcomes (21.5% vs. 19.0%;  $p=0.76$ ) were not significantly different between weekdays and on weekends. During night hours, these endpoints were similar between day/evening and night as well as the report from NRCPR.

[Conclusion] According to JRCPR, survival rates from in-hospital cardiac arrest are lower during

nights. Unlike NRCPR, survival rates are similar on weekends in Japanese population.

**Author Disclosure Information:** H. Higashi, None; N. Yonemoto, None; H. Yokoyama, None; H. Nonogi, None.

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# Survival From In-Hospital Cardiac Arrest During Nights and Weekends From Japanese Registry of CPR(JRCPR)

Haruhiko Higashi<sup>1</sup>, Naohiro Yonemoto<sup>2</sup>, Hiroyuki Yokoyama<sup>1</sup>, Hiroshi Nonogi<sup>1</sup>

<sup>1</sup>Department of Cardiovascular Medicine, National Cerebral and Cardiovascular Center, Suita, Japan

<sup>2</sup>Department of Epidemiology and Biostatistics, National Center of Neurology and Psychiatry, Kodaira, Japan

No Conflict of Interest to Disclose

## Background

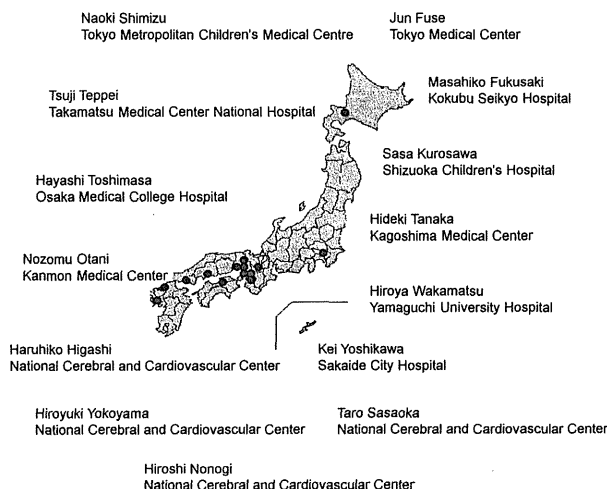
- It has been reported that survival rates from in-hospital cardiac arrest were lower during nights and weekends from the National Registry of Cardiopulmonary Resuscitation (NRCPR).
- However, available data about in-hospital cardiac arrest is extremely limited and has not been investigated from aspects of time of day and day of week in Japan.

## Aim

The aim of this study was to investigate whether there are differences in survival rate between day/evening and night or weekdays and weekends in Japan.

## Methods

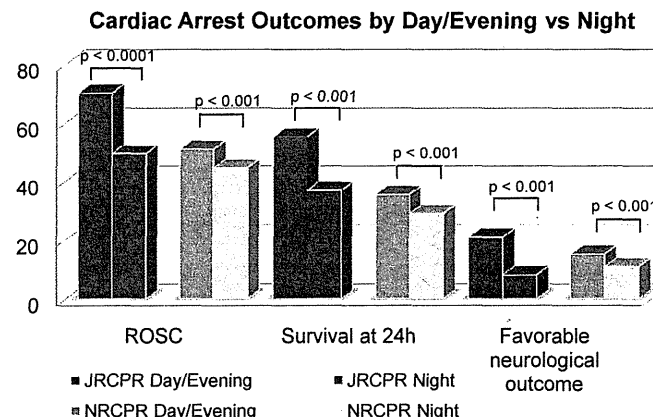
- The patients with in-hospital cardiopulmonary arrest (CPA) were registered prospectively from 11 hospitals, between January 2008 and December 2009 in Japan.



- We divided into two groups (Day/evening group and night group) based on the onset time of CPA.
- Day/evening was defined as 7:00 AM to 10:59 PM and night as 11:00 PM to 6:59 AM.
- Rate of return of spontaneous circulation (ROSC), survival at 24 hours, and favorable neurological outcomes were compared.

