

## **Relationship between favorable neurological outcome and time interval from collapse to return of spontaneous circulation in patients treated with hypothermia after Ventricular Fibrillation Arrest Out of Hospital.: J-PULSE-Hypo**

### **Background**

For protection of the brain and other organs, hypothermia is a helpful therapeutic approach in patients who remain comatose after return of spontaneous circulation (ROSC). However, optimal time window for therapeutic hypothermia have not been determined. We investigated the relationship between neurological benefits and time interval from collapse to ROSC in patients treated with hypothermia after Ventricular Fibrillation (VF).

### **Methods**

The J-PULSE-Hypo was conducted a multicenter observational registry to investigate the effects of therapeutic hypothermia. In this study, we investigated the relationship between neurological outcome at hospital discharge and time intervals from collapse to ROSC.

### **Results**

Of the 452 unconscious adult patients treated with therapeutic hypothermia, 435 who were cooled to 32°C to 34°C were included; 341 were VF arrest (VF group) and 94 were non-VF arrest (non-VF group). The VF group had a higher frequency of favorable neurological outcome than the non-VF group (65% vs. 32%,  $p < 0.0001$ ). The favorable neurological outcome of VF group decreased in stepwise fashion across the increasing quartiles of the collapse-to-ROSC interval. The collapse-to-ROSC interval cutoff value of 28.5 min had an accuracy of 71% for identification of a favorable neurological outcome. A frequency of favorable neurological outcome was 80% in patients who achieved ROSC within 28.5 minutes after VF cardiac arrest.

### **Conclusions**

In patients undergoing mild hypothermia after ROSC, time interval from collapse to ROSC was an independent predictor for a favorable neurological outcome. Further research is needed in patients with prolonged CPR of 28.5 min or longer.

## **The Impact of Bystander CPR on Defibrillation-Survival curve in Out-of-hospital Cardiac Arrest From All-Japan Utstein Registry Data**

Naohiro Yonemoto<sup>1</sup>; Hiroyuki Yokoyama<sup>2</sup>; Ken Nagao<sup>3</sup>; Takeshi Kimura<sup>4</sup>; Hiroshi Nonogi<sup>2</sup>; JCS-ReSS group

**[Background]** The study objective was the effect of time to chain of survival from out-of-hospital cardiac arrest. Several studies had the effects of them on survival from sudden cardiac arrest. These studies were estimated from medium sample size before guideline 2005.

**[Method]** We used All-Japan Utstein Registry of the Fire and Disaster Management Agency with a prospective, population based, involving consecutive patients with an out-of cardiac arrest with witness with layperson, over 18 years, from April 1, 2006 to December 31 2009. The primary outcome measure was survival and good neurological outcome; CPC 1 or 2. We evaluated the effect and described the relationship of intervals from collapse to defibrillator with or without bystander CPR for the outcome.

**[Results]** 19993 adults were included in the analysis. The median time to bystander CPR was 2 minutes. The median time to defibrillation was 12 minutes (Figure). Adjusted odds ratio of the average effect of interval from collapse to bystander CPR per a minute was 1.09 and 95% Confidence Intervals (CI) 1.07 to 1.11. Adjusted odds ratio of the average effect of interval from collapse to defibrillator with bystander CPR per a minute was 1.11 and 95%CI 1.10 to 1.12. Adjusted odds ratio of the average effect of interval from collapse to defibrillator without bystander CPR per a minute was 1.12 and 95%CI 1.11 to 1.14. The effect of time to defibrillator with bystander CPR was better outcome than the effect of time to defibrillator without bystander CPR.

**[Conclusions]** Proportion of survival with good neurological outcome cardiac arrest differently decreased with time that defibrillation with or without bystander CPR was delayed. Bystander CPR before defibrillation showed better neurological outcome and gained about 5 minutes to obtain the same proportion of the survival without bystander CPR. Our results suggest the effect of times to the chain of survival from nationwide large population data.

## **Influence of Age Differences for Collapse-to--Defibrillator Time on Survival in Out-of Hospital Cardiac Arrest from All-Japan Utstein Registry Data**

Naohiro Yonemoto<sup>1</sup>; Hiroyuki Yokoyama<sup>2</sup>; Ken Nagao<sup>3</sup>; Takeshi Kimura<sup>4</sup>; Hiroshi Nonogi<sup>2</sup>; JCS-ReSS group

**[Background]** The study investigated influence of age differences for collapse-defibrillator time on survival in out-of hospital cardiac arrest. Several studies had the effects of age on survival from out-of hospital cardiac arrest, however those were for medium sample size.

