



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

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No Conflict of Interest to Disclose

## Background

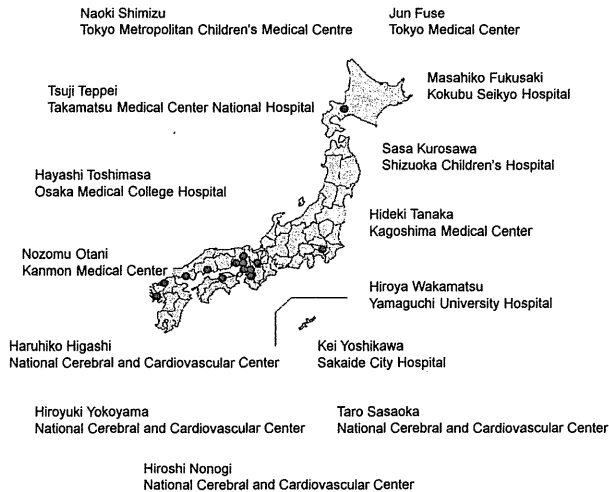
- It has been reported that survival rates from in-hospital cardiac arrest were lower during nights and weekends from the National Registry of Cardiopulmonary Resuscitation (NRCPR).
- However, available data about in-hospital cardiac arrest is extremely limited and has not been investigated from aspects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

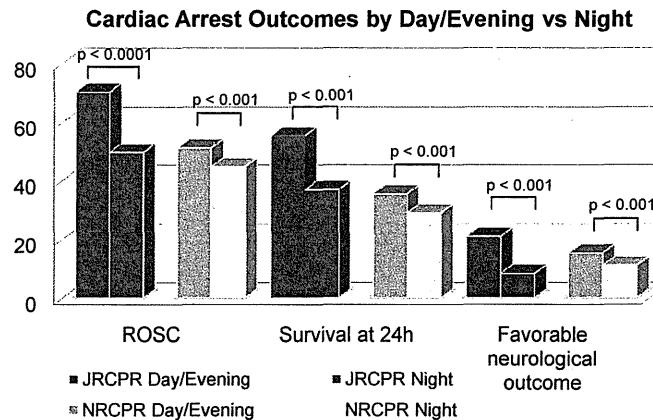
- The patients with in-hospital cardiopulmonary arrest (CPA) were registered prospectively from 11 hospitals, between January 2008 and December 2009 in Japan.



- 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

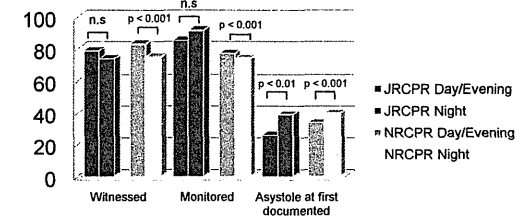
- A total of 358 cases of in-hospital cardiac arrest occurred during day/evening hours (including 274 on weekdays and 84 on weekends), and 133 cases occurred during night hours (including 103 on weekdays and 30 on weekends).
- Rate of ROSC (70.2% vs. 49.6%;  $p < 0.0001$ ), survival at 24 hours (55.3% vs. 36.8%;  $p < 0.001$ ), and favorable neurological outcomes (20.9% vs. 8.2%;  $p < 0.001$ ) 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.

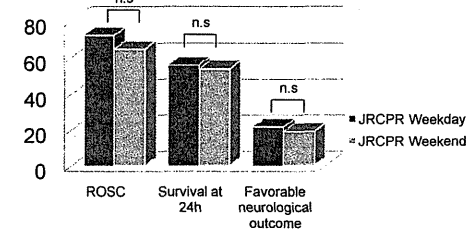
- Incidence of witnessed CPA and percentage of monitored patients were not significantly different between day/evening and night. However, the prevalence of asystole at first documented pulseless rhythm was higher in night group.

Cardiac Arrest Characteristics by Day/Evening vs Night



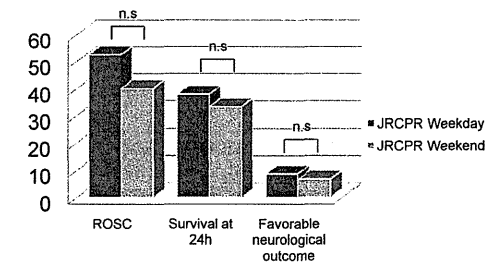
- During day/evening hours, in contrast to NRCPR, rate of ROSC (71.9% vs. 64.6%;  $p = 0.22$ ), survival at 24 hours (55.8% vs. 53.6%;  $p = 0.80$ ) and favorable neurological outcomes (21.5% vs. 19.0%;  $p = 0.76$ ) were not significantly different between weekdays and on weekends.

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



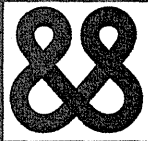
- During night hours, these endpoints were similar between day/evening and night as well as the report from NRCPR.

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.



# 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)

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No Conflict of Interest to Disclose

## Background

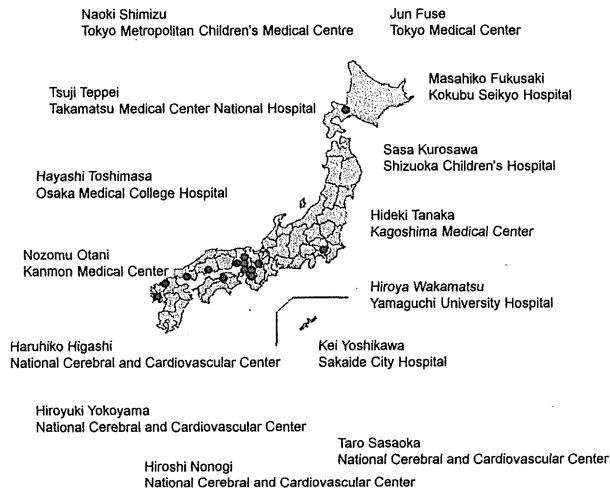
- ◆ In-hospital cardio pulmonary arrest (IHCPA) is an important factor of all cause of death.
- ◆ Although National Registry of Cardio Pulmonary Resuscitation (NRCPR) from United States has reported the rate of discharge was 18%, the impact of underlying disease on IHCPA remains unknown.

## 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.

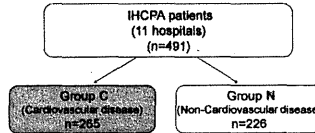
## Methods

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



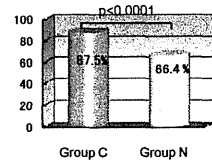
- ◆ They are divided in two groups according to the underlying disease, hospitalized for the treatment of cardiovascular disease (Group C, n=265, including ACS/Arrhythmia/Heart failure/Aortic diseases), and non-cardiovascular disease (Group N, n=226).

## Results

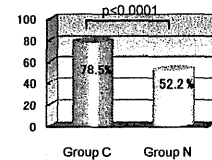


- ◆ Baseline characteristics of sex, age were not significantly different in Group C and Group N.

