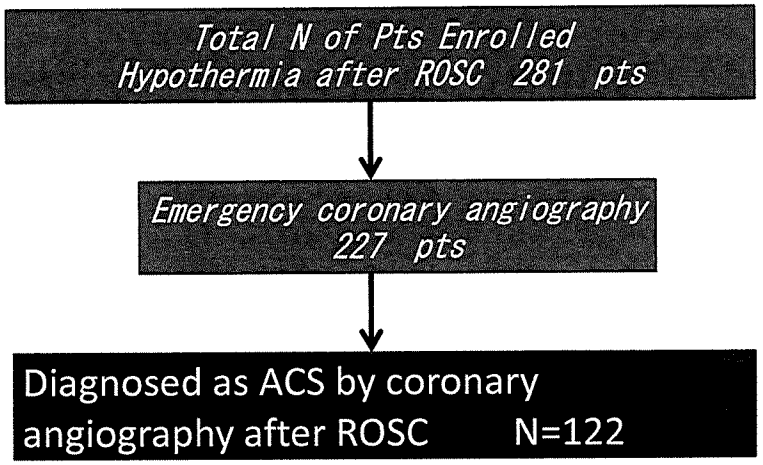
Results



Baseline Characteristics (1)

Man (%)	95.1
Age	60+/−11
Bystander CPR (%)	54.1
Shockable Rhythm (%)	82.8
Mean no flow time (min)	3.0
OMI (%)	2.5
History of Heart Failure (%)	4.9
Stroke (%)	5.7
Hypertension (%)	35.0
Diabetes (%)	15.6
Mean GCS	3.8
ROSC before ER (%)	55.7
Hb (mean g/dl)	14.0+/−1.6
Serum K (mEq/l)	4.1+/−0.9
Cre>1.5 (%)	12.3

Baseline Characterstics (2)

mean B.E	−12.9
mean CA-ROSC	30 +/− 24
Cold saline use (%)	52.7
Surface cooling (%)	56.0
Over cooling during Tx (%)	28.6
cooling start to target temperature (min)	239.8+/− 211.4
Mean cooling time (hrs)	32.6+/−14.0
Rewarming	
24 hours>= (%)	24.6
24-48 hours (%)	30.3
48-72 hours (%)	33.6
72 hours<	9.0
Multivessel disease (%)	41.0
Anterior MI (%)	63.1
Left main culprit (%)	4.0
IABP use (%)	61.5
PCPS use (%)	29.5

Clinical Outcomes

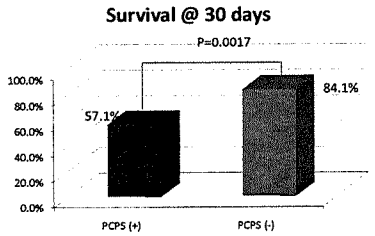
Alive @ 30days 77.0%

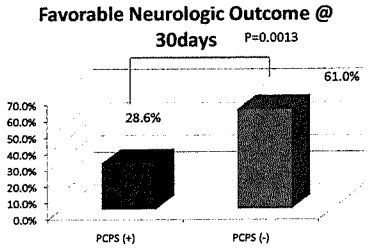
Favorable Neurologic Outcome @ 30days 52.0%

Including cardiogenic shock required PCPS

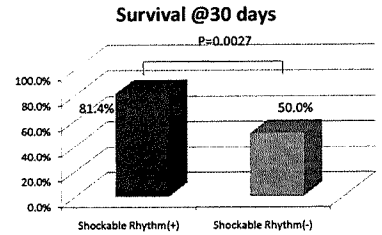
Clinical Outcomes (2)

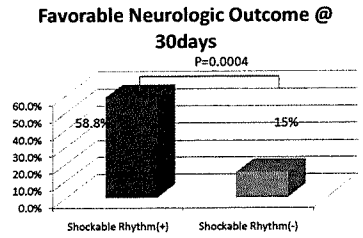
PCPS use

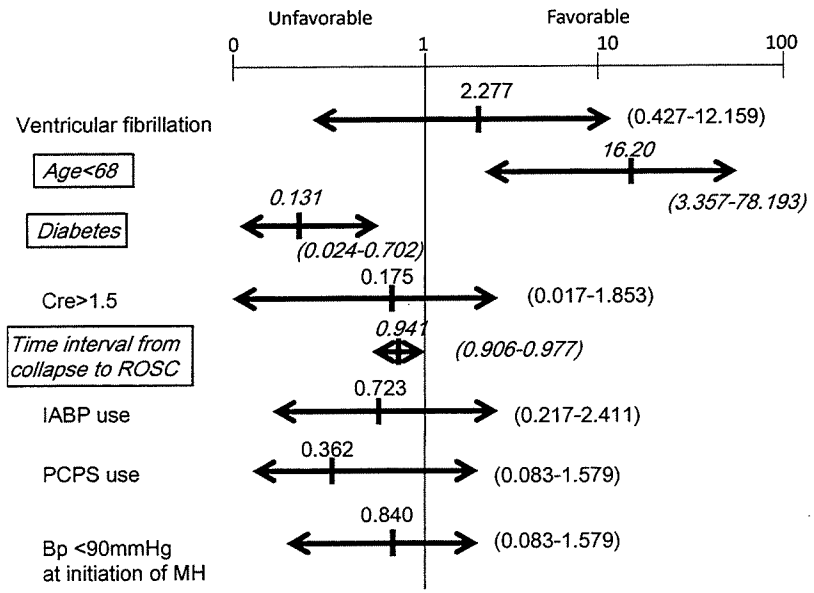




Shockable Rhythm

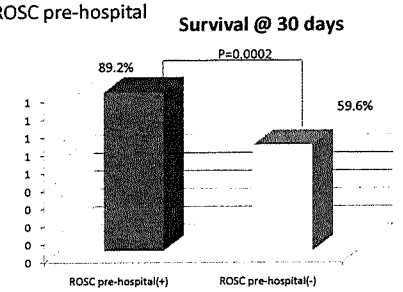


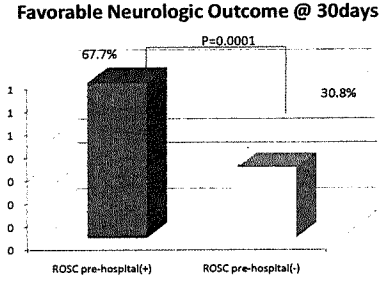




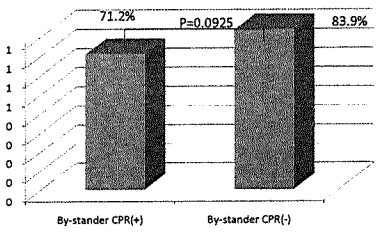
Clinical Outcomes (2)

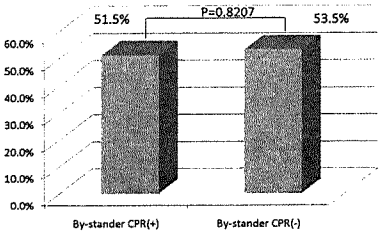
ROSC pre-hospital





By-stander CPR





Summary

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.