**[Method]** We used All-Japan Utstein Registry of the Fire and Disaster Management Agency with a prospective, population based, involving consecutive patients with an out-of cardiac arrest with witness with layperson, from 16 to 89 years (young adult: 16-39 age, middle: 40-64 age, older: 65-89 age) and from April 1, 2006 to December 31 2009. The primary outcome measure was survival and good neurological outcome CPC 1 or 2. We evaluated the effect of collapse-defibrillator time for the outcome in logistic regression by age group.

**[Results]** 1329 were young adults, 7400 were middles and 10315 were at older in the analysis. Odds ratio of the average effect of the time per five minutes by defibrillator was 1.53 and 95% confidence intervals (CI) 1.36 to 1.73,  $p < .0001$  at young adult, 1.61 and 95%CI: 1.53 to 1.71,  $p < .0001$  at middle, 1.77 and 95%CI: 1.67 to 1.87,  $p < .0001$  at older (figure).

**[Conclusion]** Our results suggest that the effect of the times by defibrillator has age differences. Elderly person need more to improve the delay of defibrillator.



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Nationwide Epidemiology and Outcomes from Paediatric Out-of-hospital Cardiac Arrest in Japan; from JCS-ReSS Research Group

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*Abstract:* Background: Though Resuscitation Outcomes Consortium (ROC) reported large volume epidemiology from US and Canada in 2009, data for paediatric cardiac arrest is still scant. Nationwide, prospective, population-based, observational larger study has done in Japan. We reported epidemiology and outcomes from paediatric out-of-hospital cardiac arrest (OHCA) in Japan with comparison to ROC study.

Methods: Nationwide OHCA registration performed from 2005 to 2009, and gathered 547,218 cases. We enrolled 11,322 children aged less than 20 years, and were stratified into 3 age groups as same as ROC study [infants (<1 y, n 4,006), children (1-11 y, n 3,372), adolescents (12-19 y, n 3,944)]. Initial cardiac rhythms (VF/VT versus Asys/PEA), pre-hospital intervention done by emergency medical teams (EMT), and outcomes were analyzed.

Results: The incidence of paediatric OHCA in Japan was 9.81 per 100,000 person-years (74.32 in infants 5.46 in children, 8.17 in adolescents), versus 8.04 in ROC. Good neurological outcome (CPC 1 or 2) for all paediatric OHCA was 5.4% (2.9% for infants, 7.5% for children, 6.2% adolescents) versus 6.4% survival to hospital discharge in ROC. In VF/VT group showed similar trends to ROC, but in Asys/PEA group, good neurological outcome was only 1.1% versus 5% in ROC (p <0.005). Analysis of EMT intervention showed defibrillation performed in 95% for adolescents, but only 59% for children and 48% in infants despite indicated. Implementation ratio of other procedure for children was 20% for advanced airway (73% in ROC), 1.7% for resuscitation drug therapy (30% in ROC), 7.1% for IV line (42% in ROC), none for IO line (38% in ROC) in Japan.

Conclusion: This study demonstrates that the incidence of paediatric OHCA and outcome of VF/VT group are similar to previously reported epidemiology from North America. Asys/PEA group showed significantly worse outcome in Japan.

It may relates to the low implementation ratio of pre-hospital intervention by EMT for children in Japan.

Author Disclosure Information: N. Shimizu: Research Grant; Modest; Governmental grant. K. Ohta: None. M. Nitta: None. N. Yonemoto: None. H. Nonogi: None. K. Nagao: None. T. Kimura: None.

Category (Complete): Cardiac Arrest

Keyword (Complete): Epidemiology ; Children ; Systems of care

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Accessibility of emergency medical systems affects cardiovascular mortality in nationwide survey

Objective: Emergency cardiovascular cares for patients with acute cardiac disease are necessary to make better prognosis, especially for acute myocardial infarction. To improve the time to treatment, the emergency medical systems (EMS) and the cardiovascular emergency hospitals cover whole areas in Japan with universal coverage of medical insurance. We examined the influences of accessibility of EMS on cardiovascular mortality in Japan (population: 128 million, area:  $378 \times 10^3 \text{km}^2$ ).

Methods: We specified the cardiovascular emergency hospitals to be possible to treat acute myocardial infarction with the reperfusion therapies. Average ambulance transfer time to hospital was assumed to be measured by electric map as the time from public office to the nearest hospital in each city. Mortality was calculated by national census of year 2005 and the data of demographic death specified by ICD-10. Standardized Mortality Ratio (SMR) for cardiovascular was adjusted by age and gender. The influences of transfer time, number of emergency hospitals in each city, and percent of habitable area on log SMR were determined by linear regression weighted by number of death.