### Witnessed IHCPA (%)

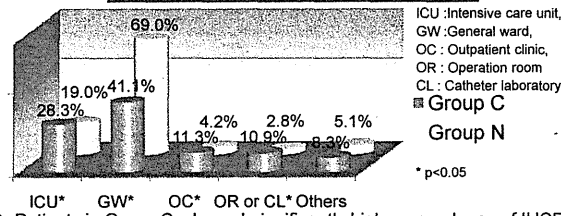


### ECG monitored (%)



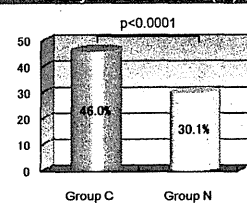
- ◆ Percentages of witnessed IHCPA and ECG monitored were significantly higher in Group C than Group N.

### Place of IHCPA confirmed (%)



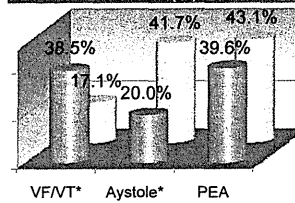
- ◆ Patients in Group C showed significantly higher prevalence of IHCPA confirmed in ICU, OC, OR or CL. On the other hand, Group N showed higher rate of IHCPA confirmed in GW.

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



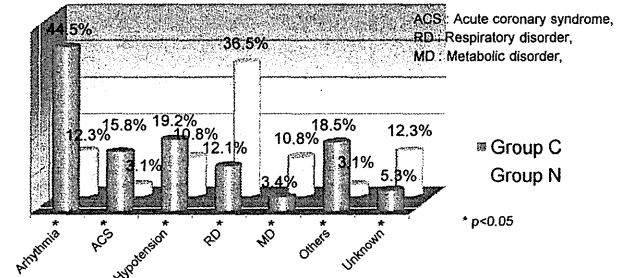
PEA: pulseless electrical activity, \* p<0.001

### First documented rhythm of IHCPA (%)



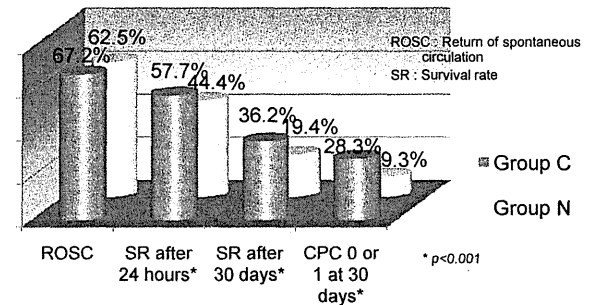
- ◆ The percentages of IHCPA occurrence within 2 days of hospital admission was significantly higher in Group C than Group N.
- ◆ Patients in Group C showed higher prevalence of VF/VT as first documented rhythm, lower prevalence of Aystole than Group N, whereas there was no difference in PEA.

### Direct cause of IHCPA (%)



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

### ROSC and SR after IHCPA (%)



- ◆ 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.



# 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

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No Conflict of Interest to Disclose

## Background

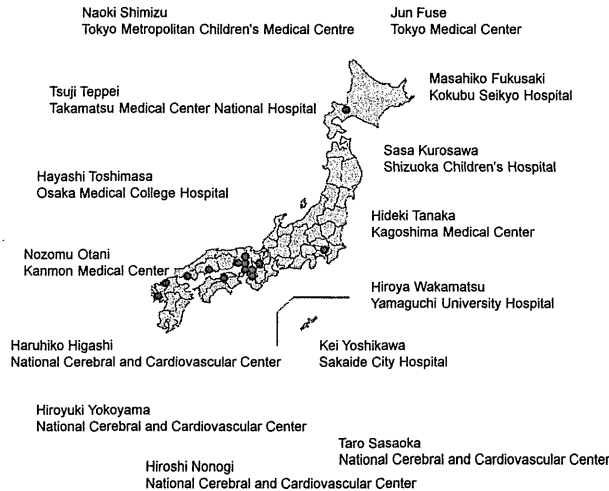
- ◆ In-hospital cardiopulmonary arrest (IHCPA) is still a serious problem.
- ◆ Some studies have shown almost one half of all the IHCPA patients are based on cardiovascular diseases. However, the detail of individual cardiovascular disease remains unknown.

## 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.

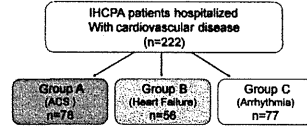
## Methods

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



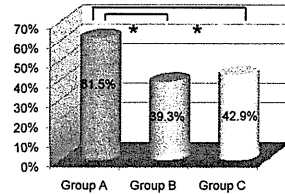
- ◆ Among those patients registered, 222 (45%) patients were hospitalized with the treatment of cardiovascular diseases; acute coronary syndrome (ACS, Group A, n=78), heart failure (HF, Group B, n=56), and arrhythmia (Group C, n=77).

## Results



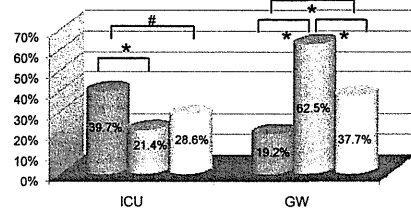
- ◆ Baseline characteristics of sex, age were not significantly different in each group.

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



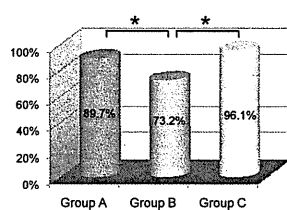
- ◆ The percentage of IHCPA within 2 days of hospitalization was significantly higher in Group A than Group B and Group C.

### Place of IHCPA confirmed (%)



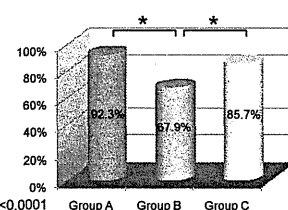
- ◆ Percentages of IHCPA confirmed at ICU was significantly higher in Group A than Group B and tended to be higher than Group C.
- ◆ Group B patients showed significantly higher prevalence of IHCPA confirmed in general ward than Group A and group C.

### Witnessed IHCPA (%)

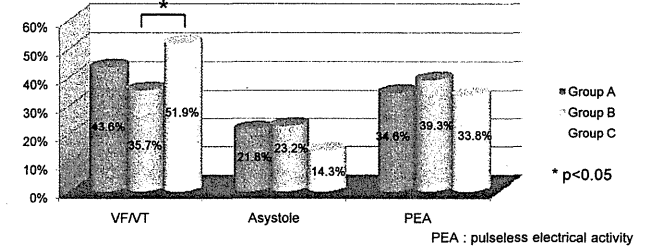


- ◆ Percentages of witnessed IHCPA was significantly lower in Group B than Group A and Group C.
- ◆ Number of patients ECG monitored was also significantly smaller in Group B than Group A and C.

