

はどちらがより CPR の質（胸骨圧迫の深さや早さ）が向上するかを検討した RCT. リアルタイムにフィードバックをして評価をする方が、胸骨圧迫の質を向上させることができると報告されていた。

“The same result for less money?”

A.De Vries et al, Educational Research, Doczero, Uden, The Netherlands.

・面白い研究では、AED を設置している場所の人達の再講習の際に、受講証が発行される通常の講習を受講する人と、ポスターによる自己学習をする人では、どちらが AED のスキルを正確に実施することができるかを、3・6・12・18 ヶ月後に評価を行った研究. 12 ヶ月後も 18 ヶ月後の、両方の人達の間でスキル維持に差がなかったことを報告しており、flexible にトレーニングプログラムを考えることが提案されていた。

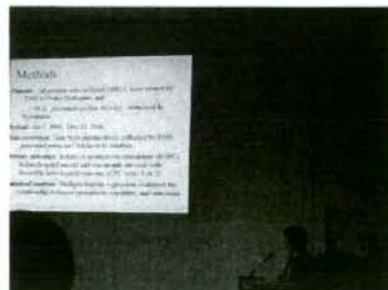
・『ウツタイン大阪プロジェクト』から心原性院外心停止症例に対するエピネフリン投与の効果の検討について、京都大学の石見先生より口頭発表が行われた。(資料4)

“Intravenous Epinephrine Improves Outcome for Cardiac Arrests with Initial Rhythm Other than Ventricular Fibrillation”

Iwami T, Nichol G, Hiraide A, Kajino K, Nishiuchi T, Hayashi Y, Nishiyama C, Nitta M, Ikeuch H Nonogi H, Kawamura T, and Utstein Osaka Committee.



石見先生



Laerdal 社による workshop では、最新のシュミレーション人形「Sim Man 3G」の説明会が行なわれた。



会場は満員で、救急隊や医者、看護師役の社員の方によるコミカルなシナリオベースに沿って、新しい製品の説明が行なわれていた。Sim Man 3G は今まで以上に臨場感をトレーニングで感じ、**decision-making** のスキルをより高めるために開発された。人形が涙を流していたのには、驚いた。



シナリオベースによるデモンストレーション



4.2 Norway Stavanger 市にある Laerdal 本社訪問



4.2_1 SAFERセンター見学

自己学習トレーニング教材のGlobal Product Managerである、Michael Sauter氏案内のもと、Laerdal本社に隣接しているシミュレーションセンター(SAFERセンター)の見学を行なった。見学当日は、医学生向けのトレーニングコースが実施されており、50名ほどの医学生がいた。



SAFERセンターにて
左から、梶野先生、石見先生、
西山、Michael Sauter氏

センターには、CPRをはじめとした蘇生スキルの指導を行なう専属の医師もおり、誰もがこのセンターを事前予約することで使用することは可能ということである。ただし、個人の申し込みではなく、大学単位や、救急隊などの団体での申し込みとなっている。Stavanger市の大学(医学部・看護学部)や病院、救急隊の利用がほとんどであり、実際にこのセンターが使用されない日はないほどの予定が詰まっている。

センター内には、講義を行なう教室や、「ここは本物の処置室か？」と一瞬疑うほどの立派なトレーニングルームがいくつもあり、各トレーニングルームの様子をモニターで外から観察したり、指導する人が、マイクで指示を出し、トレーニング人形のシナリを遠隔操作することも可能である。



←本物そっくり再現されている処置室。左壁の棚は、実は「絵」。実際に棚があり消耗品などが陳列されているわけではなかった。



←トレーニングルームの真ん中にある、モニタールーム。ここで、トレーニング人形の設定を操作したり、受講生の様子を観察し、指導することができる。



←もちろん、人形も、新生児から、乳児、幼児、小学生、中学生、成人と豊富に揃えられており、そのトレーニング目的にあった、人形とトレーニングルームをあてがわれ練習が行なわれる。



←救急車までがセンター内に再現されていた。

4.2_2 Utstein修道院見学

Bjørn Egeland氏 (Q-CPRおよび除細動器のGlobal Product Manager)に案内をしてもらい、Laerdal本社から車で1時間弱のところにある、Utstein修道院に行った。

ここで、蘇生に関連する専門家が集まり、ウツタイン様式が提唱されたところは、どんなどころかと非常に楽しみに行ったが、残念ながら修道院の定休日であったため、中には入れず会議が行われた場所を実際見ることはできなかった。