## Results

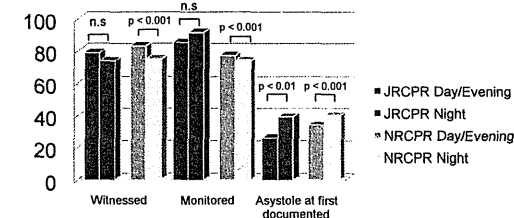
- A total of 358 cases of in-hospital cardiac arrest occurred during day/evening hours (including 274 on weekdays and 84 on weekends), and 133 cases occurred during night hours (including 103 on weekdays and 30 on weekends).
- Rate of ROSC (70.2% vs. 49.6%;  $p < .0001$ ), survival at 24 hours (55.3% vs. 36.8%;  $p < .001$ ), and favorable neurological outcomes (20.9% vs. 8.2%;  $p < .001$ ) were significantly lower during the night compared with day/evening.



NRCPR data: Peberdy MA, et al. Survival from in-hospital cardiac arrest during nights and weekends. JAMA 2008;299(7):785-792.

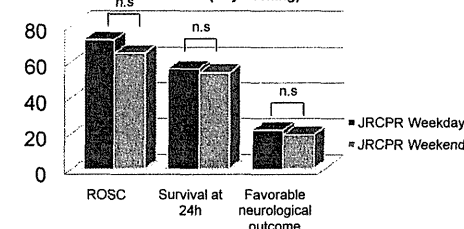
- Incidence of witnessed CPA and percentage of monitored patients were not significantly different between day/evening and night. However, the prevalence of asystole at first documented pulseless rhythm was higher in night group.

Cardiac Arrest Characteristics by Day/Evening vs Night



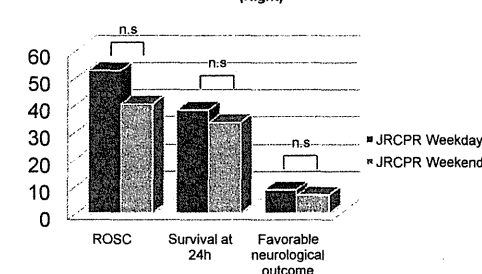
- During day/evening hours, in contrast to NRCPR, rate of ROSC (71.9% vs. 64.6%;  $p = 0.22$ ), survival at 24 hours (55.8% vs. 53.6%;  $p = 0.80$ ) and favorable neurological outcomes (21.5% vs. 19.0%;  $p = 0.76$ ) were not significantly different between weekdays and on weekends.

Cardiac Arrest Outcomes by Weekdays vs Weekends (Day/Evening)



- During night hours, these endpoints were similar between day/evening and night as well as the report from NRCPR.

Cardiac Arrest Outcomes by Weekdays vs Weekends (Night)



## Conclusion

According to JRCPR, survival rates from in-hospital cardiac arrest are lower during nights. Unlike NRCPR, survival rates on weekdays are similar to weekends in Japanese population.

## **The Detail of Individual Cardiovascular Disease on Inhospital Cardiopulmonary Arrest; from the Japanese Registry of CPR for Inhospital Cardiac Arrest (J-RCPR)**

**Author Block Taro Sasaoka**, Natl Cerebral and Cardiovascular Ctr, Osaka, Japan; Naohiro Yonemoto, Natl Ctr of Neurology and Psychiatry, Tokyo, Japan; Hiroyuki Yokoyama, Hiroshi Nonogi, Natl Cerebral and Cardiovascular Ctr, Osaka, Japan; J-RCPR Investigators

### *Abstract:*

**Background:** In-hospital cardiopulmonary arrest (IHCPA) is still a serious problem for cardiologists; recent studies have shown almost one half of all the IHCPA patients are based on cardiovascular diseases. However, the detail of individual cardiovascular disease remains unknown.

**Method:** A total of 491 consecutive adults with IHCPA were registered in J-RCPR as a multicenter trial. Among them, 222 (45%) patients were hospitalized with the treatment of cardiovascular diseases; acute coronary syndrome (ACS, Group A, n=78), heart failure (HF, Group B, n=56), and arrhythmia (Group C, n=77).