### ECG monitored (%)

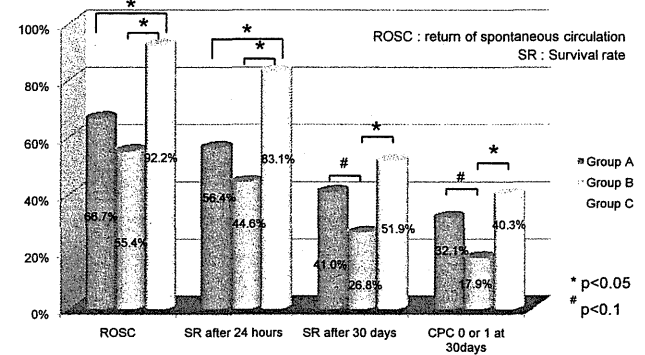


### First documented rhythm of IHCPA (%)



- ◆ 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 (%)



- ◆ 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 30 days and favorable neurological function (CPC 0 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 2 days 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.

# 日循学会抄録 採択課題

1. Effect of CPR training on favorable neurologic outcome for in-hospital cardiac arrest from the Japanese Registry of CPR for In-hospital Cardiac Arrest (JRCPR) 吉川先生
2. The Impact of Individual Cardiovascular Disease on In-Hospital Cardiopulmonary Arrest (J-RCPR) 篠岡先生
3. Cardiovascular and Non-cardiovascular Disease on the Prognosis of In-Hospital Cardiac Arrest (J-RCPR) 篠岡先生
4. Clinical Outcome from In-Hospital Cardiac Arrest During Nights and Weekends: Japanese Registry of CPR for In-Hospital Cardiac Arrest(JRCPR) 大谷先生
5. The Impact of Therapeutic Hypothermia in the Treatment with Patients with out-of-Hospital Cardiopulmonary arrest from J-Pulse-Hypo registry 横山先生
6. The Report from The Japanese Registry of CPR for In-hospital Cardiac Arrest (J-RCPR) 横山先生
7. Factors Related to Clinical Outcome in Patients with Ventricular tachycardia and fibrillation as Initial Arrest Rhythm in In-hospital Cardiopulmonary Arrest 田中先生

## Effect of CPR training on favorable neurologic outcome for in-hospital cardiac arrest from the Japanese Registry of CPR for In-hospital Cardiac Arrest (JRCPR)

### Background:

Many training courses for CPR have been performed to medical personnel but few data have been reported those effect.

### Method:

From 2008 to 2009, during 24 month, 491 patients were registered in the Japanese Registry of CPR for In-hospital Cardiac Arrest (JRCPR). In this study, 445 patients treated by the first responder received the CPR training (Group T n=357) and non-trained first responder (group n-T n=88) were analyzed.

We evaluated the ratio of return of spontaneous circulation (ROSC), 24 hours survival, survival discharge, good neurological function patients at discharge (CPC1 or 2 in Glasgow-Pittsburgh cerebral performance category) in each groups. We also analyzed each indexes initial rhythm VF/VT arrest (n=122) and PEA/Asystole (n=316).

### Result:

The ratio of ROSC, 24hr survival, survival discharge and good neurological performance were 65.8%, 47.1%, 28.0%, 21.1% in group T, and 59.1%, 48.9%, 28.4%, 10.3% in group n-T (In good CPC  $p < 0.05$ ). In VF/VT, the ratio were 80.2%, 70.3%, 50.5%, 45.5% in group T, and 74.2%, 64.5%, 35.5%, 15.4% in group n-T (In good CPC  $p < 0.05$ ). In PEA/Asystole, the ratio were 60.8%, 38.5%, 19.6%, 12.6% in group T, 50.0%, 39.3%, 23.2%, 5.9% in group n-T.

### Conclusion:

In-hospital cardiac arrest treated by the first responder with the CPR training is significantly associated with higher rate of favorable neurologic outcome, especially in VF/VT.

## The Impact of Individual Cardiovascular Disease on In-Hospital Cardiopulmonary 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:** Some studies have shown almost one half of in-hospital cardiopulmonary arrest (IHCPA) patients are based on cardiovascular diseases. However, the detail of individual cardiovascular disease remains unknown. **Method:** A consecutive series of 491 adults with IHCPA were registered in Japanese registry of CPR for in-hospital cardiac arrest (J-RCPR). Among them, 222 patients (45%) were hospitalized for 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 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%,  $p<0.001$ ). Patients in Group A showed greater rate of IHCPA within 2 days of hospitalization (61% vs. 39% vs. 43%,  $p<0.05$ ). The prevalence of first documented rhythm of IHCPA was not different in each group; however, the rate of return of spontaneous circulation (ROSC) was 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. Interestingly, patients with HF showed poorer prognosis even though the prevalence of first documented rhythm was not different.

## Cardiovascular and Non-cardiovascular Disease on the Prognosis of In-Hospital Cardiac Arrest (J-RCPR)

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### Abstract:

**Background:** In-hospital cardiopulmonary arrest (IHCPA) is an important factor of death; however, the detail of underlying disease remains unknown.

**Method:** 491 consecutive patients were registered in Japanese registry of CPR for in-hospital cardiac arrest (J-RCPR). They were divided into two groups; definitive cardiovascular disease (Group C, n=265), and non-cardiovascular disease (Group N, n=226).

**Result:** The prevalence of Vf/VT as first documented rhythm was 38.5% (16.4%,  $p<0.0001$ ), asystole was 20.8% (39.8%,  $p<0.0001$ ) in Group C (Group N). The survival rate was significantly higher in Group C, even though the rate of return of spontaneous circulation (ROSC) was not different. The rate of favorable neurological function was also higher in Group C (82.4% vs. 45.9%,  $p<0.001$ ).

**Conclusion:** Patients with cardiovascular disease showed better outcome in IHCPA compared to patients with non-cardiovascular disease.

	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 2days of hospitalization	46.0%	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
Outcome 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

演題名 :

Clinical Outcome from In-Hospital Cardiac Arrest During Nights and Weekends: Japanese Registry of CPR for In-Hospital Cardiac Arrest(JRCPR)

抄録用図表の有無 : なし

抄録本文 :

<B>Purpose:</B> To examine whether outcomes after in-hospital cardiac arrest during nights and weekends differ from those during days and weekdays. <B>Method:</B> We examined survival from cardiac arrest in hourly time segments, defining day the time as from 8:00 to 15: 59, evening as from 16:00 to 23: 59, night as from 0:00 to 7:59, and weekends as Saturday and Sunday, in 488 adult, consecutive in-hospital cardiac arrest events in JRCPR obtained from 11 hospitals from January 1, 2008 though December 31, 2009. <B>Results:</B> 203 cases of in-hospital cardiac arrest occurred during day (106 on weekdays and 40 on weekends), 152 cases occurred during evening (106 on weekdays and 46 on weekends), 133 occurred during night (106 on weekdays and 27 on weekends). Rates of return of spontaneous circulation (ROS) during day were 79.1% on weekdays and 65.0% on weekends. Rates of ROS during evening were 64.2% and 58.7%, respectively. Rates of ROS during night were 53.8% and 37.0%, respectively. Survivals at 24 hours during day were 58.9% on weekdays and 50.0% on weekends. Survivals at 24 hours during evening were 47.2% and 47.8%, respectively. Survivals at 24 hours during night were 45.2% and 26.0%, respectively. <B>Conclusion:</B> Survival rates from in-hospital cardiac arrest are lower during nights and weekends.



