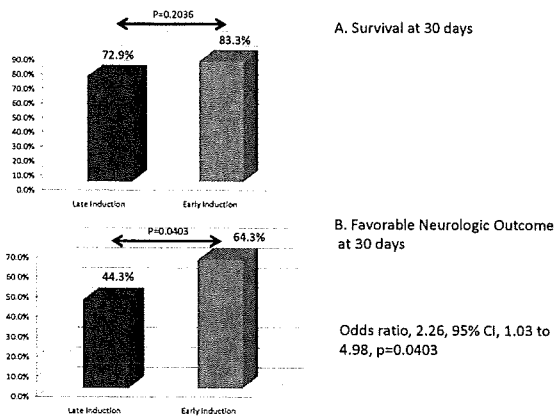


Figure-3



|                       | Late Induction (Group L) | Early Induction (Group E) | p-value |
|-----------------------|--------------------------|---------------------------|---------|
| Blood Transfusion (%) | 10.3                     | 25.0                      | 0.0629  |
| DIC                   | 5.1                      | 6.9                       | 0.7071  |
| Infection             | 15.4                     | 20.8                      | 0.4841  |

Table-4 During hypothermia complication data.

## Conclusion

- 1) Mild Hypothermia therapy with coronary intervention for ACS patients complicated by cardiac arrest was safe and effective for improving mortality and neurological outcomes compared with previous reports even in this high-risk cohorts.
- 2) Very high-risk patients with profound shock requiring PCPS was high-mortality and less favorable-outcome, however, for almost one-third of the shock patients, MHT with PCI was effective to achieve favorable outcome.
- 3) Early ROSC was one of the contributor for intact neurologic survival, therefore, early establishment of circulation might be effective by using extracorporeal circulation assist device.
- 4) Mild hypothermia induction prior to coronary intervention did not only increase complication rates even using anticoagulation with anti-platelet therapy but had an efficacy to achieve neurological recovery compared with coronary intervention before cooling.

## Discussion

We reported the safety and efficacy of early induction of mild therapeutic hypothermia (MHT) prior to coronary intervention.

In previous reports (#3,5,6-8), the efficacy of MHT with PCI was limited for the cardiac arrest pts with STEMI. This was the first report of the efficacy and safety of the early induction of hypothermia prior to PCI for the patients with angiographically confirmed severe coronary block immediately after ROSC without limitation of ST elevation in ECG. In our study cohorts, more than 80 percent of all this MHT patients received coronary angiography, as a results, almost half of the resuscitated pts were treated in PCI.

In previous reports, the patients with cardiac arrest (CA) had a coronary artery disease (CAD), and CAD was the leading cause of sudden cardiac arrest (SCD)(#1). Furthermore, acute plaque change was found in 40-86% of resuscitated patients from CA and 15-64% of autopsy cases (#2). Percutaneous coronary intervention (PCI) was reported to be feasible and effective for the STEMI patients with CA, even for unconscious pts immediately after ROSC (#3-10). Success of revascularization was associate with the improvement of survival rate after ROSC (#4). Therefore, emergency coronary angiography and PCI for the culprit lesion was thought to be the standard care for the post cardiac arrest syndrome (PCAS) in patients with out-of-hospital cardiac arrest with ROSC to protect myocardium (#11).

Bundled therapy, together with following interventions; Early coronary reperfusion, control of ventilation, blood glucose control, temperature control, treatment of seizures, was recommended for the patients with PCAS. In terms of this theory, PCI itself improved the mortality of the pts, however, PCI without hypothermia could not achieve the improvement of neurologic outcome (#12). Therefore, it was necessary to undergo MHT with PCI in order to have neurological benefit. The early induction of hypothermia was reported to be neurologically beneficial as soon as possible in animal model (#14) and human (#15, 16)

MHT was reported to be associated with bleeding complication (#17). Furthermore, the procedure of coronary intervention increased bleeding complication because of administration of aspirin, thienopyridines and heparin before and during PCI to prevent stent thrombosis. Therefore, the beneficial effect of MHT prior to PCI to improve neurologic outcome was not fully elucidated because of bleeding risk of the procedures. Our results reported that in early hypothermia induction group, the complication rate of blood transfusion was lower than late induction group. This finding revealed the safety of early MHT induction prior to PCI as to bleeding complication. Same as previous reports (#18), usage of 4 degree cold saline infusion in order to start MHT was not only safe for the patients underwent PCI, but also effective to shorten the time to reach target temperature.

This result confirmed that the combination therapy of MHT with PCI was the effective and mandatory therapy to achieve favorable neurologic outcome to treat PCAS patients who suffered from acute coronary event, and elucidate that the therapeutic time window of the MHT was narrower than that of PCI, therefore, MHT should be started as soon as possible.

Early induction of hypothermia using cold saline should be applied for any etiology of cardiac arrest even in ischemic origin necessary to perform coronary intervention to achieve favorable neurologic outcome.