中には入れなかった、↑
ウツタイン修道院 →



4.2_3 Prof. Eldar SøreideとDr.Kristian Lexowとのミーティング

Stavanger University Hospitalの救急部の教授で、Norwegian Air Ambulanceのboard memberでもあり、SAFERセンターのMedical DirectorであるProf. Eldar SøreideとNorwegian Resuscitation CouncilのChairmanであるDr.Kristian Lexowとミーティングを行なった。Prof. Eldar Søreideは、Hypothermiaの臨床試験に力を注がれており、一方のDr.Kristian Lexowからは、ノルウェー全体の病院外心停止の疫学について説明を受けた。ノルウェーの中でもStavanger市は特にBystander CPR実施割合が70%以上と非常に高いことに驚いた。市民のほとんどがCPR講習を受講しており、ノル

ウェーの中でも、特別な地域のようなものである。その一つがLaerdal本社がこのStavangerの街にあることに由来しているのかもしれない。

4.2_4 Tore Laerdal, Tor Morten Osmundsen, Todd A.Beadleとの ミーティング

Laerdal 社の会長である Tore Laerdal 氏、CEO の Tor Morten Osmundsen 氏、ミニアンをはじめとしたさまざまな Training Products の manager である Todd A.Beadle 氏とでミーティングを行なった。石見先生より大阪のウツタインのデータの研究結果、および胸骨圧迫のみの蘇生教育の効果を検証した研究結果のプレゼンが行われた。また、今後の蘇生教育の研究計画についての概要を説明して、アドバイスをたくさんもらうことができた。Laerdal 社が長年蘇生に関する製品を製造し続けていく中で、新しい研究結果や、市場のニーズを踏まえ、どんなところを今後研究していかないといいないか？どんなデータが必要か？という製品を販売する側からみた市場の見方や、意見は大変貴重なものであった。また、様々な研究が Laerdal 社のトレーニング人形をはじめとした機材を使用しているため、論文からだけではわからない、詳細な情報を聞くこともできた。



左から、石見先生、西山、
Tore Laerdal 氏、梶野先生

5. まとめ

今回の学会参加およびノルウェー視察は大変有意義なものであった。特にノルウェーでの、Tore Laerdal 氏を初めとしたミーティング、SAFER センターの見学は、今後の研究計画を考えていく上で大変有用な情報を多く得ることができた。今後も、1人でも多くの心停止患者を救うためにはどうしたらいいのか？という問いに、現在の問題点を明らかにし、それらの問題点を解決するための臨床研究を行い、現場にフィードバックしていき、更なる救命率向上を目指していけたらと思った。

J-PULSE II 海外発信

2. AHA、国際会議

院外心停止の疫学 —活動状況とその転帰について—

European Resuscitation Council
9th Scientific Congress

Department of Preventive Services,
Kyoto University School of Public Health

Chika Nishiyama, Taku Iwami, Takashi Kawamura

Ghent, Belgium
22-24th, May, 2008.



- More than 500 titles on Resuscitation.
- About 20 titles from Japan.



Outcome after out-of-hospital cardiac arrest depends on activity before arrest



Department of Preventive Services,
Kyoto University School of Public Health

Chika Nishiyama, Taku Iwami, Takashi Kawamura

Backgrounds

- The course of sudden cardiac arrest has been poorly understood.
- Many studies found that physical activity or/and emotional stress becomes triggers of acute myocardial infraction.
- Few epidemiological data of the onset or outcome of sudden cardiac arrest were reported.





Purpose

The aim of this study was to describe the outcome for patients with out-of-hospital cardiac arrest (OHCA) in relation to when sudden cardiac arrest occurs.

5



Methods

Participants

All persons aged 18 years or more who suffered from cardiac arrest of cardiac etiology.

Study period

Jan. 1st, 2005 – Dec. 31st, 2006.

Data correction

Data were prospectively collected by EMS personnel using an Utstein-style database.

6

Methods

Factors: Activity before arrests
(sleeping, bathing, working, exercise,
non-specific activities)

Outcome measures

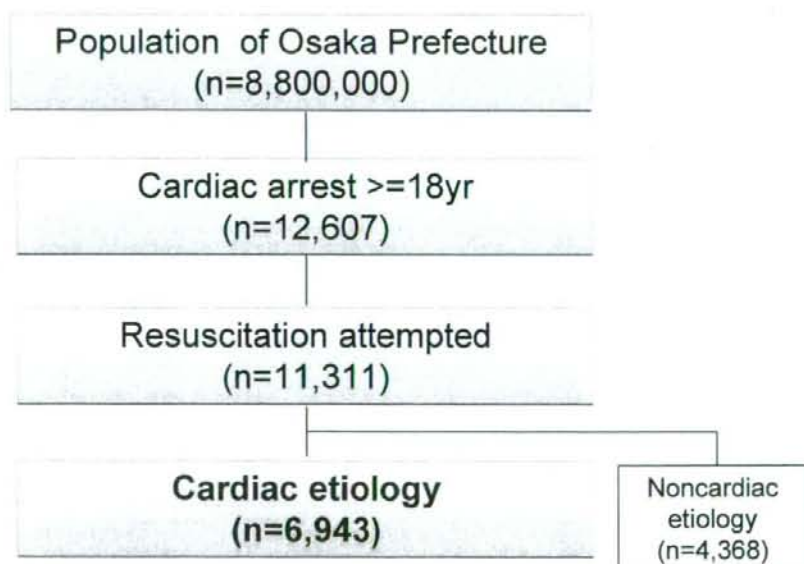
1. Return of spontaneous circulation (ROSC).
2. Admission to hospital.
3. One-month survival.
4. One-month survival with favorable neurological outcomes (CPC score 1 or 2).