Results: There were 1875 cities and 1998 cardiovascular emergency hospitals in Japan. Time to the hospital was 13(1-252) minutes, percent of habitable area was 0.45(0.02-1.00), and SMR was 1.02(0-2.48) [median (range)]. Longer transfer time, less emergency hospitals, and lower percent of habitable area increased SMR (Table1). High risk category with no emergency hospital, time  $\geq 30$ min, and habitable area  $< 50\%$  were much distributed on mountainous areas and peninsulas.

Conclusion: Cardiovascular mortality increased according to the inaccessibility to EMS combined transfer time, existence of cardiovascular emergency hospital, and geographical livability. These variations should be taken account to make EMS more effectively such as mobile telemedicine system with direct transmission of 12-lead ECG.

Table1. Effects of categorized characteristics of cities on SMR

| Emergency hospital | Time          | habitable area % | N of cities | Median SMR | SMR ratio | 95% C.I.    |
|--------------------|---------------|------------------|-------------|------------|-----------|-------------|
| No                 | $\geq 30$ min | $< 50\%$         | 454         | 1.10       | 1.18      | 1.14 - 1.21 |
| No                 | $\geq 30$ min | $\geq 50\%$      | 47          | 1.12       | 1.18      | 1.09 - 1.27 |
| No                 | $< 30$ min    | $< 50\%$         | 256         | 1.10       | 1.16      | 1.12 - 1.20 |
| No                 | $< 30$ min    | $\geq 50\%$      | 317         | 1.02       | 1.05      | 1.02 - 1.08 |
| Yes                | $< 30$ min    | $< 50\%$         | 323         | 1.03       | 1.04      | 1.03 - 1.06 |
| Yes                | $< 30$ min    | $\geq 50\%$      | 468         | 0.96       | 1         | -           |

No: No cardiovascular emergency hospital in the city, Yes: 1 to 20



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Activity: Abstract

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Effect of Cardiopulmonary Resuscitation Training on Favorable Neurological Outcome for In-hospital Cardiac Arrest

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Abstract:

Background:

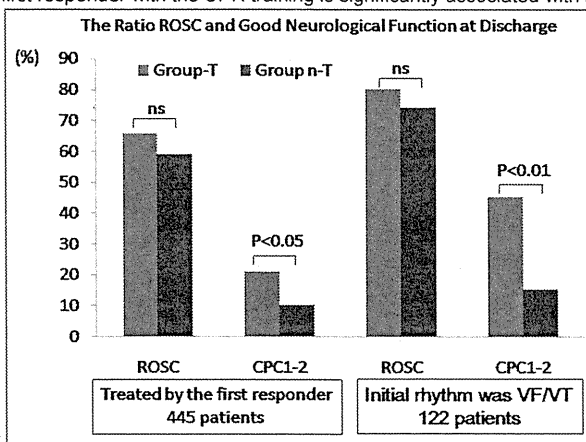
Many training courses for CPR have been performed to medical personnel but few data have been reported those effect.

Method:

From 2008 to 2009, during 24 month, 491 patients were registered in the Japanese Registry of CPR for In-hospital Cardiac Arrest (J-RCPR). 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) and good neurological function at discharge (CPC1 or 2 in Glasgow-Pittsburgh cerebral performance category) in each groups. We also analyzed each indexes by initial rhythm was VF/VT arrest (n=122) and PEA/Asystole (n=316).

Result: The ratio of ROSC, good neurological performance were 65.8%, 21.1% in group T, and 59.1,10.3% in group n-T (In good CPC p<0.05). In VF/VT, the ratio were 80.2%, 45.5% in group T, and 74.2%,15.4% in group n-T (In good CPC p<0.01). In PEA/Asystole, the ratio were 60.8%, 12.5% in group T, and 50.0%, 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 neurological outcome, especially in VF/VT

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International Comparison of Paediatric In-hospital Cardiac Arrest - Impact of Critical Care Settings for Hospital Safety and Outcome; from The Japanese Registry of CPR for In-hospital Cardiac Arrest (J-RCPR)

Author Block: Sasa Kurosawa, Naoki Shimizu, Tokyo Metropolitan Children's Medical Ctr, Tokyo, Japan; Jun Honma, Chiba Univ, Chiba, Japan; Seishiro Marukawa, Iseikai Hosp, 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: Number of paediatric intensive care unit (PICU) is scant in Japan (only 1 PICU bed available for more than 80,000 children). It may affect hospital safety issue relating to the paediatric in-hospital cardiac arrest (IHCA). We investigated the epidemiology of IHCA including location of events from domestic IHCA registration and performed international comparison.