**Result:** Baseline characteristics of sex, age, and consciousness before IHCPA did not show significant difference in each group. Compared with other groups, Group B showed lower rate of ECG monitoring (Group A: 90%, Group B: 70%, Group C: 95%,  $p<0.001$ ) and the witnessed IHCPA (95%, 75%, 91%,  $p<0.001$ ), higher rate of IHCPA in general ward (19%, 63%, 38%,  $p<0.001$ ). The percentage of IHCPA within 2 days of hospitalization was significantly higher in Group A (61% vs. 39% vs. 43%,  $p<0.05$ ). Interestingly, the prevalence of first documented rhythm and the first treatment of IHCPA were not different in each group; however, the rate of return of spontaneous circulation (ROSC) is significantly higher in Group C (67%, 55%, 92%,  $p<0.001$ ) and survival rate after 30days of IHCPA was significantly lower in Group B (41%, 27%, 52%,  $p<0.001$ ).

**Conclusion:** ACS patients showed higher rate of IHCPA within 2days of hospitalization; thus, we need to pay special attention to those patients in acute phase of hospitalization. In addition, the fact that patients with HF showed poor prognosis implies ECG monitoring and possible intensive care may lead to better outcome.

	ACS (Group A)	Heart Failure (Group B)	Arrhythmia (Group C)	p-value
N	78	56	77	
Witness of IHCPA	95%	73%	91%	<0.0001
First documented rhythm at IHCPA				
Vf or VT	44%	36%	52%	NS
Asystole	22%	23%	14%	NS
PEA	35%	39%	34%	NS
IHCPA within 2 days of hospitalization	63%	43%	44%	<0.05
Place of IHCPA confirmed				
General Ward	19%	63%	38%	<0.0001
Intensive Care Unit	40%	21%	29%	<0.1
ROSC	67%	55%	92%	<0.0001
Outcome 30 days after IHCPA				
Death	59%	73%	48%	<0.0001
Discharge	32%	9%	44%	<0.0001
Favorable Neurological outcome (among pts survived at 30 days)	78%	67%	79%	N.S.



# The Detail of Individual Cardiovascular Disease on In-hospital Cardiopulmonary Arrest; from the Japanese Registry of CPR for In-hospital Cardiac Arrest (J-RCPR)

Taro Sasaoka<sup>1</sup>, Naohiro Yonemoto<sup>2</sup>, Hiroyuki Yokoyama<sup>1</sup>, Hiroshi Nonogi<sup>1</sup> and J-RCPR investigators

<sup>1</sup>Department of Cardiovascular Medicine, National Cerebral and Cardiovascular Center, Suita, Japan

<sup>2</sup>Department of Epidemiology and Biostatistics, National Center of Neurology and Psychiatry, Kodaira, Japan

No Conflict of Interest to Disclose

## Background

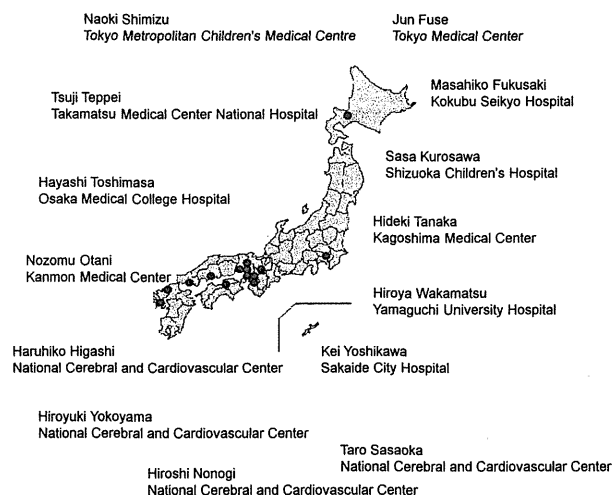
- ◆ In-hospital cardiopulmonary arrest (IHCPA) is still a serious problem.
- ◆ Some studies have shown almost one half of all the IHCPA patients are based on cardiovascular diseases. However, the detail of individual cardiovascular disease remains unknown.

## Purpose

- ◆ The purpose of this study was to investigate whether there is a difference in survival rate in individual cardiovascular disease among patients with IHCPA.

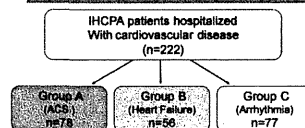
## Methods

- ◆ A total of 491 adults with IHCPA were registered prospectively from 11 hospitals in JRCPR from January 2008 to December 2009.