Statistical analysis

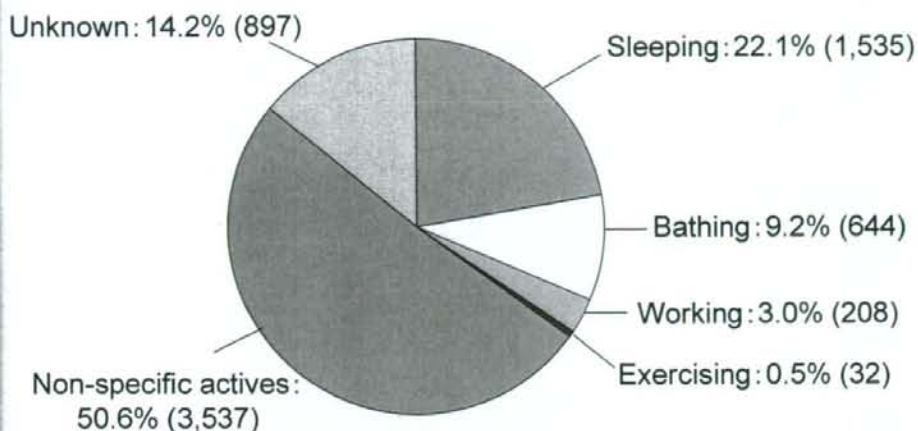
Multiple logistic regression was applied to the effect of bathing, working, exercise, and non-specific activities with the reference of sleeping.

Results: Utstein template

(Jan. 1st, 2005 – Dec. 31st, 2006)



Result: Activity before arrest



9

Patients characteristics according to the activity before arrest

	Sleeping n=1,535	Bathing n=644	Working n=208	Exercising n=32	Non-specific n=3,537	Unknown n=987
Men, n (%)	801 (52.2)	359 (55.7)	189 (90.9)	24 (75.0)	2,130 (60.2)	544 (55.1)
Age, yr (SD)	75.5 (14.5)	76.1 (11.5)	60.5 (13.2)	61.3 (17.3)	72.8 (14.5)	71.3 (13.9)
ADL before arrest, n (%)						
Good	756 (49.3)	552 (85.7)	190 (91.3)	31 (96.9)	2,525 (71.4)	661 (67.0)
Location, n (%)						
Home	1,251 (81.5)	549 (85.2)	23 (13.5)	—	2,206 (62.4)	708 (71.7)
Witness, n (%)	387 (25.2)	52 (8.1)	99 (47.6)	26 (81.3)	1,641 (46.4)	76 (0.7)
Bystander CPR, n (%)	613 (40.0)	229 (35.6)	62 (29.8)	15 (46.9)	99 (28.2)	32 (32.5)
VF, n (%)	94 (6.1)	10 (1.6)	67 (32.2)	15 (46.9)	584 (16.5)	61 (6.2)

Outcomes according to the activity before arrest

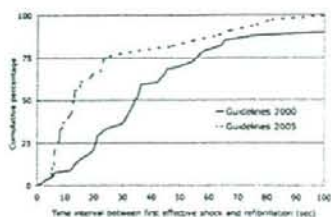
	Sleeping n=1,535	Bathing n=644	Working n=208	Exercising n=32	Non-specific n=3,537	Unknown n=987
ROSC, n (%)	295 (19.2)	75 (11.6)	75 (36.1)	11 (34.4)	1258 (35.6)	181 (18.3)
Admission, n (%)	216 (14.1)	62 (9.6)	68 (32.7)	9 (28.1)	1039 (29.4)	147 (14.9)
Survival at one-month, n (%)	36 (2.3)	7 (1.1)	32 (15.4)	6 (18.8)	338 (9.6)	25 (2.5)
Neurologically favorable one-month survival, n (%)	13 (0.8)	1 (0.2)	15 (7.2)	5 (15.6)	185 (5.2)	9 (0.9)
OR (95% CI)	ref	0.2 (0.03-1.5)	2.8 (1.3-6.2)	5.4 (1.7-17.2)	3.5 (1.9-6.2)	0.7 (0.3-1.8)

*Adjusted by age, sex, activity of daily living before arrest, witness arrest, bystander-initiated CPR, time interval from collapse to CPR by EMS, and initial cardiac rhythm.