- ① 心肺停止患者においては、ほとんどの症例において冠動脈疾患を有しているばかりではなく心臓性突然死の大きな原因であることも報告されている(#1)。さらに心肺蘇生後生存患者においては40-86%、副症例からは15-64%の頻度で、冠動脈プラークの急性変化が認められると報告されている(#2)。
- ② 心肺停止に至ったSTEMIを含む急性冠動脈症候群にたいしてはPCIを施行することで、たとえ意識障害が遷延している患者においてもメリットを有していることも報告されている(#3-#10)。そして、生存のためにはPCIの成功が必要条件であることも報告されている(#4)。心肺停止患者に対して緊急冠動脈造影検査を施行すること、そして責任病変に対してPCIを施行することは、standard-careの一つとすべきと考えられる(#11)。
- ③ また、蘇生後症候群の患者管理に対してはBundled therapy, together with following interventions; Early coronary reperfusion, control of ventilation, blood glucose control, temperature control, treatment of seizures was recommended. (#11)。であり、PCI単独では神経学的予後の改善も得られないと報告されている(#12)。therefore, 冠動脈症候群を原因とする心肺停止患者においてPCIと低体温療法をcombinationで施行することは、予後の改善につながると報告されている(#13)。
- ④ 心肺停止に対する低体温療法は早ければ早いほど神経学的予後を改善すると報告されており、実際Intra-arrest coolingを施行することで神経学的予後が改善する証明として動物実験(#14)、そして人でも(#15)evidenceが得られてきている。
- ⑤ 今回の我々の報告では、低体温先行群に比べ、PCI先行群で輸血を必要とする出血性合併症が少なかったが、これに関して、その原因は明らかではない。しかし、以前の報告と同様(#18)、4℃の冷却水をPCI施行前に低体温のinductionとして使用することは、出血性合併症が増加するということはなく、安全に投与可能であるだけでなく、目標温度への到達時間を短縮させることが可能であり、有用であることも明らかであった。今回の結果はPCAS治療において冠動脈interventionとMHTは良好な神経学的予後を得るために必要不可欠な治療であるが再認識されたこと、さらにMHTはPCIに比べ治療を開始する際のtime-windowが重要であり、PCIよりも早期に開始することが重要であると考えられる。
- ⑥ その点からは、心肺停止という状況に対して早期からの低体温を施行する際にはCPAの原因となった疾患の違いは関係がないことも認められた。
- ⑦ このことから、将来、pre-hospitalからの低体温の開始がなされる際、インターベンション施行に有無にかかわらず、全例で開始時血液を低体温で施行することが推奨されるものと予測される。

⑥ 過去の報告は、心肺停止を合併したSTEMI症例(#3,5,6-8)であるが我々の報告はlimitationを加えずに心肺停止蘇生後状態の患者のうち約80%以上の患者に対して、原因究明のための緊急冠動脈造影検査が施行されている。さらに、動脈硬化に起因する責任病変に対してPCIを施行するだけでなく脳保護目的で施行し最初の報告と考えられる。

In previous reports (#3,5,6-8), the efficacy of MHT with PCI was limited for the cardiac arrest pts with STEMI. In this report, more than 80 percent of all this MHT registry patients received coronary angiography immediately after ROSC, furthermore, the pts with significant stenosis or coronary block was treated in PCI subsequently performed coronary angiography.

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## Study Limitation

- 1) RESISTRYのデータであり、ランダム化されていないこと
- 2) 低体温を先行したは経過のうち比較的晩期に施行されていること
- 3) 比較的症例数が少ないこと
- 4) 冠動脈eventとしてはplaque ruptureを原因とするACSが疾患群以外にも冠れん縮による突然死も対象となる場合があるが、今回のinclusionとしてはその群は入っていない。

であるが、そうした条件ではあっても、インターベンションを施行する患者群においても低体温を早期から施行することは生存率、とくに心機能に影響を与えず、神経学的予後を良好なものとしたことは優位性をもって認められた結果であると考えられた。

|                                  | Late Induction (L)<br>(N=70) | Early Induction (E)<br>(N=42) | p-value |
|----------------------------------|------------------------------|-------------------------------|---------|
| Age                              | 61+/-1                       | 58+/-2                        | 0.0788  |
| Man (%)                          | 94.3                         | 95.2                          | 0.8284  |
| Witness (%)                      | 90.0                         | 88.1                          | 0.7524  |
| By-stander CPR (%)               | 54.2                         | 50.0                          | 0.6601  |
| Shockable Rhythm (%)             | 82.9                         | 83.3                          | 0.9482  |
| No flow time (min)               | 2.8+/-0.8                    | 4.6+/-1.1                     | 0.2025  |
| Prior MI (%)                     | 3.2                          | 2.5                           | 0.8427  |
| History of heart failure (%)     | 6.3                          | 5.0                           | 0.7757  |
| History of Stroke (%)            | 6.3                          | 5.0                           | 0.7757  |
| Hypertension (%)                 | 27.0                         | 35.0                          | 0.3874  |
| Diabetes                         | 19.0                         | 15.0                          | 0.5981  |
| ROSC before hospital arrival (%) | 42.9                         | 64.2                          | 0.1842  |
| Hemoglobin (g/dl)                | 13.7+/-2.0                   | 14.2+/-2.0                    | 0.1546  |
| Serum creatinine (mg/dl)         | 1.47+/-0.25                  | 1.74+/-0.32                   | 0.5312  |
| Serum potassium (mEq/l)          | 4.0+/-0.1                    | 4.0+/-0.1                     | 0.9101  |
| Serum glucose (mg/dl)            | 286+/-12                     | 277+/-15                      | 0.6558  |
| Collapse to ROSC (min)           | 31.3+/-2.9                   | 28.2+/-4.0                    | 0.5312  |
| Hemodynamic compromise (%)       | 15.1                         | 22.9                          | 0.3356  |

Table-1 Baseline patient characteristics. CPR: cardiopulmonary resuscitation, MI: myocardial infarction. ROSC: recovery of spontaneous circulation.