Conclusions

MH with PCI for patients with ROSC after out-of hospital cardiac arrest of ACS was effective for improvement of 30 days neurologic outcome even in the case of hemodynamic unstable and in any rhythm.

タイトル:

Early Induction of Hypothermia using intravenous Ice-cold Fluids Improves Neurological Outcome (J-PLUSE-Hypo registry) and Its Optimal Monitoring of Core Temperature

抄録用図表の有無:なし

抄録本文:

Background Intravenous ice-cold fluids alone cannot be used to maintain hypothermia, but this cooling method can be used to institute easily and inexpensively. **Methods** The J-PLUSE-Hypo was conducted as a multi-center hypothermia study. We added a study of optimal monitoring places of core temperature during intravenous 2000mL of normal saline at 4° C using high-pressure infusion bags to the J-PLUSE-Hypo. **Results** In the J-PULSE-Hypo, 165 survivors from out-of-hospital VF cardiac arrest were treated with mild hypothermia (34° C for 1 to 3 days). Of those, 74 were treated with intravenous ice-cold fluids (IV group), and 91 induced hypothermia without ice-cold fluids (no-IV group). The two groups had similar cooling-to-34° C interval (median; 168 min vs. 195 min, p=0.68), but a significant difference was seen in a favorable neurological outcome (72% vs. 52%, p=0.009). In our additional study, a mean administrated interval of ice-cold fluids was 14 minutes. Significant differences were seen in mean core temperatures among 3 places before and after initiation of ice-cold fluids (before ice-cold fluids; 34.4±2.3° C in esophagus vs. 37.0±1.2° C in rectum vs. 36.5±1.2° C in bladder, p<0.001: After 30 minutes; 32.5±2.5° C in esophagus vs. 34.8±1.7° C in rectum vs. 35.0±1.5° C in bladder, p<0.001). **Conclusions** Early induction of hypothermia using intravenous ice-cold fluids was associated with better neurological outcomes. During ice-cold fluids, esophagus temperature was not suitable as a core temperature monitoring.

Efficacy of Early Induction of Hypothermia Using Intravenous Ice-cold Fluids (J-PLUSE-Hypo registry) and Its Optimal Monitoring Places of Core Temperature

Masakazu Matsuzaki, Ken Nagao, Hiroshi Nonogi, Hiroyuki Yokoyama, Naohiro Yonemoto and J-PLUSE-Hypo investigators/ J-PLUSE-Hypo. Registry Group

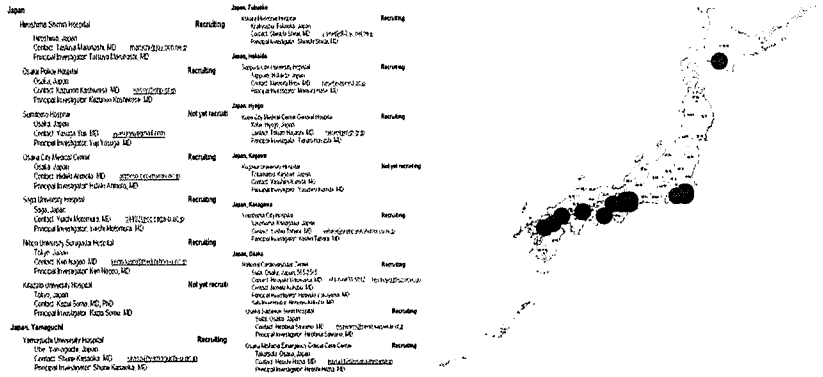
Kimio Kikushima, Kazuhiro Watanabe, Yoshiteru Tominaga, Katsushige Tada, Mitsuru Ishii, Nobutaka Chiba, Kei Nishikawa, Taketomo Soga, Yutaka Tateda, Harumi Ikeda and Tsukasa Yagi/ Surugadai Nihon University Hospital

ClinicalTrials.gov
A service of the U.S. National Institutes of Health

Multicenter Registry Study With Therapeutic Hypothermia After Cardiac Arrest in Japan (J-PULSE-HYPO)

This study is currently recruiting participants.
Verified by National Cardiovascular Center, Japan, May 2009

First Received: May 12, 2009 No Changes Posted



J-PULSE hypothermia registry

Introduction

動物実験ならびに臨床試験において、心停止蘇生後早期に脳低体温療法を導入することが、神経学的予後に寄与することが報告されてきた。

院外VF心停止蘇生後患者には、より早期に32～34℃の低体温を12～24時間持続することが提案されているが、脳低体温療法の目標温度、導入方法、維持方法、復温方法などについては未だ確立されていない。

脳低体温療法の導入方法としては、氷嚢やクーリングブランケットの使用、胃洗浄、冷却水輸液、冷却ガス吸入などが試されてきた。なかでも冷却水輸液は低体温の維持には不向きではあるが簡便、安価であり、その有用性が報告されてきた。

Resuscitation 2003; 56: 9-13.
Circulation 2005; 112: 715-719
Circulation 2007; 115: 3064-3070 . etc

ClinicalTrials.gov
A service of the U.S. National Institutes of Health

Multicenter Registry Study With Therapeutic Hypothermia After Cardiac Arrest in Japan (J-PULSE-HYPO)

This study is currently recruiting participants.
Verified by National Cardiovascular Center, Japan, May 2009

Study Population

Patients with therapeutic hypothermia after cardiac arrest from 2005 to 2009 in each hospitals.

Criteria

Inclusion Criteria:

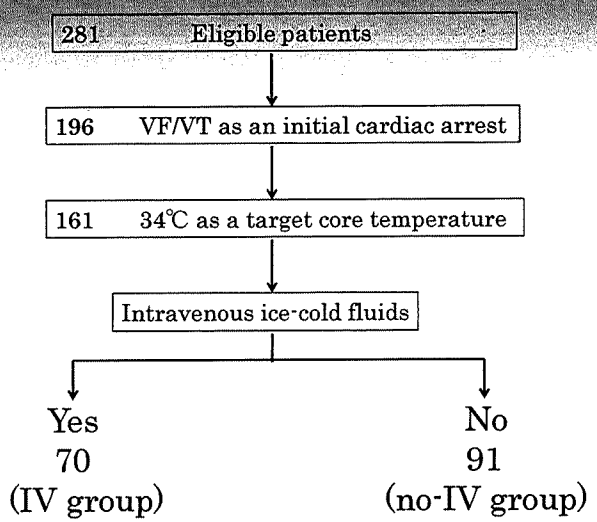
- Adult patients who remained unconscious after resuscitation from out-of-hospital or inhospital cardiac arrest
- Presented the stable hemodynamics with drug treatments or mechanical supporting system including IABP or PCPS

Exclusion Criteria:

- Patients with:
  - pregnancy
  - acute aortic dissection
  - pulmonary thromboembolism
  - drug poisoning
  - poor daily activity