**Methods:** Japanese Registry of Cardiopulmonary Resuscitation (J-RCPR) was established to accumulate events of IHCA. J-RCPR registered 491 adult events in 12 general hospitals, and 156 paediatric events in 4 children's hospitals from 2002 to 2009. Event location, etiology, and prognosis were analyzed. J-RCPR data was compared between children and adults. National paediatric data was compared to those from National Registry of Cardiopulmonary Resuscitation (NRCPR).

**Results:** From J-RCPR data, bradycardia was the most common first documented rhythm in children (36%, n=56). Major cause of adult CPA was arrhythmia (31%, n=150), whereas in children the main causes were hypotension (47%, n=73), acute respiratory insufficiency (28%, n=44). In children, over all ROSC was achieved to 56% (n=88) in J-RCPR versus 52% (n=459) in NRCPR. Paediatric survival to hospital discharge was 26% (n=41) in J-RCPR versus 27% (n=236) in NRCPR. J-RCPR showed 48% (n=75) paediatric events occurred in PICU versus 65% (n=570) in NRCPR, and up to 27% (n=40) paediatric events occurred in general ward in Japan versus only 14% (n=123) in NRCPR (p<0.05). Survival to hospital discharge was achieved in 27% (n=20) cases arrested in PICU versus 25% (n=10) cases arrested in general ward from J-RCPR data.

**Conclusion:** International comparison in paediatric IHCA showed similar tendency except for the event location. J-RCPR showed significantly low IHCA prevalence in PICU and high prevalence in general ward, which indicates poor compliance of preventive PICU admission before cardiac arrest in children with respiratory failure and shock. Although it didn't show statistical difference of outcome, it revealed poor hospital safety in Japanese children's hospital. It might be led by the difference of intensive care circumstances between Japan and North America, and by poor number of PICU beds in Japan, which needs to be corrected.

Author Disclosure Information: S. Kurosawa: None. N. Shimizu: Research Grant; Modest; Governmental grant. J. Honma: None. S. Marukawa: None. N. Yonemoto: None. H. Yokoyama: None. H. Nonogi: None.

Category (Complete): Cardiac Arrest

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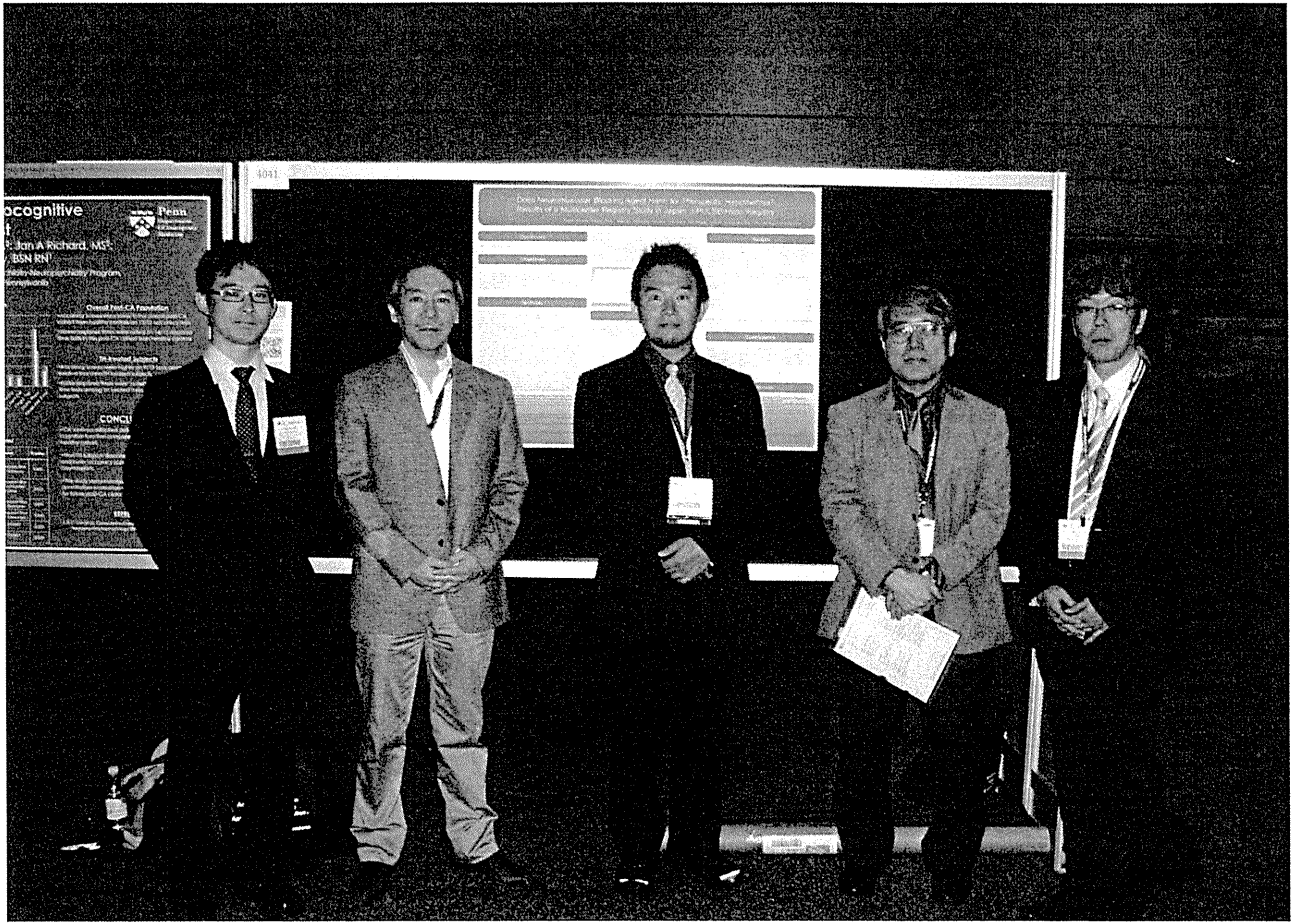
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急性心筋梗塞 改訂第2版