# 新世代tPAと治療有望患者の抽出



tPA治療可能時間



**DIAS** Hacke W, et al: Stroke 2005;36:66-73  
**DEDAS** Furlan AJ, et al: Stroke 2006;37:1227-31  
**DIAS-2** Hacke W, et al: Lancet Neurol 2009;8:141-150



# 循委16A-1 岡山班「循環器病臨床評価指標の質的向上と効果的活用法の研究」より

**Cerebrovascular Diseases**

Original Paper

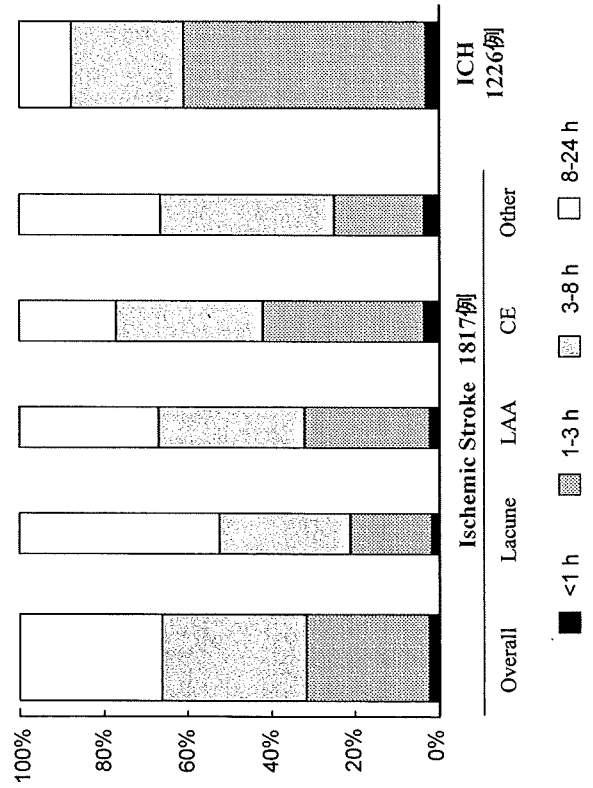
Cerebrovasc Dis 2009;33:33-38  
 DOI: 10.1159/00017541

Received: November 10, 2008  
 Accepted: February 6, 2009  
 Published online: May 6, 2009

**Early Hospital Arrival Improves Outcome at Discharge in Ischemic but Not Hemorrhagic Stroke: A Prospective Multicenter Study**

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## 脳梗塞1817例の臨床像

|                        | <3 h        | 3 - 8 h       | ≥8 h        | p value |
|------------------------|-------------|---------------|-------------|---------|
| Age                    | 574 cases   | 632 cases     | 611 cases   |         |
|                        | 72.1 ± 11.0 | 73.2 ± 12.0   | 72.6 ± 11.6 | 0.242   |
| Male sex               | 338 (58.9)  | 385 (60.9)    | 369 (60.4)  | 0.759   |
| Initial NIHSS score    | 9 (4 - 17)  | 5 (2.25 - 11) | 4 (2 - 7)   | <0.001  |
| mRS score at discharge | 3 (1 - 5)   | 2 (1 - 4)     | 2 (1 - 4)   | <0.001  |
| In-hospital death      | 61 (10.6)   | 38 (6.0)      | 31 (5.1)    | <0.001  |

## 脳出血1226例の臨床像

|                        | <1.2 h      | 1.2 - 3.5 h | ≥3.5 h      | p value |
|------------------------|-------------|-------------|-------------|---------|
| Age                    | 473 cases   | 424 cases   | 329 cases   |         |
|                        | 63.8 ± 14.1 | 67.7 ± 14.2 | 67.8 ± 13.9 | <0.001  |
| Male sex               | 252 (53.3)  | 219 (51.7)  | 166 (50.5)  | 0.725   |
| Initial NIHSS score    | 8 (4 - 21)  | 8 (4 - 19)  | 6 (3 - 15)  | 0.001   |
| mRS score at discharge | 4 (2 - 6)   | 4 (2 - 5)   | 3 (1 - 5)   | <0.001  |
| In-hospital death      | 139 (29.5)  | 104 (24.8)  | 52 (16.0)   | <0.001  |





## 多施設脳梗塞登録症例におけるrt-PA静注療法と 退院時転帰との関連：循委19A-2班登録研究

萩原隆朗、室下史生、他

- 【目的】発症≤3hに来院した脳梗塞患者へのIV rt-PAの有無と退院時転帰の関連を解明  
 【対象】2008年1月から12月までに国内28施設に発症≤3hに来院した脳梗塞546例  
 【方法】転帰良好：退院時mRS≤1、転帰不良：退院時mRS 4-6、IV rt-PAの有無と転帰との関連を、年齢・性別・入院時NIHSSで補正したロジスティック回帰分析によって求めた  
 【結果】  
 ✓ rt-PA使用群148例(27.1%、男87例、72.7±10.9歳)は非使用群398例(男244例、78.3±10.8歳)に比べて入院時NIHSS(中央値15 vs 5, P<0.001)、退院時mRS(中央値3 vs 2, P=0.006)がより高く、転帰良好(29.1% vs 41.0%, P=0.013)が少なく、転帰不良(48.0% vs 36.7%, P=0.018)が多い  
 ✓ 多変量解析で、rt-PA群は非使用群に比べて転帰良好が多く(OR 2.02, 95%CI 1.16-3.58)、転帰不良が少ない(OR 0.51, 95%CI 0.30-0.85)  
 【結論】発症後3時間以内に来院した脳梗塞患者に対するrt-PA静注療法は、退院時転帰を好転させていた



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# AHA 学会資料



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### Patient Characteristics and Outcomes of Witnessed Out-of-Hospital Cardiac Arrest in Osaka: A 7-Year Emergency Medical Services Perspective in a Large Population

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#### Abstract:

**Objectives:** To evaluate the temporal trend of baseline characteristics, resuscitation care characteristics, and outcomes of out-of-hospital cardiac arrests (OHCA) from a large population-based cohort study. **Methods:** We enrolled all OHCA of presumed cardiac etiology in adults (>17 years old) that were witnessed by bystanders and were treated by emergency medical service (EMS) in Osaka Prefecture (population, 8.8 million), Japan from 1999 through 2005. Data were prospectively collected by EMS personnel and physicians in charge using an Utstein-style database. Time course was divided into 7 successive one-year periods. We evaluated changes in demographic and cardiopulmonary resuscitation (CPR)-related factors, and outcomes. Multivariate logistic regression analysis was performed to evaluate the relationship between prognostic factors and outcomes. **Results:** Mean age gradually increased over time. The proportion of cases with bystander CPR and with ventricular fibrillation (VF) increased. The time interval from emergency call to the first defibrillation by EMS personnel shortened from 14 to 8 min, while the time to the initiation of CPR by EMS remained 6-7 min. Neurologically favorable outcome 1-month after arrest improved from 1.5% to 4.7% in the entire cohort (Table) and from 5.5% to 16.9% in witnessed VF cases during the observation period. Excluding very-long-duration cardiac arrests (>15 minutes), bystander-initiated cardiac-only resuscitation yielded a higher rate of favorable neurological outcome than no bystander CPR (3.6% versus 2.8%; OR, 1.51; 95% CI, 1.00-2.26), and conventional CPR showed similar effectiveness (3.6%; OR, 1.39; 95% CI, 0.96-2.02). **Conclusion:** This study showed the continuous improvement of the chain of survival and outcomes of patients with witnessed OHCA in a large population. Further efforts to increase bystander-initiated cardiac-only resuscitation would improve the outcomes more.

Table: Baseline, Resuscitation Care Characteristics and Outcomes according to time period

|                             | 1999<br>(n=944) | 2000<br>(n=975) | 2001<br>(n=1037) | 2002<br>(n=935) | 2003<br>(n=1005) | 2004<br>(n=967) | 2005<br>(n=1066) |
|-----------------------------|-----------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| Age, yr, Mean (SD)          | 68.4<br>(15.5)  | 69.4<br>(15.6)  | 70.6<br>(14.8)   | 70.2<br>(14.7)  | 70.4<br>(15.5)   | 72.0<br>(14.7)  | 71.6<br>(15.3)   |
| Male, % (n)                 | 63.3<br>(593)   | 63.4<br>(616)   | 64.8 (669)       | 62.0<br>(578)   | 63.4<br>(636)    | 60.5<br>(585)   | 63.5<br>(677)    |
| Presenting rhythm VF, % (n) | 17.4<br>(164)   | 15.1<br>(146)   | 16.6 (170)       | 19.2<br>(177)   | 21.0<br>(210)    | 23.0<br>(221)   | 22.5<br>(239)    |
| Bystander CPR, %            | Cardiac-only    |                 |                  |                 |                  |                 |                  |
|                             | 11.8<br>(111)   | 9.7 (94)        | 12.8 (132)       | 12.9<br>(119)   | 13.3<br>(133)    | 15.5<br>(148)   | 14.4<br>(153)    |

| (n)  | Conventional<br>CPR | 13.3<br>(125) | 15.2<br>(147) | 18.0 (185)   | 19.5<br>(180) | 19.8<br>(198) | 21.0<br>(201) | 20.8<br>(222) |
|--|---------------------|---------------|---------------|--------------|---------------|---------------|---------------|---------------|
| Time from call to CPR, min, median (IQR)             |                     | 7 (6 - 9)     | 7 (6 - 9)     | 7 (6 - 9)    | 7 (6 - 9)     | 7 (6 - 9)     | 6 (6 - 9)     | 7 (6 - 9)     |
| Time from call to defibrillation , min, median (IQR) |                     | 14 (12 - 19)  | 12 (10 - 16)  | 12 (10 - 16) | 11 (9 - 15)   | 10 (8 - 12)   | 9 (7 - 12)    | 8 (7 - 11)    |
| One-month survival, % (n)                            |                     | 4.6 (42)      | 5.6 (54)      | 6.6 (68)     | 7.9 (72)      | 8.0 (80)      | 7.8 (74)      | 9.4 (100)     |
| Neurologically favorable outcome, % (n)              |                     | 1.5 (14)      | 2.4 (23)      | 2.5 (26)     | 3.0 (28)      | 3.4 (34)      | 3.5 (34)      | 4.7 (50)      |
| SD, standard deviation; IQR, interquartile range     |                     |               |               |              |               |               |               |               |

**Author Disclosure Block:** T. Iwami, None; A. Hiraide, None; K. Kajino, None; R.A. Berg, None; T. Nishiuchi, None; Y. Hayashi, None; M. Nitta, None; T. Hayashi, None; H. Ikeuchi, None; H. Nonogi, None; T. Kawamura, None.

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**Control/Tracking Number:** 07-SS-A-11417-AHA**Activity:** Abstract**Current Date/Time:** 6/1/2007 9:38:24 AM

### Outcome and Characteristics of Out-of-Hospital Pediatric Cardiac Arrest from the large-scale, population-based Utstein Osaka cohort study

**Author Block:** Masahiko Nitta, Osaka Medical Coll, Takatsuki, Osaka, Japan; Taku Iwami, Kyoto Univ, Kyoto, Japan; Naoki Shimizu, Natl Ctr for Child Health and Development, Setagaya, Tokyo, Japan; Robert A Berg, The Univ of Arizona Coll of Med, Tucson, AZ; Takashi Kawamura, Kyoto Univ, Kyoto, Japan; Toshimasa Hayashi, Osaka Medical Coll, Takatsuki, Osaka, Japan; Kentaro Kajino, Osaka Univ Graduate Sch of medicine, Suita, Osaka, Japan; Tatsuya Nishiuchi, Osaka Prefectural Senshu Critical Care Medical Ctr, Izumisano, Osaka, Japan; Yasuyuki Hayashi, Osaka Prefectural Senri Critical Care Medical Ctr, Suita, Osaka, Japan; Atsushi Hiraide, Kyoto Univ Graduate Sch Faculty of Med, Kyoto, Japan; Hisashi Ikeuchi, Osaka General Medical Ctr, Osaka, Japan; Hiroshi Nonogi, Natl Cardiovascular Ctr, Suita, Osaka, Japan; Hiroshi Tamai, Hiroshi Morita, Osaka Medical Coll, Takatsuki, Osaka, Japan; J-PULSE investigators

#### Abstract:

**Objectives:** To analyze the outcome and characteristics of out-of-hospital pediatric cardiac arrests from a large-scale cohort study.