第 75 回日本循環器学会総会・学術集会 Late Breaking Clinical Trials

以下のデータが登録番号 100056 で登録されました。

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共著者2 野々木 宏

キーワード1 :hypothermia キーワード2 :cardiac arrest

演題名：

The Impact of Therapeutic Hypothermia in the Treatment with Patients with out-of-Hospital Cardiacpulmonary arrest from J-Pulse-Hypo registry

抄録本文：

[Background] Mild hypothermia is an effective therapy for patients with return of spontaneous circulation after out-of-hospital cardiac arrest. However, the evidence of the efficacy of therapeutic hypothermia remains unclear. The purpose is to resolve clinical questions concerning therapeutic hypothermia by using multicenter registry database.

[Methods] We conducted a multicenter retrospective registry in Japan (J-Pulse-Hypo) from 14 institutions, to evaluate the effect of therapeutic hypothermia on out-of-hospital cardiac arrest, between January 2005 and December 2009. The committee entrusted each hospital with the timing of cooling, cooling methods, target temperature, duration, rewarming rate. Selection of cooling procedure was left to each institution.

[Results] In this study period, 452 patients (375 men) were enrolled into the registry. The age was 59±13 years. Initial ECG are VF/VT 78%, PEA 14%, asystole 8%. The median interval from collapse to return of spontaneous circulation was 25 (17-40) minutes. Mean temperature was 33.9±0.4 degrees C and mean cooling time was 32 hours. 102 patients (22.6%) were treated with percutaneous cardiopulmonary assisted devices, used in case with hemodynamic compromised state. The rates of favorable outcomes, Cerebral Performance Category of 1-2, at 30 days after onset was 69%. The rates of favorable outcomes were 63% in VF group, 32% in PEA group and 19% in asystole group.

[Conclusions] We conducted a multicenter retrospective registry and showed clinical aspect of therapeutic hypothermia.

第 75 回日本循環器学会総会・学術集会 Late Breaking Clinical Trials

以下のデータが登録番号 100055 で登録されました。

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共著者 野々木 宏

キーワード1：cardiac arrest キーワード2：resuscitation

演題名：

The Report from The Japanese Registry of CPR for In-hospital Cardiac Arrest (J-RCPR)

抄録本文：

[Backgrounds] In-hospital cardiopulmonary arrest (CPA) is an important matter and National Registry of Cardiopulmonary Resuscitation (NRCPR) from the United States reported that the rate of survival of hospital discharge following CPA was 18%. However, limited data are available in-hospital CPA in Japan. [Methods] Major pre- and in-hospital cardiac arrest and event, therapeutic interventions and time intervals and the data about condition of patients finally confirmed alive before CPA were collected. The patients with in-hospital CPA were registered prospectively from 11 hospitals, during January 2008 to December 2009 in Japan. All patients, visitors, employees, and staff within the facility campus, 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] 490 adults (71.0%±14.9, 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%. These prognosis of in-hospital CPA were similar as the report from NRCPR. 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, 53.9% of the patients were monitored and 78.

0% of the patients were witnessed at CPA. [Conclusion] This is the first report of in-hospital CPA in Japan. These results were similar as the results reported from NRCPR in the United States.

カテゴリー：Cardiopulmonary and critical care / ACLS

キーワード1：arrhythmia

キーワード2：cardiopulmonary resuscitation

演題名：

Factors Related to Clinical Outcome in Patients with Ventricular tachycardia and fibrillation as Initial Arrest Rhythm in In-hospital Cardiopulmonary Arrest

抄録用図表の有無：なし

抄録本文：

(Background) Better survival rate had been reported in case of ventricular tachycardia (VT) and ventricular fibrillation (VF) as initial arrest rhythm compared with other rhythms (PEA or Asystole) in in-hospital cardiopulmonary arrest. It is still unknown about predictive factors related to clinical mortality in patients with VT and VF as initial arrest rhythm.

(Methods) In a prospective observational study from multicenter registry (JRCPR) from 2008 to 2009, 24 months, total of 137 adults ( $\geq 20$  years, age:  $66 \pm 15$ ) with VT and VF were assessed. Survival data (ratio of Return of Spontaneous Circulation (ROSC), 24-hour survival, survival to hospital discharge) and arrest variables were collected, including preexisting conditions and therapeutic interventions. To detect predictive factors related to mortality, multivariate logistic regression analysis were performed. (Result) Of 137 patients, ratio of ROSC, 24-hour survival and survival to hospital discharge were 78.8%, 72.3% and 47.4%. After multivariate logistic regression analysis, advancing age, events during night and epinephrine use were significantly associated with poor outcome of both ROSC and survival to hospital discharge.

(Conclusion) For cardiac arrest with VT and VF as initial rhythm, high age, night event and epinephrine use appear to relate to poor outcome in in-hospital cardiopulmonary arrest. Further studies are needed to clarify the factors determining the prognosis of VT and VF in in-hospital cardiopulmonary arrest.

## 心肺蘇生記録記載要項

### 1. 目的

心肺蘇生の患者の正確な情報や客観的具体的事実を迅速に記載することで、各治療、処置の一連の過程を把握し心肺蘇生の質の向上を図る。

### 2. 記載内容

- 1) 急変時刻
- 2) 心停止確認時刻
- 3) 応援要請時刻
- 4) ドクターハート要請時刻
- 5) CPR開始時刻
- 6) 医師到着時刻
- 7) モニター装着時刻
- 8) 急変時の心電図調律
- 9) 最初の除細動(AEDを含む)
- 10) 最初のアドレナリン(エピネフリン)投与時刻
- 11) 最初のアトロピン投与時刻
- 12) 気管挿管時刻
- 13) CPR中止時刻
- 14) その他

### 3. その他

- 1) 定位置は救急カートとする
- 2) 記載者は必ずサインをする
- 3) 心肺蘇生経過記録用紙は心肺蘇生が開始された時刻から中止時まで使用する
- 4) 記録記載後はカルテに保存する(病歴委員会での承認を得る)
- 5) 心肺蘇生経過記録用紙のコピーを一部そえて、院内心肺蘇生事例報告書とともに(医療安全推進室)へ提出
- 6) ICU チャート、CCU チャート、NCU チャート、SCU チャート、一般重症チャート使用患者の場合も、『心肺蘇生経過記録用紙』に記載し、チャートに添付する。チャートの形式上添付が困難な場合は、必須記載事項をチャートに記入することとする。ただし、その場合も必須記載事項を記入した『院内心肺蘇生経過記録用紙』を、院内心肺蘇生事例報告書とともに、医療安全推進室に提出する。





2010.7.1 野々木班会議

## The Japanese Registry of CPR for In-hospital Cardiac Arrest (J-RCPR)

国立循環器病センター 心臓血管内科 緊急治療科  
横山広行・野々木宏・米本直裕

### 全米医学研究所

Shaping the Future for Health  
INSTITUTE OF MEDICINE

### 「人は誰でも間違える」

年間最大9.8万人医療ミスで死亡  
TO ERR IS HUMAN:  
BUILDING A SAFER HEALTH SYSTEM

Health care in the United States is not as safe as it should be—and can be. At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented, according to estimates from two major studies. Even using the lower estimate, preventable medical errors in hospitals exceed attributable deaths from such feared threats as motor-vehicle wrecks, breast cancer, and AIDS.