第4章 治療

病院収容前突然死とプレホスピタルケア

野々木 宏

最新医学社

## 第4章 治療

# 病院収容前突然死とプレホスピタルケア

### 要旨

院外心停止の最大原因は急性心筋梗塞（AMI）であり、その死亡数は院内での死亡を上回っている。そのため、診療のフォーカスは発症から入院までのプレホスピタルにある。ST 上昇型急性心筋梗塞（STEMI）の総虚血時間、すなわち発症から再灌流療法施行までを、2 時間以内にすることが重要である。そのためには、救急隊（EMS）到着からバルーン拡張までを 90 分以内とすること、EMS による 12 誘導心電図の記録と事前伝送がガイドラインで勧告され、地域専門病院との連携により治療までに時間短縮が期待されている。

### 循環器救急医療のフォーカスは院外へ

我が国における 3 大死因は、悪性腫瘍、心疾患、脳卒中であるが、後者 2 疾患は循環器疾患で合計すると悪性腫瘍とほぼ同数であり、その特徴は、急性期治療が奏効すると救命の可能性や社会復帰率が上昇することである。循環器救急疾患の代表的なものとして急性心筋梗塞（AMI）が挙げられるが、過去 30 年間に再灌流療法などの導入により院内死亡率は低率となり、5% 前後となってきた。しかし、我が国も米国でも心筋梗塞（MI）の死亡の半数は院外死である<sup>1)2)</sup>。したがって、地域の救急システムの構築を含め、循環器救急医療のフォーカスは院外に定めることが必須である。

### ●キーワード

急性心筋梗塞  
院外心停止  
心臓突然死  
プレホスピタル  
ガイドライン

### 院外心停止の現状と対策

AMI による救命率向上対策を検討するうえで、現状把握を行うことが重要である。臨床疫学の立場から院外心停止が定義され、国際的に共通の様式で記録するためのガイドラインが作成された<sup>3)</sup>。その様式は、最初の会議の開催地の名前にちなんでウツタイン様式と呼ばれている。ウツタイン様式による心停止とは、「脈拍が触知できない、

反応がない、無呼吸で確認される心臓の機械的な活動の停止」と定義され、心原性と推測できるものと非心原性に分けられ、原因が不明な場合には除外診断に基づき、心原性と扱われている。この登録方法のメリットは、国際比較が可能となること、経年変化が分かることが挙げられる。我が国においても大阪府や東京都でウツタイン登録が開始され、その報告は世界から注目されている。その成果を受け全国データ登録が開始され、年間 10 万件の院外心停止登録により世界最大規模のデータベースとなり、その解析データからの知見が注目を浴びている<sup>4)</sup>。国を挙げて悉皆性の高い大規模データ登録が開始されたことは、世界的にも希有なことである。国際的に評価の高い報告が開始され、市民による自動体外式除細動器 (AED) の効果が明らかにされた。今後も国際的な発信により、内外の救急医療体制の対策構築に効果が上がることが期待される<sup>5)6)</sup>。