**Method:** The Utstein Osaka project is a large population-based cohort study of out-of-hospital cardiac arrest, which covers 8.8 million residents, in Osaka, Japan. As part of this study, we evaluated emergency medical service (EMS)-treated pediatric patients (age <18 years) from January 1, 1999 to December 31, 2003, using an Utstein-style database. We investigated patients' backgrounds, resuscitation characteristics, and outcomes. Data were prospectively collected by EMS personnel in cooperation with the physicians in charge of the patient.

**Results:** In this period, there were 650 out-of-hospital pediatric cardiac arrests and the incidence was 8.5 per 100,000 person-year. Among them, 277 cases (42.6%) were due to traumatic accidents such as traffic accidents, choking, and drowning and their survival rate was dismal (one-year neurologically favorable, 1.8%). In those with non-traumatic cardiac arrests (n=373), 45.8% were <1 year old and 56.8% were male (Table). Non-cardiac etiology was more common in younger groups. The proportion of witnessed cases became smaller in younger groups and was only 12.9% in <1 year group. Bystander CPR was performed in 48.4% of cases in <1 year group while only 13-22% in other groups. Ventricular fibrillation (VF) was more common in 13-17 years group (21.8%) but there were few VF cases in the other groups. The rate of one-year neurologically favorable outcome was lower in younger age groups varied from 0.6% in <1 year group to 10.9% in 13-17 years group.

**Conclusions:** Traumatic arrests were common in pediatric cardiac arrest and their outcome was dismal. Outcomes from non-traumatic cardiac arrests were much better for older children whose arrests were more commonly witnessed and more frequently had VF.

#### Outcomes and Characteristic of non-traumatic out-of-hospital pediatric cardiac arrest (n=373)

|                             | 0 - 1 year<br>(n=171) | 1 - 4 years<br>(n=90) | 5 - 12 years<br>(n=57) | 13 - 17 years<br>(n=55) |
|-----------------------------|-----------------------|-----------------------|------------------------|-------------------------|
| Male, % (n)                 | 54.7 (93)             | 63.3 (57)             | 49.8 (28)              | 61.8 (34)               |
| Cardiac, % (n)              | 48.2 (80)             | 55.1 (49)             | 50.9 (29)              | 66.7 (36)               |
| Witnessed, % (n)            | 12.9 (22)             | 33.3 (30)             | 39.3 (22)              | 56.4 (31)               |
| Bystander CPR, % (n)        | 48.4 (75)             | 16.8 (26)             | 21.9 (34)              | 12.9 (20)               |
| Presenting rhythm VF, % (n) | 1.9 (3)               | 0.0 (0)               | 3.6 (2)                | 21.8 (12)               |

|   |            |            |            |            |
|---|------------|------------|------------|------------|
| BLS response interval, min, median (quartile) | 8 (6 - 10) | 8 (6 - 10) | 8 (6 - 10) | 7 (6 - 10) |
| Outcomes                                      |            |            |            |            |
| One-year survival, % (n)                      | 1.8 (3)    | 3.3 (3)    | 3.5 (2)    | 10.9 (6)   |
| Neurologically favorable outcome, % (n)       | 0.6 (1)    | 1.1 (1)    | 3.5 (2)    | 10.9 (6)   |

**Author Disclosure Block:** M. Nitta, None; T. Iwami, None; N. Shimizu, None; R.A. Berg, None; T. Kawamura, None; T. Hayashi, None; K. Kajino, None; T. Nishiuchi, None; Y. Hayashi, None; A. Hiraide, None; H. Ikeuchi, None; H. Nonogi, None; H. Tamai, None; H. Morita, None.

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Activity: Abstract

Current Date/Time: 6/1/2007 6:17:16 PM

Subsequent VF is Associated with Better Outcomes from Out-of-Hospital Cardiac Arrests with Initial Non-shockable Rhythms-population-based Utstein Study In Japan~

Author Block: Kentaro Kajino, Osaka Univ Graduate Sch of medicine, Suita, Japan; Taku Iwami, Kyoto Univ, Kyoto, Japan; Robert A Berg, The Univ of Arizona Coll of Med, Tucson, AZ; Tathuya Nishiuchi, Senshu Critical Care Medical Ctr, Izumisano, Japan; Yasuyuki Hayashi, Senri Critical Care Medical Ctr, Suita, Japan; Hisashi Ikeuchi, Osaka General Medical Ctr, Osaka, Japan; Hiroshi Nonogi, Natl Cardiovascular Ctr, Suita, Japan; Atushi Hiraide, Kyoto Univ Graduate Sch Faculty of Med, Kyoto, Japan; Takashi Kawamura, Kyoto Univ Sch of Public Health, Kyoto, Japan; Masahiko Nitta, Osaka Medical Coll, Takatuki, Japan; Osamu Tasaki, Hiroshi Tanaka, Takeshi Shimazu, Hisashi Sugimoto, Osaka Univ Graduate Sch of medicine, Suita, Japan