可避死(有害事象)  
are adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries or death, falls, burns, pressure ulcers, and mistaken patient identities. High error rates with serious



November 1999

### 第5章 エラーに関する報告システム

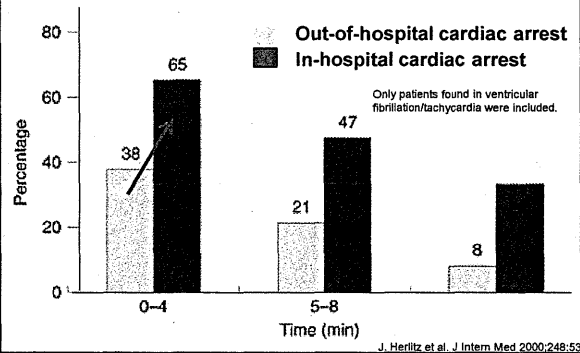
「強制報告システム (Mandatory reporting systems)」

「自発報告システム (voluntary reporting systems)」

## 背景

- 院外心停止は科学的根拠に基づいたガイドラインの普及により、その蘇生率は徐々に向上している。
- 一方、院内心停止においては、原因や対策に関する研究は十分ではない。
- 院内心停止に対する方策立案には、院内心停止に関する多施設登録に基づく実態調査が必要である。
- 米国ではAHAがスポンサーとなり2000年から院内心停止のデータを収集、評価するためにthe National Registry of Cardiopulmonary Resuscitation (NRCPR)の登録が開始された。

## Survival in relation to time to first defibrillation



### NRCPR

全米における院内心停止登録; 1999 AHA ECC Programs established a task force to develop the NRCPR

参加施設に登録用ソフト配布講習会開催  
2000年登録開始

JCAHO requirements for monitoring in-hospital resuscitation events

NRCPRの使命は「効率的に継続的データを収集、解析し、必要な設備、資源、訓練を評価することにより、より多くの人命を救うこと」が掲げられている。

### Facts About Cardiovascular Disease

Cardiovascular disease is the leading cause of death in the United States. It is the main cause of death for 35% of the population.

Heart disease is the leading cause of death in the United States. It is the main cause of death for 35% of the population.

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## 院内心停止において解決すべき Clinical Questions

1. 院内心停止の蘇生率・生存退院率は？
2. 院内心停止の直接原因・誘因は？
3. 入院の原因疾患と院内心停止の関係は？
4. 院内心停止の初期心調律の影響は？
5. 院内心停止においてすべき急性期治療は？
6. 院内心停止と院外心停止で治療効果は同一か？
7. 院内心停止の予防策は？
8. 講習会は院内心停止の生存率を改善するか？
9. 院内心停止は国内外で相違があるのか？
10. 成人と小児で院内心停止の特徴は異なるか？

**【J-RCP;院内心停止に関して解決すべきClinical Questions】**  
 J-RCPは2008-2009年分総数541例。成人(18歳以上)491例

1. 院内心停止の蘇生率・生存退院率は?院内心停止の国内外比較;JRCPR総論として2009年のデータを加え再解析(横山)
2. 院内心停止の直接原因と誘因;(岩国医療センター櫻木先生)
3. 入院の原因疾患と院内心停止の関係;(篠岡先生)
4. 初期心調律の影響;(鹿児島医療センター田中先生)
5. 発症場所と予後の関係;(山口大学若松弘也先生)
6. 講習会と院内心停止の予後;(坂出市立病院 吉川圭先生)
7. 発症時間と予後、休日夜間の検討;(関門医療センター大谷先生→再解析;愛媛大学大学院 東晴彦先生)
8. 院内心停止の予防策、心停止前の状況に関する検討;(高松医療センター 辻先生)
9. 院内心停止予防策、入院原因;(東京医療センター布施先生)
10. 成人と小児で院内心停止の特徴は異なるか;(成育医療セ)
11. 院内心停止と性差;(函館医療センター米澤先生)

**First Documented Rhythm and Clinical Outcome From In-Hospital Cardiac Arrest Among Children and Adults**  
 VM. Nadkarni, GL Larkin, MA Peberdy, et al, for the National Registry of Cardiopulmonary Resuscitation Investigators *JAMA*. 2006;295:50-57.

**院内心停止における発症時心電図;成人と小児の比較**  
 (N=36,902)

**Survival From In-Hospital Cardiac Arrest During Nights and Weekends**  
 MA. Peberdy, JP. Ornato, GL. Larkin, RS. Braithwaite, et al. *JAMA*, 2008; 299:785-792.

**院内心停止における生存退院率の検討;日中と夜間・週末の検討**  
 (N=86,748)

**First Documented Rhythm and Clinical Outcome From In-Hospital Cardiac Arrest Among Children and Adults**  
 VM. Nadkarni, GL Larkin, MA Peberdy, Scott M. CW Kaye, ME. Mancini, G Nichol, T Lane-Truitt, J Potts, JP. Ornato, RA. Berg, for the National Registry of Cardiopulmonary Resuscitation Investigators *JAMA*. 2006;295:50-57.

Results. The rate of survival to hospital discharge following pulseless cardiac arrest was higher in children than adults [27% (236/880) vs 18% (6485/36 902); adjusted odds ratio [OR], 2.29; 95% confidence interval [CI], 1.95-2.68]. Of these survivors, 65% (154/236) of children and 73% (4777/6485) of adults had good neurological outcomes. The prevalence of VF or pulseless VT was the in intensive care unit location of arrest, and duration of cardiopulmonary resuscitation, only first documented pulseless arrest rhythm remained significantly associated with differential survival to discharge (24% [135/563] in children vs 11% [2719/24 987] in adults with asystole and PEA; adjusted OR, 2.73; 95% CI, 2.23-3.32).

**院内心停止;発症時心電図 Children vs Adult**

**Survival From In-Hospital Cardiac Arrest During Nights and Weekends**  
 MA. Peberdy, JP. Ornato, GL. Larkin, RS. Braithwaite, et al. *JAMA*, 2008; 299:785-792.