ウツタイン登録では、心停止の原因疾患は不明であるため、東海林らは心停止により搬入され死亡した成人症例の病理解剖により、その原因を検討した<sup>7)</sup>。内因性心停止 593 例の 34% が AMI で最多であり、その他の心疾患 (陳旧性心筋梗塞, 冠攣縮性狭心症, 致死性不整脈, 心筋症, 弁膜症, 先天性心疾患, 心タンポナーデが含まれる) が 18%, 大動脈瘤破裂と急性大動脈解離などの大動脈病変 12%, くも膜下出血 14%, その他 (急性呼吸不全, 肺塞栓, アルコール中毒, 消化管出血, 脳神経筋疾患, がん末期など) 22% であった。その結果、心原性が 52% であり、また脳血管と大血管疾患を含めた循環器疾患が 78% と高率であることが判明した。これで明らかとなったことは、搬入時に急性心不全による心停止と判断された症例のうち、半数が AMI であった点である。

### 『心肺蘇生法ガイドライン』改訂

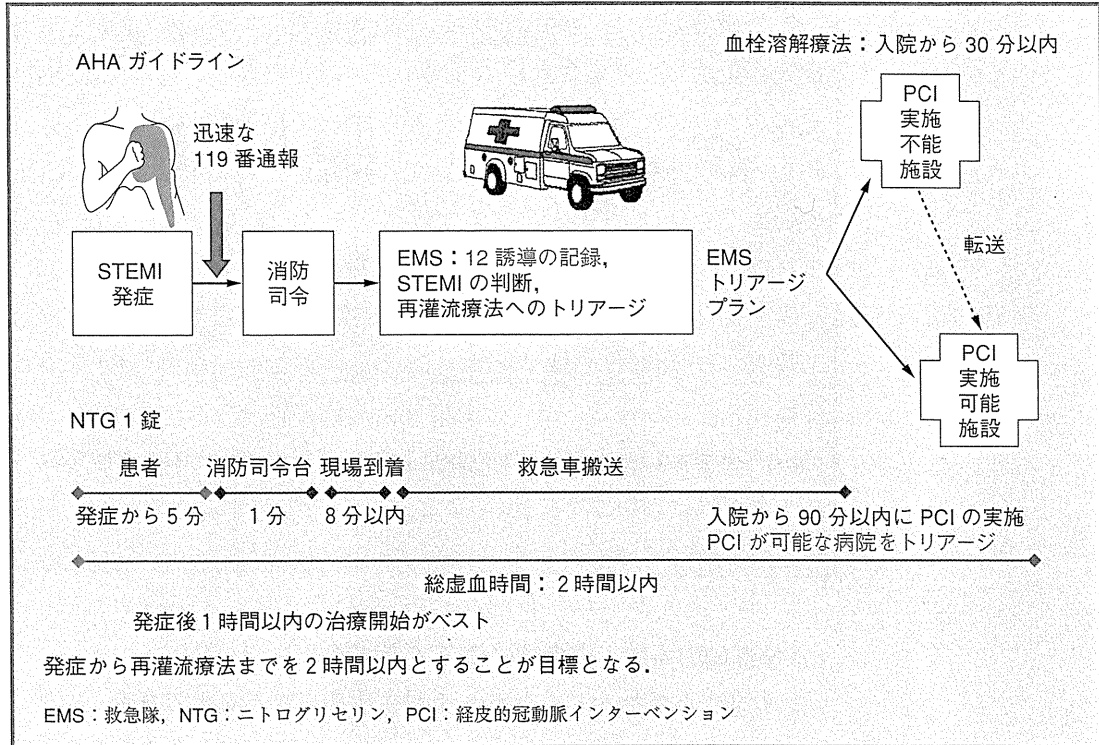
心原性で目撃のある初期調律が心室細動であった例の救命と脳蘇生良好 (社会復帰) 例は年々増加している<sup>8)</sup>。この要因は、市民の心肺蘇生法 (CPR) 実施率の増加と通報から除細動実施までの時間短縮である。その中で、胸骨圧迫のみの CPR 実施が増えていることが効果発現に寄与している可能性がある。それは、発見者による胸骨圧迫 (心臓マッサージ) のみでも標準 CPR と同等<sup>9)</sup>、あるいはより効果

的<sup>10)</sup>に救命できていることが明らかとなった点である。

この報告を受け、2007年には、AHAがhands-only CPRとして、成人の突然の心停止に対しては、人工呼吸ができない場合には胸骨圧迫のみのCPRを勧告した<sup>11)</sup>。さらに、米国心臓協会(AHA)は2010年ガイドライン改訂において、国際蘇生連絡委員会(ILCOR)の勧告<sup>12)</sup>を受け、CPRのアルゴリズムをA, B, CからC, A, Bと変更した<sup>13)</sup>。これは、CPRが1960年に確立してから50年ぶりの大きな改訂と言える。これまでのCPRは、気道の確保(A)、口対口の人工呼吸(B)、胸骨心臓マッサージ(C)、電氣的除細動(D)の順番で行われ、いわゆるABCとして覚えられていたのを、我が国からのデータをもとに胸骨圧迫の重要性をさらに勧め、CABの順に変更した。我が国においても、ILCOR勧告を受け、日本蘇生協議会(JRC)が各国と同時に同様のガイドラインを発表した<sup>14)</sup>。