*Abstract:*

**OBJECTIVE:** To compare survival rates from out-of-hospital cardiac arrest (OHCA) with an initial non-shockable rhythms according to whether they remained in a non-shockable rhythm or converted to shockable rhythms. **METHODS:** *Designs:* Population-based cohort study. *Subjects:* Witnessed OHCA cases of cardiac etiology with pulseless electrical activity (PEA) or asystole as initially recorded rhythm. *Main outcome measure:* Neurologically favorable one-month survival. We enrolled all adult (age  $\geq 18$  years) patients with witnessed OHCA of cardiac etiology who were treated by the emergency medical services (EMS) in Osaka, Japan, from January 1 to December 31, 2005, by means of the Utstein Style. Resuscitation was performed according to the AHA guideline 2000. Survival indicators were compared between patients with sustained non-shockable rhythm (No-shock group) and patients with subsequent VF/VT and electrical shock (Shock group) using logistic regression. **RESULTS:** Of 3191 OHCA of cardiac etiology, 824 witnessed cases had PEA or asystole as initially recorded rhythm. Of the 824, 742 (90%) remained in a non-shockable rhythm at each evaluation throughout the resuscitation while 82 (10%) subsequently converted to VF/VT and were shocked by EMS personnel. Neurologically favorable one-month survival was significantly greater in the Shock group (4.9% versus 0.8%,  $p=0.001$ ). Subsequent VF/VT was a significant predictor (OR, 5.4; 95%CI, 1.38-20.9) of neurologically favorable survival after adjustment for potential confounders. **CONCLUSIONS:** Among these patients with OHCA and initial non-shockable rhythm, subsequent VF/VT was associated with better outcomes.

## Baseline and Resuscitation Care Characteristics

| No-Shock | Shock |
|----------|-------|
| N=742    | N=82  |

|                                      |             |             |         |
|--------------------------------------|-------------|-------------|---------|
| age (yr), mean (S.D.)                | 74.7 (14.7) | 69.6 (13.6) | p=0.003 |
| male, n (%)                          | 430 (58)    | 53 (64.6)   | p=0.244 |
| Citizen CPR, n (%)                   | 274 (36.9)  | 37 (45.1)   | p=0.146 |
| EMS care interval (min), mean (S.D.) |             |             |         |
| 119 to EMS arrival                   | 6.3 (2.6)   | 6.0 (2.3)   | p=0.421 |
| 119 to EMS CPR                       | 8.1 (2.9)   | 7.8 (2.5)   | p=0.374 |
| 119 to first shock                   |             | 16.9 (6.1)  |         |

Main Outcome

|   | No-Shock   | Shock     |         |
|---|------------|-----------|---------|
|   | N=742      | N=82      |         |
| ROSC, n (%)                             | 231 (31.1) | 26 (31.7) | p=0.915 |
| Hospital admission, n (%)               | 178 (24)   | 21 (25.6) | p=0.745 |
| One month survival, n (%)               | 31 (4.2)   | 7 (8.5)   | p=0.075 |
| Neurologically favorable outcome, n (%) | 6 (0.8)    | 4 (4.9)   | p=0.001 |

Author Disclosure Block: K. Kajino, None; T. Iwami, None; R.A. Berg, None; T. Nishiuchi, None; Y. Hayashi, None; H. Ikeuchi, None; H. Nonogi, None; A. Hiraide, None; T. Kawamura, None; M. Nitta, None; O. Tasaki, None; H. Tanaka, None; T. Shimazu, None; H. Sugimoto, None.

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Keyword (Complete): Cardiopulmonary resuscitation ; Ventricular defibrillation ; Ventricular fibrillation

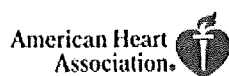
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**Control/Tracking Number:** 07-SS-A-10745-AHA**Activity:** Abstract**Current Date/Time:** 6/1/2007 10:21:22 AM**Effectiveness Of Cardiac-only CPR Training by Self-learning Video, a 1-hour program, or Both**

**Author Block:** Chika Nishiyama, Taku Iwami, Takashi Kawamura, Masahiko Ando, Kyoto Univ school of public health, Kyoto, Japan; Robert A. Berg, The Univ of Arizona Coll of Med, Arizona, AZ; Naohiro Yonemoto, Kyoto Univ school of public health, Kyoto, Japan; Risa Fukuda, Osaka Univ Graduate school of medicine, Osaka, Japan; Haruyuki Yuasa, Kinki Univ Sch of Med, Osaka, Japan; Akiko Kada, Hiroyuki Yokoyama, Hiroshi Nonogi, J-PULSE Investigators, Natl Cardiovascular Ctr, Osaka, Japan

*Abstract:*

**[Introduction]** Despite present efforts to train the general public in CPR, the proportion of bystander CPR is still low. Length of CPR training program and complexity of CPR skills may be barriers to bystander CPR performance. Recently, simple video self-learning has been shown to be an effective CPR training technique.

**[Objective]** To evaluate the effectiveness of cardiac-only CPR training program by a self-learning video, a 1-hour practical course, or both.

**[Method]** *Designs:* A randomized controlled trial. *Participants:* General public aged 18 years or older. *Intervention:* In the video (V) group, participants received the self-learning video before CPR training and then attended a 1-hour cardiac-only CPR training program; in the control (C) group participants attended the training program without a self-learning video. *Data collection:* Before and immediately after the training, a 2 minute scenario-based test was conducted and CPR skills were recorded. *Outcomes:* The primary outcome measure was the number of correct chest compressions immediately after the training. We also calculated the achievement of correct chest compressions, which meant the proportion of correct chest compressions in relation to the ideal number of chest compressions based on 2005 CPR guideline.

**[Result]** 214 participants were randomly assigned to V (108) and C (106) groups. Before the training, the proportion of attempting chest compression, attempting AED operation, and calling for an AED, and the total number of chest compressions were significantly greater in the V group. After the training, all measured CPR skills of both groups improved substantially compared with pre-training skills, but there were no differences between groups (Table).