Results. A total of 58 593 cases of in-hospital cardiac arrest occurred during day/evening hours (including 43 483 on weekdays and 15 110 on weekends), and 28 155 cases occurred during night hours (including 20 365 on weekdays and 7790 on weekends). Rates of survival to discharge (14.7% [95% CI, 14.3%-15.1%] vs 19.8% [95% CI, 19.5%-20.1%], return of spontaneous circulation for longer than 20 minutes (44.7% [95% CI, 44.1%-45.3%] vs 51.1% [95% CI, 50.7%-51.5%]), survival at 24 hours (28.9% [95% CI, 28.4%-29.4%] vs 35.4% [95% CI, 35.0%-35.8%]), and survival at 72 hours (15.1% [95% CI, 14.7%-15.5%] vs 19.8% [95% CI, 19.5%-20.1%]) were higher during night hours than during day/evening hours (odds ratio [OR], 1.15 [95% CI, 1.09-1.22]), whereas among in-hospital cardiac arrests occurring during night hours, survival to discharge was similar on weekdays (14.6% [95% CI, 14.1%-15.2%]) and on weekends (14.8% [95% CI, 14.1%-15.2%]); odds ratio, 1.02 [95% CI, 0.94-1.11]).

**院内心停止;生存退院率 During Nights vs During Weekends**

PI 3/7 15:30-16:20

**The Japanese Registry of CPR for In-hospital Cardiac Arrest (JRCPR)**

国立循環器病センター 心臓血管内科 緊急治療科  
 横山広行・野々木宏・米本直裕

Division of Cardiology and Emergency Medicine, National Cardiovascular Center, Suita, Osaka Japan  
 Hiroyuki Yokoyama, Hiroshi Nonogi, Naohiro Yonemoto

The 74th Annual Scientific Meeting of the Japanese Circulation Society, March 2010

**背景**

- 院外心停止は科学的根拠に基づいたガイドラインの普及により、その蘇生率は徐々に向上している。
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- 米国ではAHAがスポンサーとなり2000年から院内心停止のデータを収集、評価するためにthe National Registry of Cardiopulmonary Resuscitation (NRCPR)の登録が開始されている。



### 目的

- 院内心停止の原因と病態、心肺蘇生活動の状況、治療効果に関する情報を正確に解析することにより、院内心停止のなかで可避死に対する対策を立案する。
- 国際比較可能な登録システムを構築する。
- 多施設共同前向き登録調査を、2008年から開始した(現在11施設が参加)。
- **Japanese Registry of CardioPulmonary Resuscitation : (J-RCPR)**

### NRCPR : CPA Inclusion Criteria

1. 病院施設中のすべての患者\*、訪問者、従業員、スタッフを対象とする。
  - 脈なし、または組織灌流が不十分なために胸骨圧迫\* かつ/または心室細動か無脈性心室頻拍に対する除細動による心肺蘇生法を施行された、心肺停止事例
1. 院内心停止として、病院全域(一般入院病棟)の事例と、集中治療部門(ICU、緊急部、手術室、PACU、分娩室)で、救急部門スタッフにより応答された事例を含む。

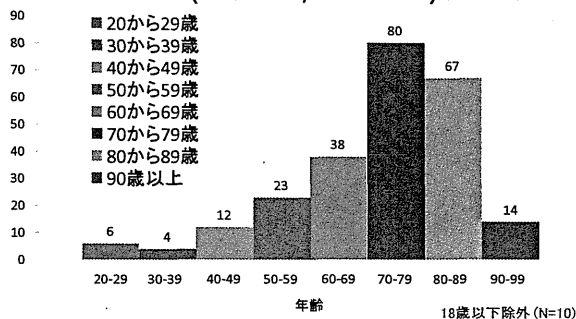
\*最小の入院期間の規定はない。  
 \*脈があっても胸骨圧迫を必要とする低灌流例は含まれている。  
 (例: 徐脈で低灌流により蘇生中に胸骨圧迫を受けた子供)  
 \*\* ICU、PACU、手術室、分娩室で胸骨圧迫かつ/または、除細動を必要とした全ての事例は、たとえ病院が蘇生記録を完成することを要求する症例であっても、登録すべきである。

### NRCPR : CPA Exclusion Criteria

- 搬送途中に生じた心停止を含めた、院外心停止例。  
院到着前の心停止、病院到着後に緊急部で心肺蘇生術が継続された事例、病院到着後20分以上ROC3.4が維持する前に、緊急部で再開された蘇生事例。
- 病院施設内の第1発見者が対応し、EMS(消防士、救急隊員、救急車)により継続した蘇生が引き継がれた事例。
- 胸部圧迫、そして/または、除細動を必要としない事例。
- VFかpulseless VTに対して胸骨圧迫、除細動を必要とせず脈があるためカルディオバージョンを実施した事例。
- ICDで除細動成功、胸骨圧迫、体外式除細動必要ない例。
- 化学Codeの事例;心停止時胸骨圧迫、除細動実施せず、薬剤投与だけを許容する変更DNR/DNAR状態の事例。
- 脳死後に生じた心停止。

### 院内心停止 : 発症時年齢 J-RCPR 2008

251 adults (71.4±14.7, M/F 161/90) enrolled.