今回のJRCガイドラインにおける主な改訂ポイントを挙げる。

- ・救命の連鎖において最初のリングを“心停止の予防”とした。
- ・質の高い胸骨圧迫が心肺蘇生で最も重要であることは従来通りとした。
- ・反応がみられず、呼吸をしていない傷病者には、まず胸骨圧迫から心肺蘇生を開始することにした。
- ・可能であれば胸骨圧迫に人工呼吸を加えるが、できない場合は胸骨圧迫のみを行うことをこれまで以上に強調した。
- ・従来の標準的な講習に加えて、内容を胸骨圧迫にしぼった短時間の講習を用意することにより、市民の受講機会を増やすことを目指した。
- ・二次救命処置のうち、主に医療機関において行う部分については、低体温療法など蘇生後の集中治療に焦点を当てた。
- ・急性冠症候群について病院前救護体制と医療システムの連携を強化することにより、発症から再灌流までの時間を短縮すべきであることを強調した。
- ・脳卒中を始めとするさまざまな脳の緊急事態からの蘇生を推進するために、“神経蘇生”の章を新たに設けた。

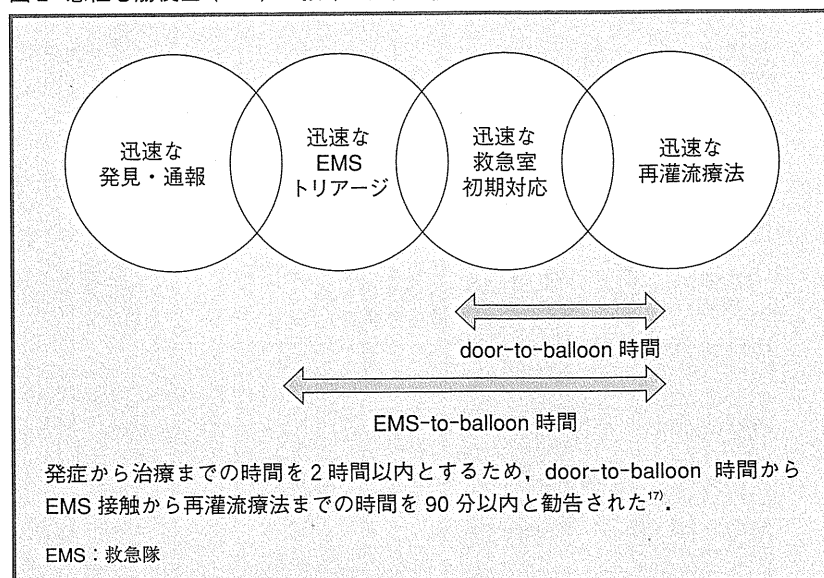
図1 ST上昇型急性心筋梗塞 (STEMI) 早期受診の対策 (文献<sup>15)</sup>より引用改変)

### 急性心筋梗塞 (AMI) のプレホスピタルケア

梗塞サイズの縮小と予後の改善を目的に、AHA / 米国心臓病学会 (ACC) ガイドライン勧告にあるように、総虚血時間を2時間以内、すなわち発症から再灌流療法施行までを2時間以内にするのが重要である (図1)<sup>15)</sup>。そのためには、119番通報が不可欠であり、救急隊 (EMS) 到着から線溶療法開始まで (EMS-to-drug 時間) 30分以内、あるいはEMSからバルーン拡張まで (EMS-to-balloon 時間) 90分以内が勧告される<sup>16)</sup>。今回の2010年ILCOR勧告においてもシステムの構築として、発症から治療までの時間短縮がうたわれ<sup>17)</sup>、JRCガイドラインにおいても同様の勧告がなされた<sup>14)</sup>。

EMSが12誘導心電図を伝送するか判断するかにより、ST上昇型急性心筋梗塞 (STEMI) の情報を事前に経皮的冠動脈インターベンション (PCI) が可能な施設へ送ることで、救急室を経ずに、専門医との連携により、直接カテーテル検査室に搬入することが可能となる。

図2 急性心筋梗塞 (AMI) の救命の連鎖 (文献<sup>20)</sup>より引用改変)