**[Conclusion]** A self-learning video improved CPR skills. However, a 1-hour practical training course was substantially more effective and the addition of a self-learning video did not improve its effectiveness.

Table: CPR Skills of Pre- and Post-training

|                                       | Pre-training |           |         | Post-training |           |         |
|---------------------------------------|--------------|-----------|---------|---------------|-----------|---------|
|                                       | V (n=95)     | C (n=87)  | p-value | V (n=95)      | C (n=87)  | p-value |
| Call for help (119), n (%)            | 52 (54.7)    | 22 (25.3) | <0.001  | 93 (97.7)     | 85 (97.9) | 1.000   |
| Call for an AED, n (%)                | 40 (42.1)    | 3 (3.4)   | <0.001  | 90 (94.7)     | 84 (96.6) | 0.720   |
| Attempts of chest compressions, n (%) | 88 (92.6)    | 56 (66.7) | <0.001  | 95 (100)      | 87 (100)  | 1.000   |



|   |           |           |        |           |            |       |
|---|-----------|-----------|--------|-----------|------------|-------|
| Total number of chest compressions, n                                 | 92.8±64.8 | 49.0±57.3 | <0.001 | 161±31.8  | 159.0±35.7 | 0.628 |
| Number of correct chest compressions, n                               | 23.8±39.1 | 12.9±27.0 | 0.031  | 74.7±65.9 | 88.8±67.0  | 0.196 |
| Achivement of correct chest compressions, %                           | 13.0±21.4 | 7.0±14.8  | 0.031  | 40.8±36.0 | 48.5±36.6  | 0.196 |
| Attempts of AED operation, n (%)                                      | 71 (74.7) | 25 (28.7) | <0.001 | 95 (100)  | 87 (100)   | 1.000 |
| Correct position of the defibrillator pad, n (%)                      | 57 (60.0) | 16 (18.4) | <0.001 | 90 (94.7) | 85 (97.7)  | 0.450 |
| Data are means ± SD unless indicated otherwise, SD: srander deviation |           |           |        |           |            |       |

**Author Disclosure Block:** C. Nishiyama, None; T. Iwami, None; T. Kawamura, None; M. Ando, None; R.A. Berg, None; N. Yonemoto, None; R. Fukuda, None; H. Yuasa, None; A. Kada, None; H. Yokoyama, None; H. Nonogi, None; J. Investigators, None.

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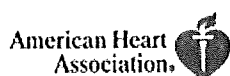
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### Lay Rescuers' Characteristics Affect Quality of Chest Compressions during cardiac-only resuscitation

**Author Block:** Chika Nishiyama, Taku Iwami, Takashi Kawamura, Masahiko Ando, Kyoto Univ school of public health, Kyoto, Japan; Robert A. Berg, The Univ of Arizona Coll of Med, Arizona, AZ; Naohiro Yonemoto, Kyoto Univ school of public health, Kyoto, Japan; Risa Fukuda, Osaka Univ Graduate school of medicine, Osaka, Japan; Haruyuki Yuasa, Kinki Univ Sch of Med, Osaka, Japan; Akiko Kada, Hiroyuki Yokoyama, Hiroshi Nonogi, J-PULSE Investigators, Natl Cardiovascular Ctr, Osaka, Japan

#### Abstract:

**[Introduction]** Quality of chest compressions has been recognized as a key determinant of successful outcome from cardiac arrest. However, whether the quality of chest compressions varies according to lay rescuers' characteristics including sex, age and body weight are unclear.

**[Objective]** To evaluate the associations between rescuers' characteristics and the quality of chest compressions.

**[Method]** *Participants:* General public (18 years or older). *Data:* Data were obtained from 182 participates in a 1-hour cardiac-only CPR training program. A 2 minute scenario-based test was conducted and resuscitation skills were recorded automatically. *Outcomes:* The primary outcome was the proportion of chest compressions with sufficient depth among the total chest compressions.

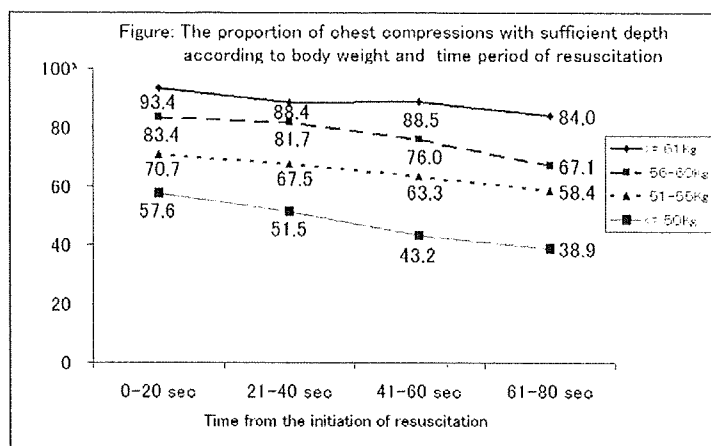
**Statistical Analysis:** Difference in the proportion of sufficient chest compressions according to sex, age ( $\leq 50$ , 51-60,  $\geq 61$ ) and body weight ( $\leq 50$ , 51-55, 56-60,  $\geq 61$  Kg) were analyzed using analysis of covariance.

**[Result]** The proportion of chest compressions with sufficient depth decreased with decreasing of body weight. Female sex and aging were independently associated with poor performance of chest compressions (Table). Time-dependent deterioration of the skills were observed (figure).

**[Conclusion]** Female sex, higher age, and low body weight of lay rescuers would lower the quality of chest compressions.