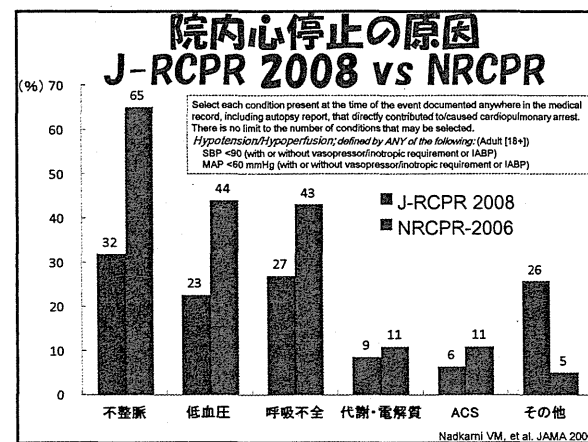
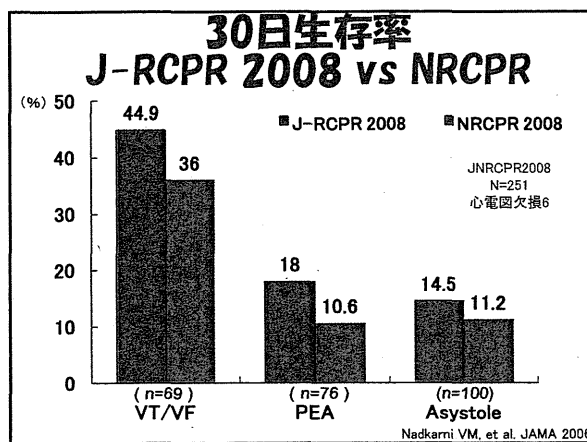
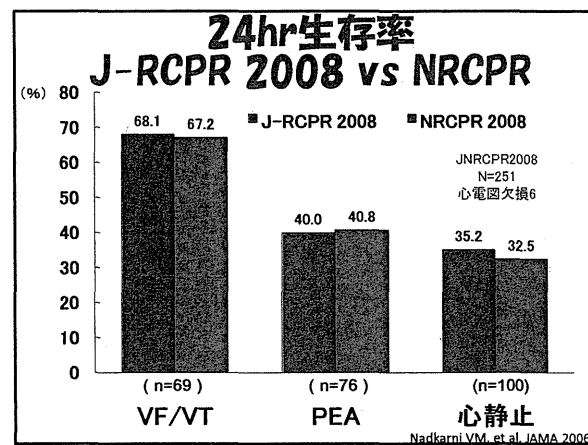
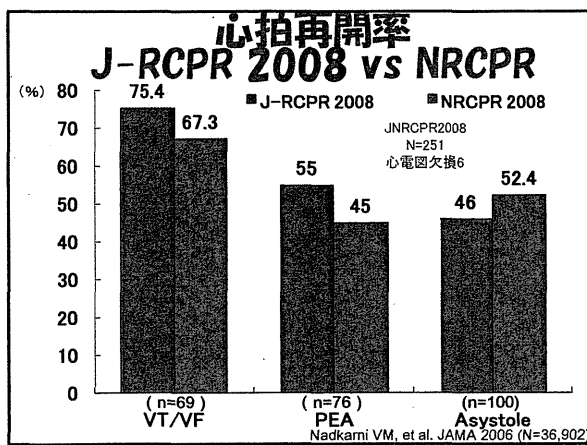
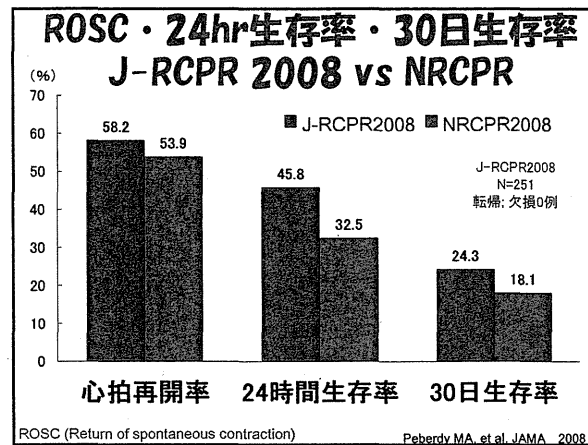
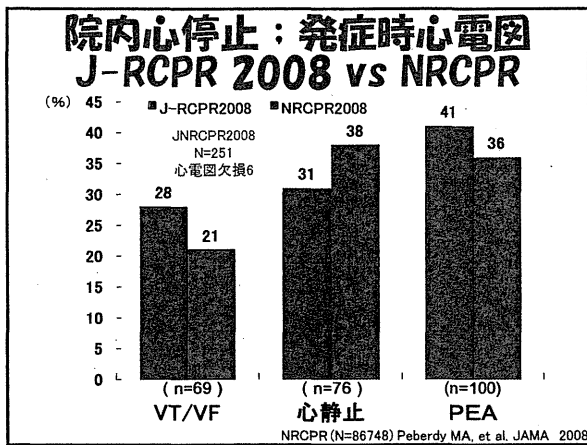


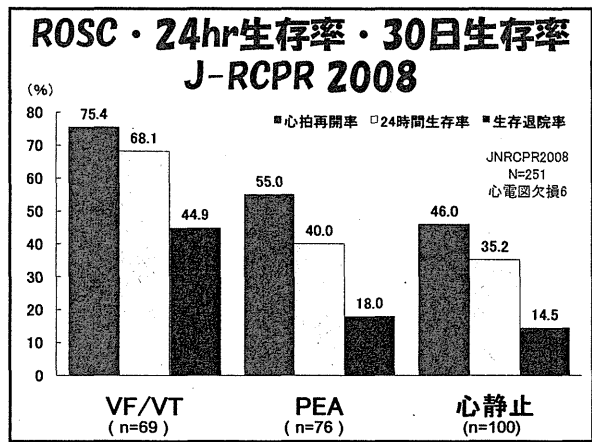
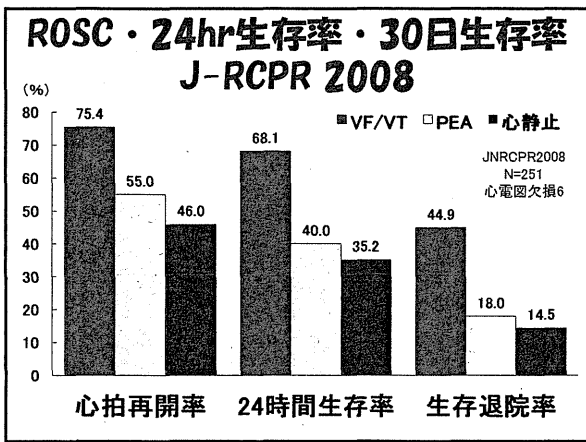
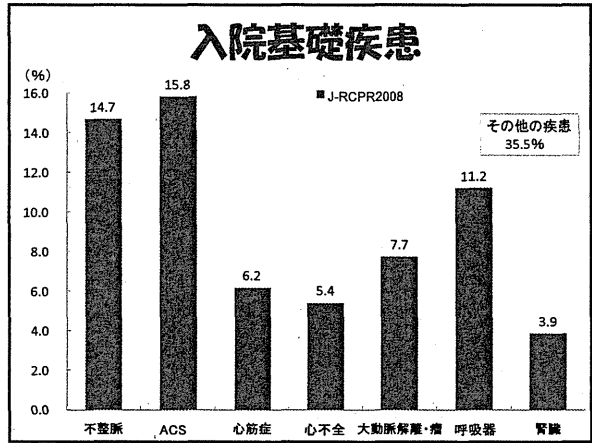
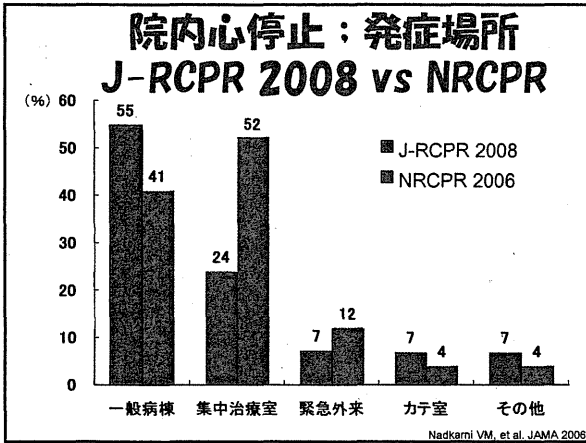
### 第74回日本循環器学会総会; 5題発表 J-RCPRの初期結果 (2008.1~2008.12)

- 11施設で251例(平均年齢71.4歳, 男性161例, 女性90例)
- 発生場所; NRCPR集中治療室52%, JRCPR一般病棟55%
- 院内心停止発見時初期心電図調律(心拍リズム):  
心室頻拍/心室細動; NRCPR vs J-RCPR; 21% vs 28%  
心静止; 38% vs 31%  
無脈性電気活動(PEA); 36% vs 41%
- 院内心停止の直接原因(複数回答):  
NRCPR, J-RCPRとも致死的不整脈(65%, 32%)  
低血圧(44%, 23%), 呼吸不全(43%, 27%)