1. 発症時の対応, 緊急時に備えての啓発

1) 早期受診を達成するためには 119 番通報が不可欠である

患者の決断時間を短縮すること, 119 番通報を利用することを日頃から啓発する必要がある。

2) 発症の高リスク群: 冠危険因子を複数有する中年期以降症例へ

突然の上半身の不快感発生時には, かかりつけ医へ連絡するより早期の 119 番通報が重要であることを, 日頃から患者へ指導しておくことが重要である<sup>18)</sup>。

3) AHA / ACC ガイドライン勧告

MI が疑われる症例には, ニトログリセリンを保有していれば 1 錠舌下し, 5 分で消失しない場合や悪化する場合には, 119 番通報することが勧告されている (図 2)。一般に, 救急車の安易な利用を制限する勧告がなされているが, 利用を推奨する疾患群について, 市民に分かりやすい症状 (警告サイン) を啓発する必要がある<sup>18)</sup>。

2. 院外 12 誘導心電図活用

1) 再灌流療法が可能な専門施設へ時間の遅れなく搬送するシステムが必要<sup>19)</sup>

2) 搬送時の 12 誘導心電図の活用

心電図記録により来院までに STEMI の診断が可能となる<sup>20) 21)</sup>。



door-to-drug 時間が約 10 分, PCI における door-to-balloon 時間が 15～20 分短縮すると報告された。これはその情報により, 事前にカテーテル検査室が確保された場合に得られる。

### 3) モバイルテレメディシンの活用

Fax で 12 誘導を病院へ伝送する方法や, 救命士による診断を口頭で報告することが現状であるが, 今後心電図の自動診断や情報技術を使用した, モバイルテレメディシンの有用性が検討されると考えられる<sup>20)21)</sup>。

野々木 宏

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## **Report From the Japanese Registry of CPR for In-Hospital Cardiac Arrest (J-RCPR)**

Hiroyuki Yokoyama, MD; Naohiro Yonemoto, PhD; Kazuya Yonezawa, MD; Jun Fuse, MD;  
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**Background:** In-hospital cardiopulmonary arrest (CPA) is an important issue, but data in Japan are limited.

**Methods and Results:** To investigate in-hospital CPA, we conducted a prospective multicenter observational registry of in-hospital CPA and resuscitation in Japan (J-RCPR). During January 2008 to December 2009, patients were registered from 12 participating hospitals. All patients, visitors and employees within the facility campus who experience a cardiopulmonary resuscitation event defined as either a pulseless or a pulse with inadequate perfusion requiring chest compressions and/or defibrillation of ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT) were registered. Data were collected in 6 major categories of variables: facility data, patient demographic data, pre-event data, event data, outcome data, and quality improvement data. Data for 491 adults were analyzed. The prevalence of pulseless VT/VF as first documented rhythm was 28.1%, asystole was 29.5% and pulseless electrical activity was 41.1%. Immediate causes of event were arrhythmia 30.6%, acute respiratory insufficiency 26.7%, and hypotension 15.7%. Return of spontaneous circulation was 64.7%; the proportion of survival 24 h after CPA was 49.8%, the proportion of survival to hospital discharge was 27.8% and proportion of favorable neurological outcome at 30 days was 21.4%.

**Conclusions:** This is the first report of the registry for in-hospital CPA in Japan and shows that the registry provides important observational data. (*Circ J* 2011; **75**: 815–822)

**Key Words:** Favorable neurological outcome; In-hospital cardiac arrest; Multicenter registry

In recent years, the scientific evidence of out-of-hospital cardiac arrest has accumulated, which has enabled the establishment of evidence-based guidelines. Accordingly, appropriate evidence-based measures and educational training methods have been developed for out-of-hospital cardiac arrest, thus improving the resuscitation and rehabilitation rates of affected patients.<sup>1,2</sup> On the other hand, there are not yet sufficient findings on in-hospital cardiac arrest that occurs in hospitalized patients, outpatients visiting a hospital, or hospital visitors.<sup>3</sup> In recent years, multicenter registry studies have been started in Europe and the United States to

collect data on in-hospital cardiac arrest.<sup>4–6</sup> A large-scale registry, the National Registry of Cardiopulmonary Resuscitation (NRCPR), was started in the United States in 2000, sponsored by the American Heart Association.<sup>7,8</sup> However, the circumstances and management of in-hospital cardiac arrest are greatly affected by the medical and healthcare systems in each country, and therefore in Japan it is necessary to accurately understand the present domestic situation in order to plan appropriate control measures. Here, we report on a multicenter prospective registry study (the Japanese Registry of CardioPulmonary Resuscitation [J-RCPR]) created to collect

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