J-PULSE hypothermia registry

Patients



Baseline Characteristic of Participants

	IV Group (n=70)	no-IV Group (n=91)	p*
Age (mean±SD, years)	57±12	60±13	0.11
Men	65 (93%)	75 (82%)	0.09
Witnessed cardiac arrest	60 (86%)	82 (90%)	0.54
Bystander CPR	31 (44%)	42 (46%)	0.93
From collapse to hospital arrival (median, min)	24	23	0.23
From collapse to ROSC+ (median, min)	21	25	0.09
Use of IABP after ROSC	25 (36%)	28 (31%)	0.51
Use of PCPS after ROSC	9 (13%)	21 (23%)	0.10
Causes of cardiac arrest			
Acute coronary syndrome	51 (73%)	59 (65%)	
Arrhythmia	7 (10%)	16 (17%)	
Cardiomyopathy	7 (10%)	6 (7%)	
Unknown	5 (7%)	10 (11%)	0.37

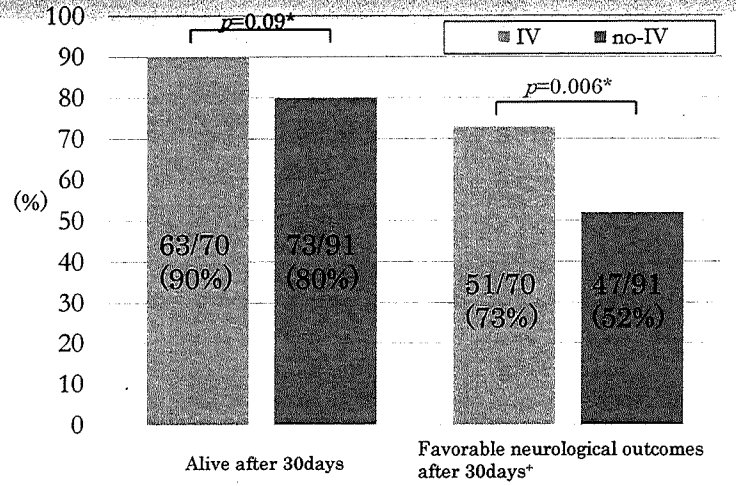
*Based on t, X^2 or log-rank test on appropriate, + Return of Spontaneous Circulation

Outcomes

	IV Group (n=70)	no-IV Group (n=91)	p*
From collapse to induction of hypothermia (median; min)	49	170	<0.001
From collapse to 34℃ (median; min)	220	360	0.06
From cooling to 34℃ (median; min)	169	195	0.61
Technique of maintenance of hypothermia (*n*)			
Blood cooling	38(54%)	33 (36%)	
Surface cooling	31(44%)	56 (62%)	
Combined cooling	1 (1%)	2 (2%)	0.07
Time duration of maintenance of hypothermia (*n*)			
24 hours	26 (37%)	40 (44%)	
25-48 hours	18 (26%)	32 (35%)	
49-72 hours	22 (31%)	15 (16%)	0.07
Missing	4 (6%)	4 (5%)	

*Based on t, log-rank or X^2 test on appropriate

Primary and Secondary Endpoint in This Study



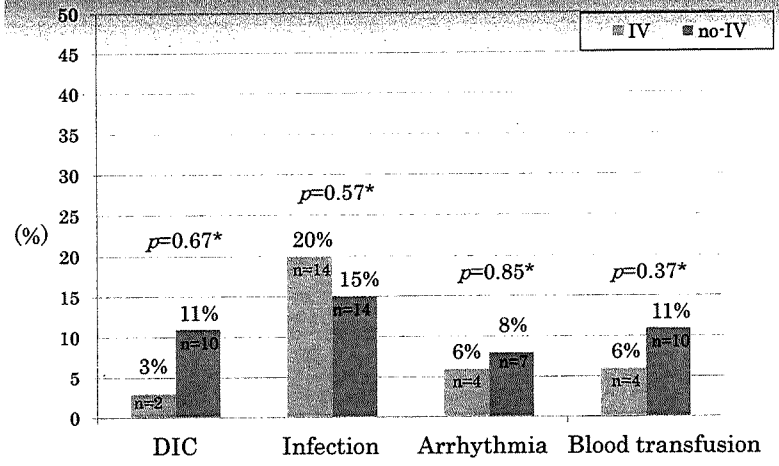
* X^2 test , +CPC(Cerebral Performance Category) 1or 2

Hemodynamics

	IV Group (n=70)	no-IV Group (n=91)	p^*
At the time of induction			
Systolic Blood Pressure (mmHg)	128±36	133±37	0.38
Heart rate (bpm)	100±23	99±30	0.88
At the time of attainment of core temperature at 34℃			
Systolic Blood Pressure (mmHg)	128±30	126±29	0.67
Heart rate (bpm)	92±20	83±24	0.02
At the time of completion of rewarming			
Systolic Blood Pressure (mmHg)	126±23	122±25	0.31
Heart rate (bpm)	91±17	88±19	0.40