Table: Factors associated with insufficient chest compressions

| Factors                 | $\beta$   | 95% CI        |
|-------------------------|-----------|---------------|
| Female                  | -17.4     | -33.9 ~ -0.8  |
| Age (years) $\leq 50$   | reference |               |
| 51-60                   | -10.8     | -20.9 ~ -0.4  |
| $\geq 61$               | -21.4     | -33.9 ~ -8.9  |
| Weight (Kg) $\geq 61$   | reference |               |
| 56-60                   | -3.1      | -16.8 ~ 10.6  |
| 51-55                   | -15.4     | -30.6 ~ -0.1  |
| $\leq 50$               | -28.8     | -43.0 ~ -14.6 |
| CI: Confidence Interval |           |               |



**Author Disclosure Block:** C. Nishiyama, None; T. Iwami, None; T. Kawamura, None; M. Ando, None; R. Berg, None; N. Yonemoto, None; R. Fukuda, None; H. Yuasa, None; A. Kada, None; H. Yokoyama, None; H. Nonogi, None; J. Investigators, None.

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# Effectiveness of Cardiac-only CPR Training by Self-learning Video, 1-hour program, or Both

Chika Nishiyama<sup>1</sup>, Taku Iwami<sup>1</sup>, Takashi Kawamura<sup>1</sup>, Masahiko Ando<sup>1</sup>, Robert A, Berg<sup>2</sup>, Naohiro Yonemoto<sup>1</sup>, Risa Fukuda<sup>3</sup>, Haruyuki Yuasa<sup>4</sup>, Akiko Kada<sup>5</sup>, Hiroyuki Yokoyama<sup>5</sup>, Hiroshi Nonogi<sup>5</sup>, J-PULSE investigators,

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## Introduction

Bystander-initiated cardiopulmonary resuscitation (CPR) is effective treatment for out-of-hospital cardiac arrest.

Video learning has some advantages that people can learn skills of interest at any time without going to the venue, and pause or repeat the learning of their own accord.

Recently, some studies showed the effectiveness of combination of video learning and a mannequin training.

## Objective

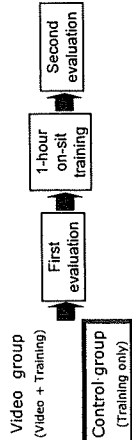
To evaluate the effectiveness of cardiac-only resuscitation training program using self-learning video prior to a 1-hour on-site training.

## Method

**Designs :** A randomized controlled trial.  
**Participants :** General public aged 18 years more.

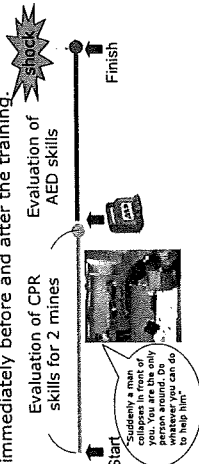
\*Exclusion criteria: Health care professionals/students

## Intervention



\*Self-learning video was distribute a week before training in the video group.

**Data collection :** Scenario-based test immediately before and after the training.



## Primary outcome measures :

Proportion of attempts of chest compressions and AED operation, and whole number of chest compressions during 2-minute test period before training.

## Secondary outcome measures :

1. Proportion of call for help (119)
2. Proportion of call for AED
3. Proportion of correct chest compressions
4. Correct positioning of defibrillator pads.

\*The correct chest compression was defined as compression with the depth of 2.3-5.5cm and the correct hand position.

## 1-hour on-site training and 7 minutes video

| Lesson                      | Critical Step   | Time estimate(min) |
|-----------------------------|---|--------------------|
| Introduction                | Course introduction, mannequin breathing and emergency call | 5                  |
| Adult cardiac-resuscitation | Check for response, adequate ventilation and emergency call | 2                  |
| Resuscitation               | Chest compressions (CVD)                                    | 6                  |
|                             | Chest compressions (practice)                               | 2                  |
| AED                         | Using an AED (practice)                                     | 3.2                |
|                             | Using an AED (practice)                                     | 2.4                |
| Total                       | Resuscitation   | 6.0                |

- Part 1 : Introduction (1min)  
 1. Why CPR is necessary?  
 Part 2 : Adult CPR cardiac-only resuscitation (2min 30sec)  
 1. Emergency call  
 2. Recognition of cardiac arrest  
 3. Chest compression  
 Part 3 : Introduction to automated external defibrillators (3min 30sec)

## Result

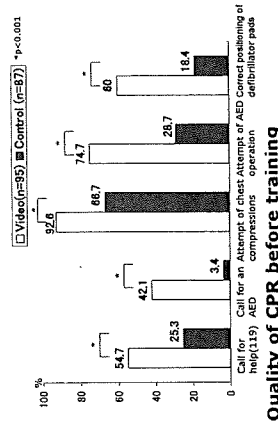
### Baseline characteristics

|                                    | Video group<br>(n = 108) | Control group<br>(n = 106) | p value |
|------------------------------------|--------------------------|----------------------------|---------|
| Men, n (%)                         | 58 (51.8)                | 58 (52.3)                  | 0.94    |
| Age, yr, mean ± SD                 | 38.9 ± 16.8              | 38.3 ± 14.6                | 0.81    |
| Previous CPR training, n (%)       | 47 (38.4)                | 2 (4.1)                    | 0.04    |
| Experience of resuscitation, n (%) | 3 (2.7)                  | 7 (6.3)                    | 0.19    |
| Watch the video material, n (%)    | 80 (81.6)                | -                          | -       |

## Conclusion

- Short-time self-learning video led people to attempt to CPR.
- 1-hour practical training made general public acquire CPR skills. After practical training disappeared effects of self-learning video.
- We recommend general public to receive a practical training course, even if it is short, to acquire CPR skills.
- To increase bystander CPR, a self-learning video is one of the optional means for general public who can not attend the practical training course.

## CPR and AED skills of before training



## CPR and AED skills of after training