### 第74回日本循環器学会総会;

- ROSCはNRCPR 53.9%、J-RCPR 58.2%、24時間生存率は32.5%、45.8%、30日生存率は18.1%、24.3%。  
初期心電図で分けた予後は、VF・VTが予後良好、除細動が有効であることが示された(鹿児島医療センター 蘭田正浩ら)。
- 入院基礎疾患で心疾患と非心疾患で分けると、ROSCは心疾患群65.5%、非心疾患群52.2%、30日生存率35.5%と15.9%、心疾患群は予後良好、初期心電図VT/VTが多い(横山ら)。
- 初期対応スタッフの心肺蘇生法講習受講の有無で予後を検討すると、生存率に差はないがCPCでみた神経学的予後は受講歴有の場合に有意に良好であった(坂出市立病院吉川圭ら)。
- 成人と比較し、小児では初期心電図調律は徐脈が40%。院内心停止誘因は成人で致死的不整脈(32%)、小児は低血圧(46%)、急性呼吸不全(36%) (成育医療センター 黒澤ら)。
- 発生時間と予後; 日中発症例が夕刻・夜間の発症より救命率が高い(関門医療センター 大谷ら、日本内科学会2010年)。



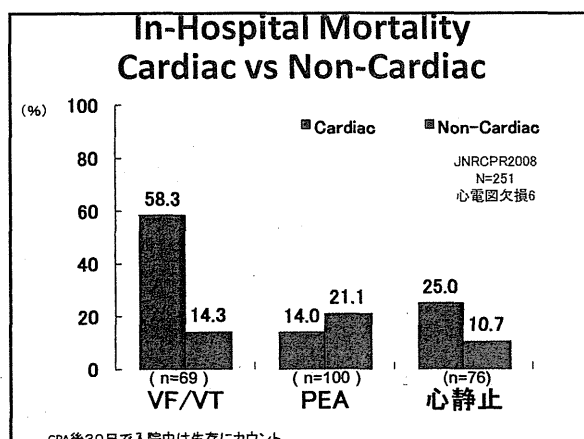
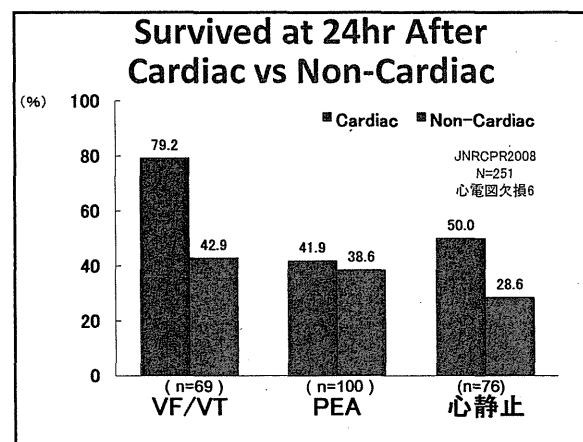
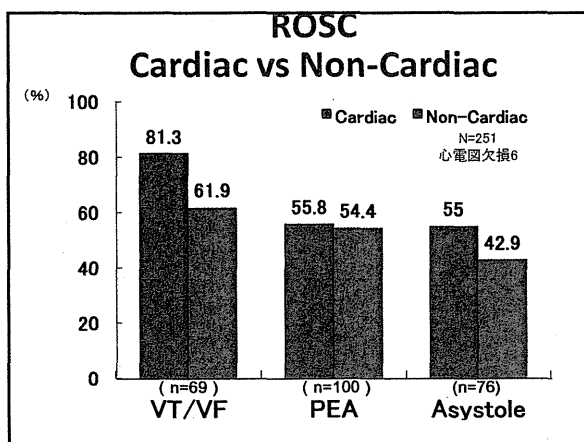
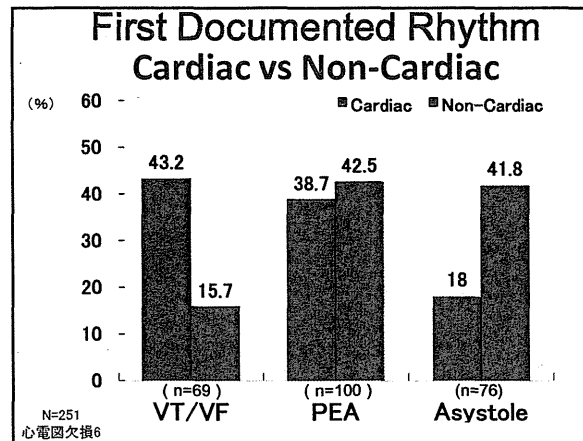
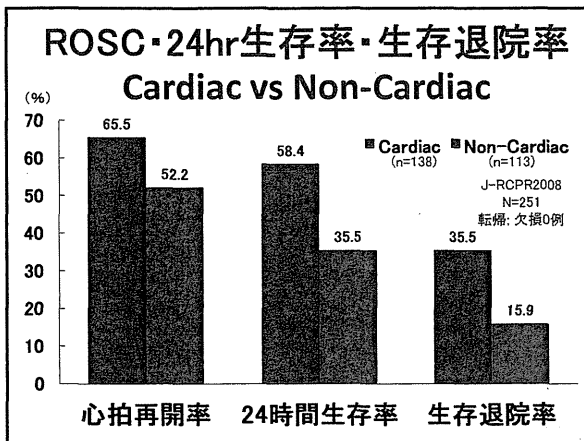


### 循環器疾患で入院していた症例： 心疾患 VS 非心疾患

	心疾患 n=113	非心疾患 n=138	P value
Witness of CPA	90.3%	66.2%	<0.0001
The Place of CPA confirmed			
General Ward	41.1%	67.6%	
Intensive Care Unit	25.9%	16.9%	
Catheter Laboratory	15.2%	1.5%	<0.0001
Emergency Room	11.6%	5.9%	
Other Place	6.20%	8.10%	

### 循環器疾患で入院していた症例： 心疾患 VS 非心疾患

	心疾患 n=113	非心疾患 n=138	P value
The direct cause of CPA			
Fatal Arrhythmia	51.4%	17.2%	
Hypotension	22.5%	15.7%	
ACS	17.1%	3.0%	<0.0001
Respiratory Failure	9.9%	33.6%	
Metabolic Disturbance	4.5%	9.0%	
Other or Unknown	15.3%	36.7%	



### 総括

- 本邦において、初めて院内心停止の多施設共同登録研究を実施した。
- 米国の大規模登録研究と類似した結果だが、今後日本の医療制度との関連性を調査する必要がある。
- 院内心停止の原因、心肺蘇生活動の状況、治療効果に関する情報をより正確に解明し、院内心停止のなかで可避死に対する対策を立案することが必要である。