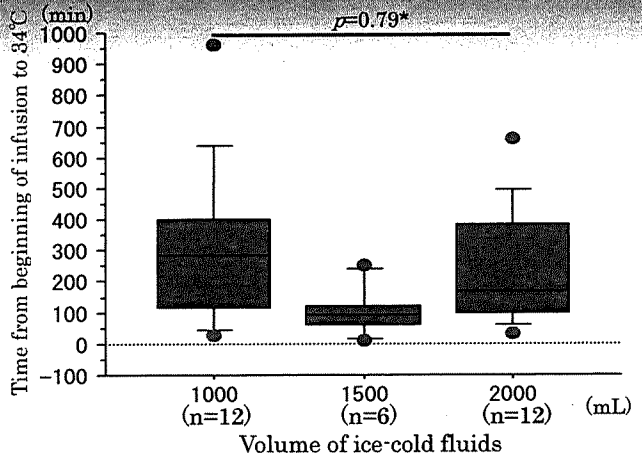
*Based on t test

Complications



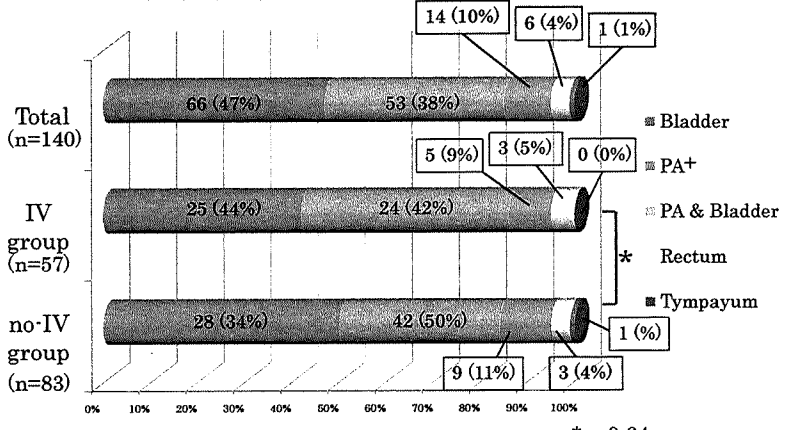
*Based on χ^2 test

Volume of Ice-cold Fluids in IV-group and Time Interval from Cooling to 34℃



* Based on Kruskal-Wallis test

Monitoring Places of Core Temperature During Hypothermia



*p=0.64
+ Pulmonary Artery

Rapid Infusion Method and Its Optimal Monitoring Places of Core Temperature

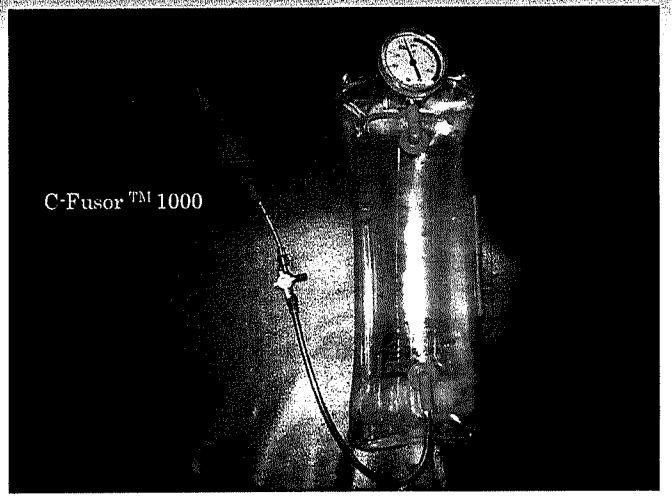
患者

駿河台日本大学病院救命救急センターに搬送されてきた院外心肺停止患者で、J-PULSE-Hypo. Registryの登録基準に該当する患者とした。

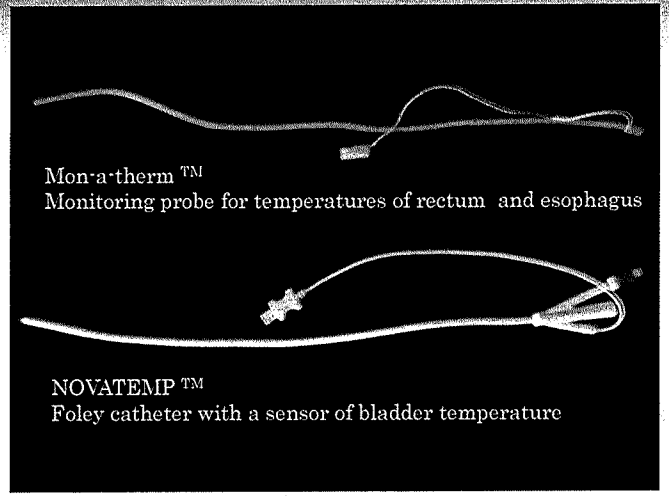
方法

患者が救命センターに到着して間もなく、両上肢または両鼠径部のいずれか2か所に18ゲージ以上の太い静脈路を確保し、そこから加圧バッグ(>300 mmHg)に取り付けられた4℃の生理食塩水を合計2000mL投与した(*Circulation 2007; 115: 3064-3070* の方法に準拠した)。その際の深部体温は膀胱、直腸、食道でモニターした。

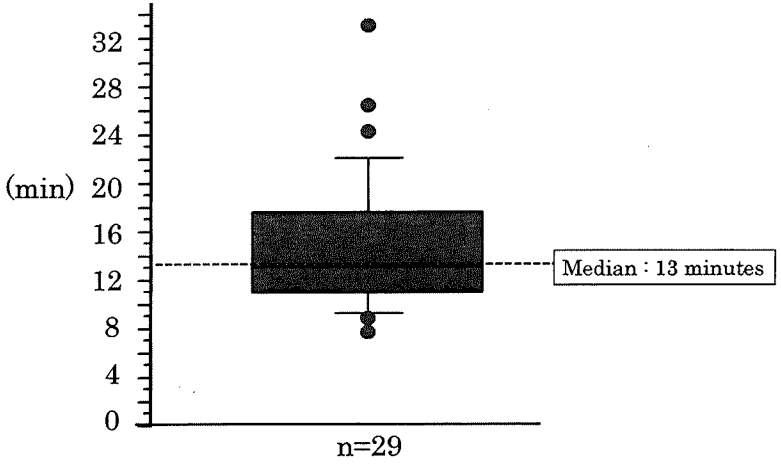
Ice-cold Normal Saline (4°C) with a High-pressure Bag



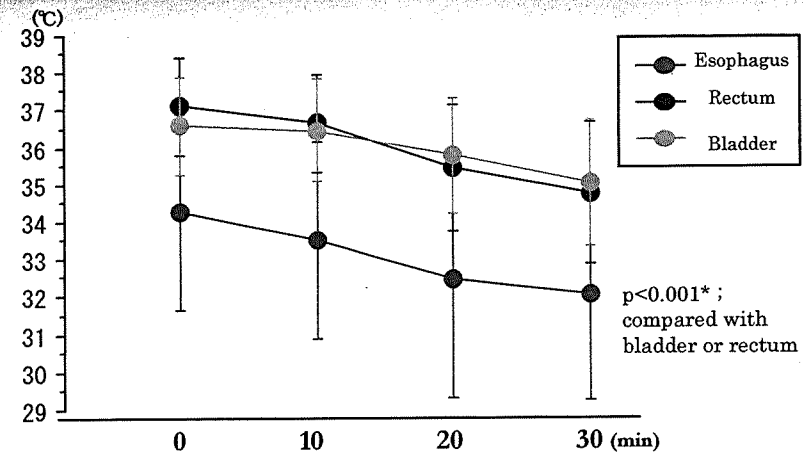
Monitoring Probe of Core Temperature



The Interval from Initiation of Intravenous Ice-cold Fluids (2000mL) to Completion of the Fluids.



Core Temperatures
Esophagus vs. Bladder vs. Rectum



* Based on repeated measured ANOVA

Discussion

・J-PLUSE-Hypo Registryにおいて、IV groupではno-IV groupに比し、良好な神経学的転帰が得られた。冷却水輸液は導入が簡便なため、初期診療時により早期に導入できたことが要因であると考えられる。

・冷却水輸液を行うことで合併症や輸血の機会が増すことはなかった。

・そのため、冷却水輸液は迅速、簡便、安価、安全であるため、冷却水輸液による脳低体温療法の導入を積極的に行うべきである。

Discussion

・加圧バッグに取り付けられた2000mLの冷却水は、13分程度で投与完了することができ、30分後には深部体温で35℃前後まで低下しうることが判明した。

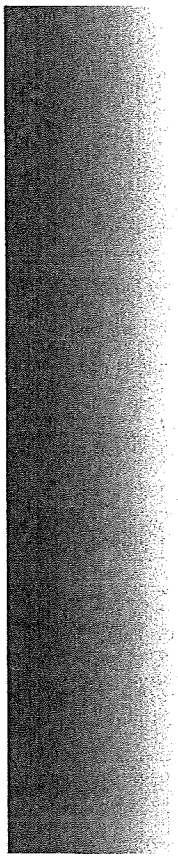
・今回食道温は膀胱温や直腸温と比べ、常に2℃程度低値を示した。これは初期診療時には外気温や換気の影響を受けやすいこと、測定デバイスが適切な位置に留置しにくいことなどが原因として挙げられる。

・深部体温の低下の程度は、輸液の温度と投与量、患者の体型、外気温などにより規定されると考えられるため、さらなる症例の蓄積が必要と考えられる。

Conclusion

冷却水輸液を用いた迅速な脳低体温療法の導入は、院外VF心停止蘇生後の昏睡患者の神経学的転帰に寄与する。

初期診療時の深部体温のモニタリングとして、食道温は過大評価を生じる可能性がある。



The Impact of Percutaneous Cardiopulmonary Assisted Devices to Treat Patients under Therapeutic Hypothermia in Hemodynamic Compromised State

Background: Therapeutic hypothermia (TH) improves neurological outcomes of patients with out-of-hospital cardiac arrest (OHCA), however, impact of cardiopulmonary assisted devices (PCPS) to treat the patients with prolonged cardiogenic shock under therapeutic hypothermia (HT) have not been sufficiently studied.