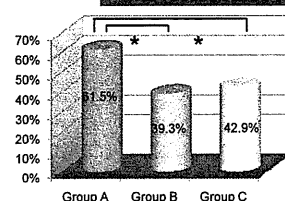
- ◆ Among those patients registered, 222 (45%) patients were hospitalized with the treatment of cardiovascular diseases; acute coronary syndrome (ACS, Group A, n=78), heart failure (HF, Group B, n=56), and arrhythmia (Group C, n=77).

## Results



- ◆ Baseline characteristics of sex, age were not significantly different in each group.

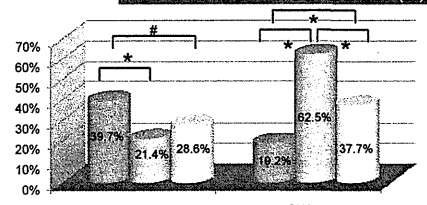
### IHCPA occurrence within 2 days of admission (%)



- ◆ The percentage of IHCPA within 2 days of hospitalization was significantly higher in Group A than Group B and Group C.

\* p<0.01

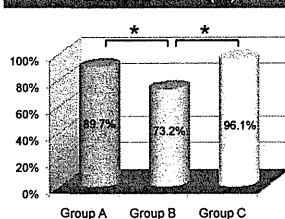
### Place of IHCPA confirmed (%)



- ◆ Percentages of IHCPA confirmed at ICU was significantly higher in Group A than Group B and tended to be higher than Group C.
- ◆ Group B patients showed significantly higher prevalence of IHCPA confirmed in general ward than Group A and group C.

\* p<0.05  
# p<0.1

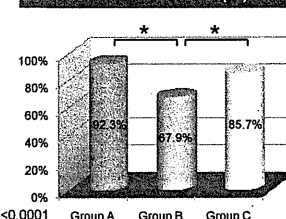
### Witnessed IHCPA (%)



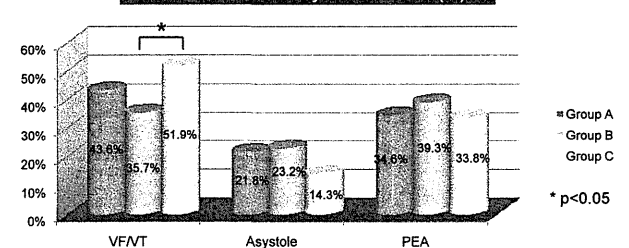
\* p<0.0001

- ◆ Percentages of witnessed IHCPA was significantly lower in Group B than Group A and Group C.
- ◆ Number of patients ECG monitored was also significantly smaller in Group B than Group A and Group C.

### ECG monitored (%)



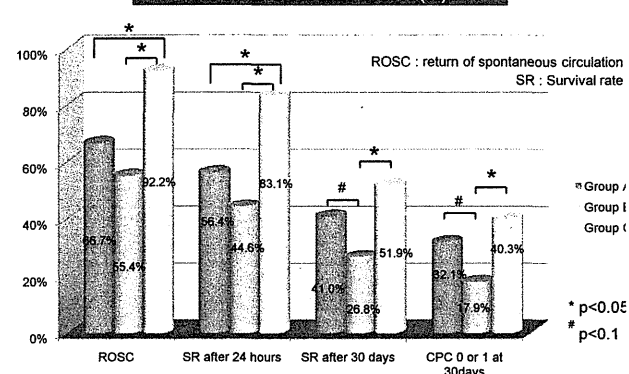
### First documented rhythm of IHCPA (%)



\* p<0.05

- ◆ In group C, percentages of VF/VT as first documented rhythm was tended to be higher than Group B.
- ◆ Percentages of Asystole and PEA were not different in each group.

### ROSC and SR after IHCPA (%)



\* p<0.05  
# p<0.1

- ◆ Patients in Group C showed significantly higher rate of ROSC and SR after 24 hours than Group A and Group B.
- ◆ The percentages of SR after 30days and favorable neurological function (CPC0 or 1) after IHCPA was significantly lower in Group B than Group and tended to be lower than Group A.

## Conclusion

- ◆ ACS patients showed higher rate of IHCPA within 2days of hospitalization. Thus, we need to pay special attention to ACS patients in acute phase of hospitalization.
- ◆ In addition, we found the difference in outcome after IHCPA; HF patients showed poor prognosis compared with other groups.
- ◆ Further studies are necessary to explore the mechanism of these findings.

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- J-Hypo

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