Methods: Four years (2005-2008) data were available for 281 patients after OHCA treated with TH in the multicenter registry in Japan. In this study, 57 patients (20.3%) were treated with PCPS. We evaluated factors to influence on favorable neurologic outcome (FNC) in the patients treated with PCPS under TH.

Results: In the patients treated with PCPS, 18 patients showed good out-come with FNC (FNC-group) and 39 had not good out-come with FNC (Non-FNC-group). Although there was no significant in age, gender, the presence of bystanders, initial ECG findings, arterial pH and arterial base excess, but FNC-group showed significantly shorter time of the collapse to return of spontaneous circulation (ROSC) interval, higher rate of ROCS before admission and higher maximum blood pressure after ROSC (27.9±24.0min, 50.0% and 136±44mmHg, respectively) than Non-FNC-group (66.1±37.3min, 7.7% and 96±28mmHg, respectively, $p<0.01$).

Conclusions: The patients treated with TH using PCPS were reached FNC at 30 days up to 31.6%. Time of the collapse to ROSC interval, ROSC before admission and blood pressure after ROSC were important factors to become FNC.

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Impacts of Percutaneous Cardiopulmonary Assisted Devices to Treat Patients under Therapeutic Hypothermia in Compromised State

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JCS 2010

Sapporo Medical University

Presenter Disclosure Information

Nobuaki Kokubu, MD
Impacts of Percutaneous Cardiopulmonary Assisted Devices to Treat Patients under Therapeutic Hypothermia in Compromised State

FINANCIAL DISCLOSURE: None

UNLABELED/UNAPPROVED USES DISCLOSURE: None

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Backgrounds

Although it has been reported that therapeutic hypothermia (TH) improves neurological outcomes of patients with cardiac arrest, procedures of the hypothermia remain to be established.

Particularly, impact of cardiopulmonary assisted devices (PCPS) to treat the patients with prolonged cardiogenic shock under TH has not been sufficiently studied.

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Objective

To investigate the efficacy of TH including PCPS in patients with return of spontaneous circulation (ROSC) after resuscitation from out-of-hospital or inhospital cardiac arrest.

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Study Populations

281 consecutive patients with ROSC after resuscitation treated with TH in the multicenter registry in Japan (J-Pulse-Hypo registry) for 4 years (2005-2008).

<Inclusion criteria>
- Adult patients who remained unconscious after resuscitation from out-of-hospital or inhospital cardiac arrest.
- Presented the stable hemodynamics with treatment or mechanical supporting system including IABP or PCPS.

<Exclusion criteria>
- pregnancy
- dissection of aorta
- pulmonary thromboembolism
- drug poisoning
- poor daily activity

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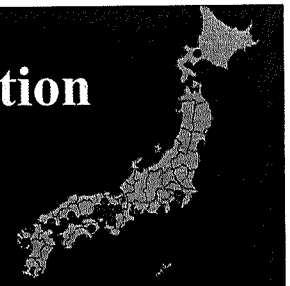
Study Organization



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Hiroshi Nonogi

Working members:
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Participating institution:

National Cardiovascular Center	Sapporo Medical University Hospital
Nihon University Surugadai Hospital	Yokohama City University Hospital
Osaka Police Hospital	Kokura Memorial Hospital
Saga University Hospital	Saiseikai Senri Hospital
Hiroshima City Hospital	Osaka City University Hospital
Takatsuki Red Cross Hospital	Kitazato University Hospital
Yamaguchi Univrsity Hospital	Mishima Emergency critical Center
Kagawa University Hospital	Sumitomo Hospital

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Methods-1

Selection of cooling procedure was left to each institution.

The patients with hemodynamic compromised state were treated with PCPS (PCPS group).

↓

PCPS group: n=57 (20%)
Non-PCPS group: n=224 (80%)

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Methods-2

We evaluated clinical characteristics of the patients treated with PCPS under TH, and factors to influence on favorable neurologic outcome (FNC) in patients treated with PCPS.

Primary end point of this study was FNC, cerebral performance category (CPC) 1 and 2 rate at 30 days.

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Clinical characteristics of patients treated with TH

	All patients (n = 281)
Age (years)	58± 13
Male	235 (84%)
Initial cardiac rhythm	
Ventricular fibrillation	196 (69%)
Pulseless electrical activity	26 (9%)
Asystole	21 (8%)
Unidentified	37 (13%)
Witnessed cardiac arrest	247 (88%)
Bystander CPR	145 (52%)
OHCA	267 (95%)
ROSC before admission	167 (60%)
Collapse to ROSC interval (min)	37.8± 50.9
Acute coronary syndrome	170 (60%)
Emergency PCI	122 (43%)
PCPS use	57 (20%)
IABP use	108 (38%)
FNC rate at 30 days	123 (44%)

Data are presented as mean value ± SD or number (%) of patients.
CPR, cadiopulmonary resuscitation; IABP, intra aortic balloon pumping;
OHCA, out of hospital cardical arrest; PCI, percutaneous coronary intervention.

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Clinical characteristics between PCPS group and non-PCPS group

	PCPS group (n = 57)	Non-PCPS group (n = 224)	p value
Age (years)	59± 9	58 ± 14	0.56
Male	52 (91%)	183 (82%)	0.06
Initial cardiac rhythm			0.32
Ventricular fibrillation	35 (61%)	161 (72%)	
Pulseless electrical activity	6 (10%)	20 (9%)	
Asystole	4 (7%)	17 (7%)	
Unidentified	12 (21%)	25 (11%)	
Witnessed cardiac arrest	50 (88%)	197 (88%)	0.96
Bystander CPR	33 (58%)	112 (50%)	0.29
OHCA	54 (95%)	213 (95%)	0.91
ROSC before admission	13 (23%)	154 (69%)	<0.01
Collapse to ROSC interval (min)	66.8 ± 48.9	30.8 ± 49.0	<0.01
Acute coronary syndrome	41 (72%)	129 (58%)	0.04
Emergency PCI	36 (63%)	86 (38%)	<0.01
IABP use	43 (75%)	65 (29%)	<0.01

Data are presented as mean value ± SD or number (%) of patients.

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Cooling parameters and laboratory value on admission between PCPS group and non-PCPS group

	PCPS group (n = 57)	Non-PCPS group (n = 224)	p value
Maximam BP after ROSC	110± 39	132± 34	<0.01
Initiation cooling to target temperature (min)	124 ± 137	293± 248	<0.01
Cooling duration (hour)	32± 13	35 ± 15	0.24
Arterial blood pH	7.06± 0.19	7.17± 0.18	<0.01
Arterial blood Base Excess(mmol/l)	-16.3± 6.5	-11.5 ± 6.2	<0.01
Blood Sugar(mg/l)	297± 120	256± 85	<0.01
Creatinine(mg/dl)	1.3± 1.3	1.5± 1.8	0.32
Potassium(mEq/dl)	4.2± 1.0	4.1± 0.1	0.43
Hemoglobin(g/dl)	13± 2	14 ± 2	0.07

Data are presented as mean value ± SD or number (%) of patients.

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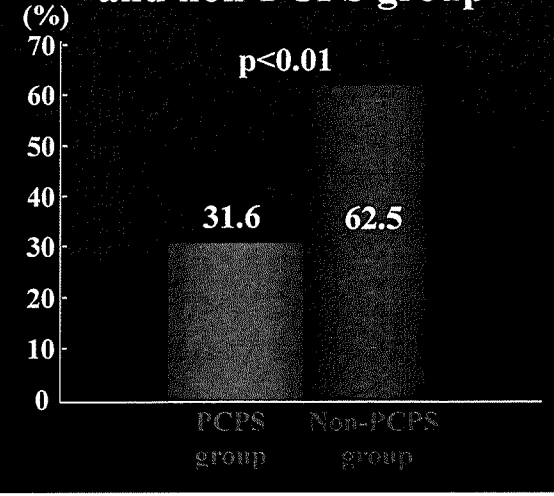
FNC rate at 30 days between PCPS group and non-PCPS group



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Comparison between FNC(CPC1/2) category and Non-FNC(CPC 3/4) category in PCPS group

	FNC group (CPC1/2) (n = 18)	Non-FNC group (CPC3/4) (n = 39)	p value
OHCA	16 (89%)	38 (97%)	0.20
ROSC before admission	9 (50%)	4 (10%)	<0.01
Collapse to ROSC interval (min)	42.6 ± 32.5	79.2 ± 51.6	<0.01
Acute coronary syndrome	16 (89%)	25 (64%)	0.04
Emergency PCI	11 (61%)	25 (64%)	0.83
IABP use	12 (67%)	31 (79%)	0.30
Maximam BP after ROSC(mmHg)	136± 44	96 ± 28	<0.01
Initiation cooling to target temperature (min)	113 ± 105	145± 185	0.43
Arterial blood pH	7.11± 0.20	7.03± 0.20	0.17
Arterial blood Base Excess(mmol/l)	-14.9± 7.8	-17.0± 5.7	0.27
Blood Sugar(mg/l)	260± 114	316± 119	0.11

Data are presented as mean value ± SD or number (%) of patients

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Summary

To compare with non-PCPS group, PCPS group showed much less FNC rate at 30 days.

Although PCPS group showed much hemodynamic compromised state in maximum blood pressure, rate of ROSC before admission, collapse to ROSC interval, blood sugar, pH and base excess of arterial blood gas at admission, PCPS group was more treated with PCI and IABP than in non-PCPS group.

Patients with FNC in PCPS group showed higher maximum blood pressure, more often coronary artery syndrome, higher rate of ROSC before admission and shorter collapse to ROSC interval than patients without FNC.

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Conclusions

The patients treated with TH using PCPS, even who were in very ill condition, were reached FNC at 30 days up to 31.6%.

Higher maximum blood pressure after ROSC, cardiac arrest due to acute coronary syndrome, ROSC before admission and collapse to ROSC interval were important factors of FNC in PCPS group.

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Efficacy of Therapeutic Hypothermia for Out-of-Hospital Cardiac Arrest in Patients with Non-Ventricular Fibrillation: J-PULSE-Hypo Registry

Yoshio Tahara, Kazuo Kimura, Noriyuki Suzuki, Ken Nagao, Naohiro Yonemoto, Hiroyuki Yokoyama, Hiroshi Nonogi and the J-PULSE-Hypo Investigators

Background: Two randomized trials and a meta-analysis showed therapeutic hypothermia improved survival and neurological outcomes in adults who remained comatose after initial resuscitation from out-of-hospital cardiac arrest due to ventricular fibrillation (VF). However, whether therapeutic hypothermia is effective for cardiac arrest without VF remains unclear.

Methods: We conducted a multicenter retrospective study at 12 institutions to evaluate the effect of therapeutic hypothermia on out-of-hospital cardiac arrest between January 2005 and December 2007. Enrolled patients were divided into the VF group, pulseless electrical activity (PEA) group, and asystole group according to the initial rhythm, and neurologic outcomes at discharge from the hospital were compared. A favorable outcome was defined as a Cerebral Performance Category (CPC) of 1-2.

Results: A total of 281 patients were enrolled. The mean age was 58±13 years. Men accounted for 84% of all patients. The median interval from collapse to return of spontaneous circulation was 18 (13-25) minutes. As compared with the asystole group (N=16), the VF group (N=239) and the PEA group (N=26) had higher rates of favorable outcomes (VF 62%; PEA 35%; asystole 6%, $p<0.01$).

Conclusions: Our results suggested that therapeutic hypothermia was effective not only for out-of-hospital cardiac arrest due to VF, but also for cardiac arrest due to causes other VF, particularly PEA. Further larger studies are needed to confirm our results.

第74回 日本循環器学会総会・3月7日（日）

Efficacy of Therapeutic Hypothermia for Out-of-Hospital Cardiac Arrest in Patients with Non-Ventricular Fibrillation: J-PULSE-Hypo Registry

Yoshio Tahara, Kazuo Kimura, Noriyuki Suzuki, Ken Nagao, Naohiro Yonemoto, Hiroyuki Yokoyama, Hiroshi Nonogi and the J-PULSE-Hypo Investigators

J-PULSE-Hypo Registry

初期調律が心室細動以外の院外心停止蘇生後に対する低体温療法の効果

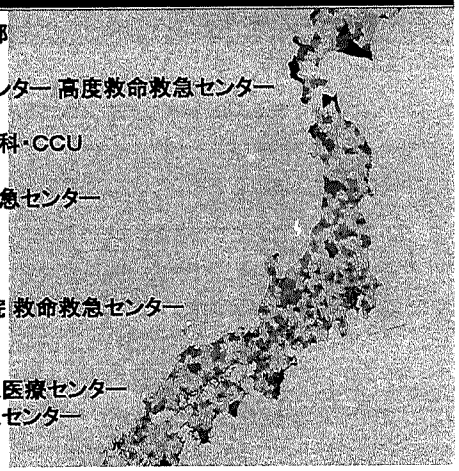
J-PULSE-Hypo Registry

J-PULSE-Hypo Registry:

心原性心停止蘇生後の低体温療法に関する多施設共同研究

厚生労働省: H19-心筋-03　急性心筋梗塞と脳卒中に対する急性期診療体制の構築に関する研究　（主任研究者　野々木　宏）

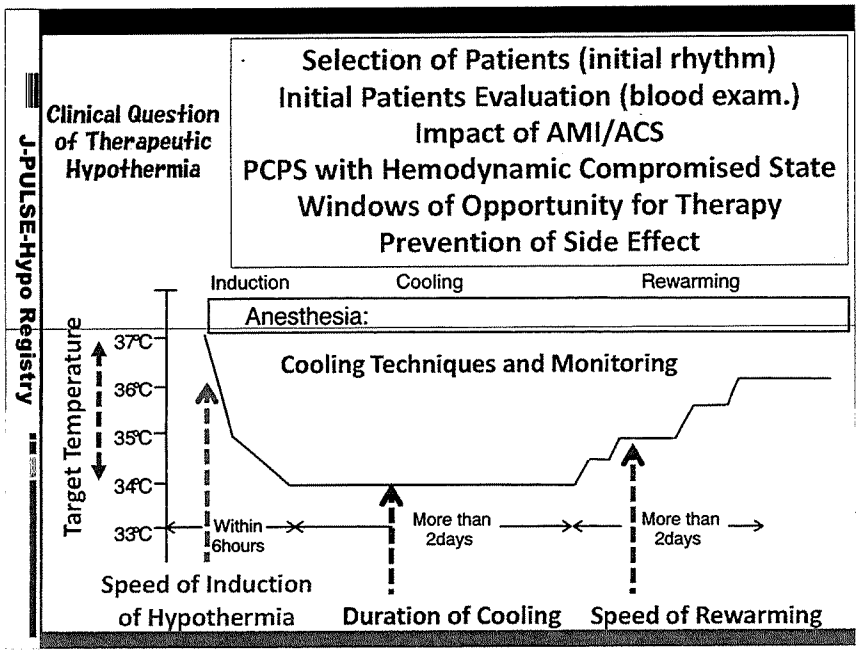
札幌医大付属病院　救急集中治療部
駿河台日本大学病院　循環器科
横浜市立大学付属市民総合医療センター　高度救命救急センター
北里大学病院　救急救命センター
国立循環器病センター　心臓血管内科・CCU
大阪府三島救命救急センター
大阪市立総合医療センター　救命救急センター
大阪警察病院
大阪府済生会千里病院
住友病院　循環器内科
神戸市立医療センター中央市民病院　救命救急センター
広島市民病院　循環器科
香川大学医学部付属病院
山口大学医学部付属病院　先進救急医療センター
佐賀大学医学部附属病院　救命救急センター
小倉記念病院循環器科

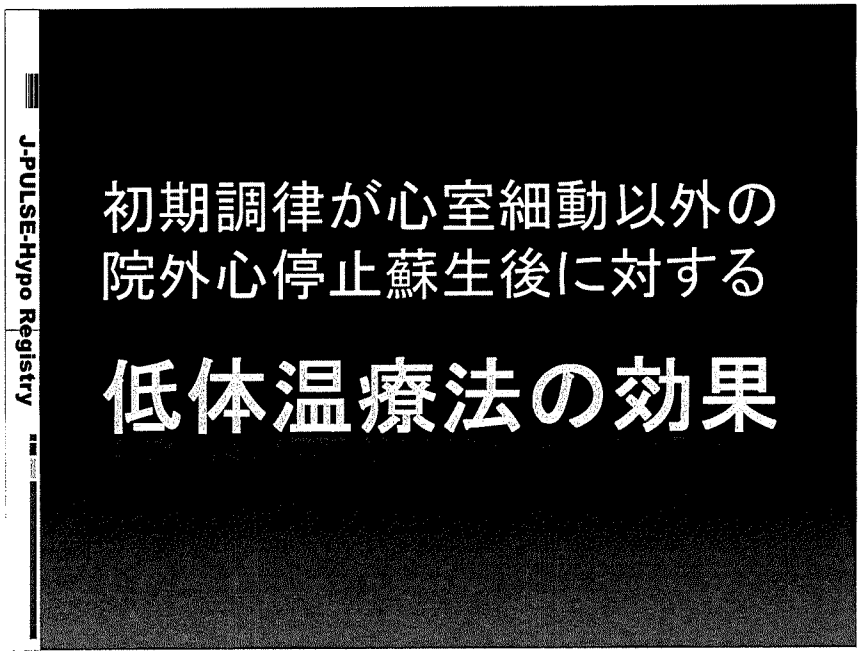


J-PULSE-Hypo Registry

＜多施設共同登録研究（コホート研究）＞

参加施設：	16施設
適格基準：	2005年から2009年までの5年間の各施設で低体温療法を施行した院外心原性心停止蘇生後患者 1）18歳以上 2）心拍再開後に循環動態が安定している（薬物あるいは補助循環で安定していても可） 3）心拍再開後も昏睡状態にある患者で、低体温療法を施行した患者
除外基準：	1）妊婦 2）大動脈解離 3）頭蓋内出血 4）発症前ADL不良の患者
目標登録数：	500
調査期間：	2005年1月～2009年12月
今回の調査期間：	2005年1月～2008年12月
登録患者数：	281

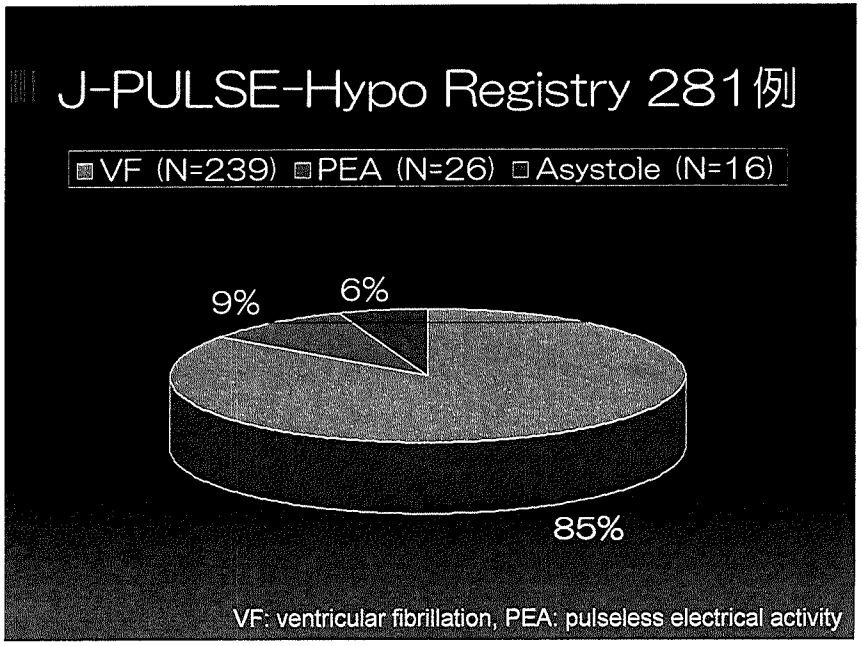




蘇生後低体温療法（ガイドライン 2005）

＜初期調律＞

VF	Class Ⅱa	Randomized trials	Favorable outcome
		N Engl J Med. 2002;346:549–556. (European study)	VF (n=136) 55%
		N Engl J Med. 2002;346:557–563. (Australian study)	VF (n=43) 49%
Non VF	Class Ⅱb	Case series	Faborable outcome
		Resuscitation. 2001;51:275–281. (Helmet device study)	PEA+Asystole (n=16) 21%



患者背景

	VF (N=239)	PEA (N=26)	Asystole (N=16)	p
年齢（歳，mean ± SD）	57±13	62±13	61±13	0.21
男性（%）	85	73	81	0.29
目撃者（%）	88	92	75	0.22
バイスタンダーCPR（%）	52	62	38	0.32
心原性（%）	99	89	88	<0.01
緊急PCI（%）	45	35	25	0.18
IABP（%）	38	42	44	0.81
PCPS（%）	20	35	6	0.07
心停止から自己心拍再開までの時間（分，mean ± SD）	27±28	31±23	36±26	0.01
心停止から目標体温到達までの時間（分，mean ± SD）	379±259	368±274	442±167	0.16

来院時血液検査　所見

（数値はすべて平均値）

	VF (N=239)	PEA (N=26)	Asystole (N=16)	p
WBC (/uL)	12297 (N=234)	12293 (N=26)	11839 (N=16)	0.73
RBC (X10⁴/uL)	435 (N=234)	417 (N=26)	423 (N=16)	0.26
Hb (g/dL)	13.8 (N=234)	13.0 (N=26)	13.2 (N=16)	0.11
Ht (%)	41.4 (N=234)	39.5 (N=26)	38.4 (N=16)	0.18
BUN (mg/dL)	20 (N=234)	24 (N=26)	18 (N=16)	0.32
Cre (mg/dL)	1.4 (N=234)	1.9 (N=26)	1.3 (N=16)	0.19
K (mEq/L)	4.0 (N=234)	4.6 (N=26)	4.7 (N=16)	<0.01
LDH (IU/L)	378 (N=223)	416 (N=25)	516 (N=15)	0.04
Glucose (mg/dL)	257 (N=234)	295 (N=25)	323 (N=16)	0.03
HbA1c (%)	5.6 (N=123)	6.2 (N=14)	6.1 (N=9)	0.26
NH3 (ug/dL)	94 (N=64)	120 (N=8)	181 (N=8)	0.27

来院時血液ガス分析　所見

	VF (N=239)	PEA (N=26)	Asystole (N=16)	p
pH	7.17 (N=217)	7.06 (N=26)	6.98 (N=16)	<0.01
PaCO2 (mmHg)	46.4 (N=217)	60.6 (N=26)	75.7 (N=16)	<0.01
PaO2 (mmHg)	272 (N=215)	213 (N=26)	223 (N=16)	0.08
HCO3 (mmol/L)	16.3 (N=212)	15.2 (N=26)	15.9 (N=15)	0.37
BE (mmol/L)	-11.9 (N=215)	-15.1 (N=26)	-15.7 (N=16)	<0.01

（数値はすべて平均値）

来院時血液ガス分析　所見

	VF (N=239)	PEA (N=26)	Asystole (N=16)	p
pH	7.17 (N=217)	7.06 (N=26)	6.98 (N=16)	<0.01
PaCO2 (mmHg)	46.4 (N=217)	60.6 (N=26)	75.7 (N=16)	<0.01
PaO2 (mmHg)	272 (N=215)	213 (N=26)	223 (N=16)	0.08
HCO3 (mmol/L)	16.3 (N=212)	15.2 (N=26)	15.9 (N=15)	0.37
BE (mmol/L)	-11.9 (N=215)	-15.1 (N=26)	-15.7 (N=16)	<0.01

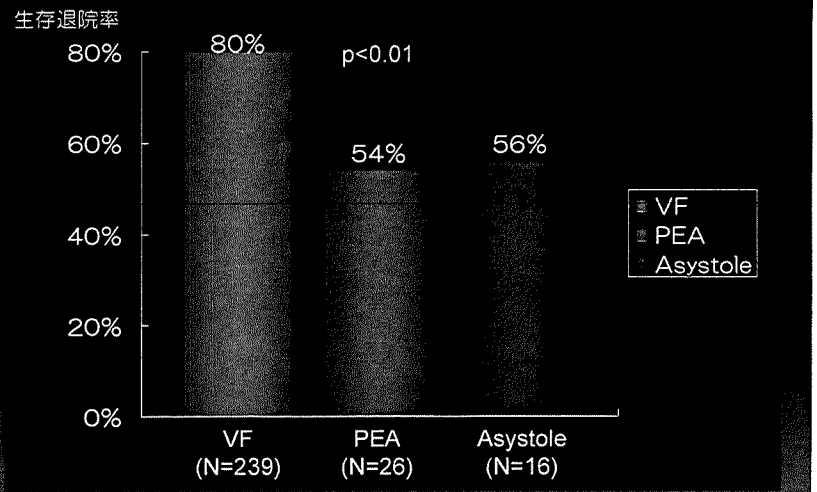
（数値はすべて平均値）

	VF (N=239)	PEA (N=26)	Asystole (N=16)	p
病院到着前自己心拍再開率（%）	65	27	25	<0.01

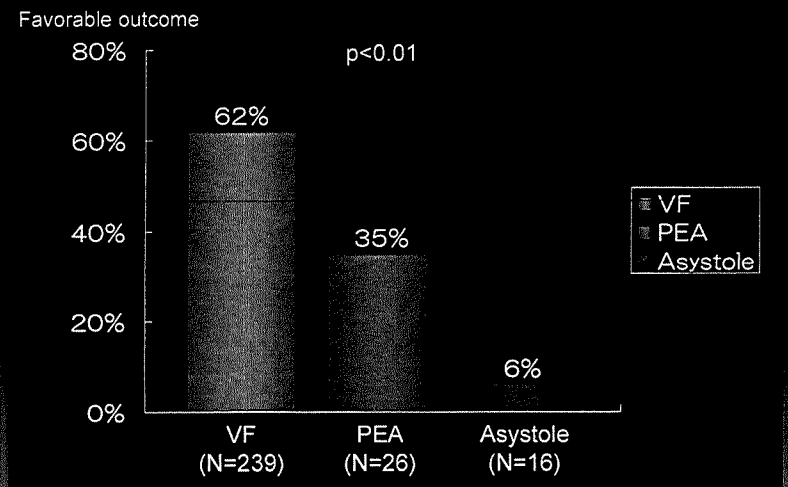
原因疾患

	VF (N=239)	PEA (N=26)	Asystole (N=16)	p
急性冠症候群（%）	61	58	56	0.89
肥大型心筋症（%）	5	0	6	0.47
拡張型心筋症（%）	2	4	6	0.39
その他の原因による不整脈（%）	13	4	0	0.13
推定心原性（%）	18	23	19	0.82
非心原性（%）	1	11	13	<0.01
	縊頸（1） 不明（1）	もち窒息（1） 腎不全（1） 呼吸器疾患（1）	喘息（1） 外傷（1）	

結果：生存退院



結果：退院時 Favorable outcome



Favorable outcome: CPC 1 or 2, CPC: Cerebral Performance Category

Non-VF (PEA, Asystole) のFavorable outcomeに寄与する因子 ＜単変量解析＞

	Favorable Group [N=10]	Non favorable Group [N=32]	p
初期調律PEA（%）	90	53	0.04
病院前自己心拍再開（%）	70	13	<0.01
心停止-心拍再開時間（分）	14.8±7.8	38.3±24.1	<0.01
来院時血液検査 Glucose（mg/dL）	239±46	327±122	0.03
血液ガス分析 pH	7.21±0.17	6.97±0.21	<0.01
血液ガス分析 HCO3（mmol/L）	17.8±5.7	14.7±3.4	0.04
血液ガス分析 BE（mmol/L）	-9.6±5.8	-17.1±6.0	<0.01
PCPS（%）	0	31	0.04