Discussion

- This study shows the difference in patient characteristics by their activities before arrest.
- VF was more frequently observed during exercising (47%) and working (32%) compared with other activities. Public Access Defibrillation (PAD) program would be effective for such situation.
- OHCA during sleeping and bathing tended to have a lower proportion of VF and disappointingly poor outcome. To contend with events occurring when patient is asleep or bathing, a more aggressive CPR training program and preventive measures would be of value. Deployment of home AED might be less effective as recently reported (Gust H Bardy, et al. N Engl J Med 2008;358:1793-1804).

『AHA2008・ReSS ニューオリンズ』



J. Berdowski, None; L. van Zyll de Jong, None; R.W. Koster, Phillips, Modest, 2. Research Grant (includes principal investigator, collaborator or consultant and pending grants as well as grants already received); Zoll, Modest, 2. Research Grant (includes principal investigator, collaborator or consultant and pending grants as well as grants already received); Zoll, Modest, 3. Other Research Support (includes receipt of drugs, supplies, equipment or other-in-kind support); Phillips, Modest, 3. Other Research Support (includes receipt of drugs, supplies, equipment or other-in-kind support); Jolife, Modest, 3. Other Research Support (includes receipt of drugs, supplies, equipment or other-in-kind support); Jolife, Modest, 2. Research Grant (includes principal investigator, collaborator or consultant and pending grants as well as grants already received); Physio Control, Significant, 2. Research Grant (includes principal investigator, collaborator or consultant and pending grants as well as grants already received); Physio Control, Modest, 3. Other Research Support (includes receipt of drugs, supplies, equipment or other-in-kind support).

P177

The Relationship Between Out-of-Hospital Cardiac Arrest Due to Cardiac Etiology and Medical History of Cardiovascular Disease
Kimo Kikushima, Ken Nagao, Tetsuya Sakamoto, Masaki Igarashi, Shinichi Ishimatsu, Akira Sato, Shingo Hori, Shigeru Kanesaka, Yuichi Hamabe, Nobuya Kitamura, SOS-KANTO Committee, Tokyo, Japan

BACKGROUND Sudden cardiac arrest is a leading cause of death in the world. Although a strong chain of survival has improved outcomes, few data of medical history are available for patients with out-of-hospital cardiac arrest. **METHODS** We investigated the relationship between cardiovascular medical histories and incidence of out-of-hospital cardiac arrest due to cardiac etiology from the SOS-KANTO study (Lancet 2007; 369). A total of 9,232 adult patients whose medical histories at the time of cardiac arrest were recorded were divided into 2 groups according to the Utstein style reporting guidelines (cardiac arrest due to cardiac etiology group vs. non-cardiac etiology group). **RESULTS** Of the 9,232 patients, 5,785 (63%) were caused by cardiac etiology. Of those 5,785 patients, 45% had the medical histories with cardiovascular disease including 17.4% hypertension, 14.9% diabetes, 12.4% ischemic heart disease, 8.7% cerebrovascular disease and 4.5% heart failure. The cardiac etiology group had significantly higher proportions of the total cardiovascular medical histories and each cardiovascular medical history without cerebrovascular disease than the non-cardiac etiology group. The adjusted hazard ratio for cardiac arrest due to cardiac etiology after heart failure was 5.1 (95%CI; 3.5 to 7.3), after ischemic heart disease; 5.0 (95%CI; 4.0 to 6.2), after diabetes; 2.1 (95%CI; 1.8 to 2.5), and after hypertension; 1.4 (95%CI; 1.3 to 1.6). Furthermore, the adjusted hazard ratio was after 1 cardiovascular medical history was 2.0 (95%CI; 1.8 to 2.2), after 2 histories; 2.9 (95%CI; 2.4 to 3.6), after 3 or more histories; 5.3 (95%CI; 3.2 to 9.1). Especially, incidence of cardiac arrest in patients with medical history of diabetes plus ischemic heart disease or heart failure was more than 10 times higher than that with no cardiovascular medical history. **CONCLUSIONS** Each cardiovascular medical history was associated with an increasing incidence of out-of-hospital cardiac arrest due to cardiac etiology, and the incidence increased in a stepwise fashion among patients in increasing number of cardiovascular medical histories. Especially, the overlaps of diabetes plus ischemic heart disease or heart failure were high risk factors of out-of-hospital cardiac arrest.

K. Kikushima, None; K. Nagao, None; T. Sakamoto, None; M. Igarashi, None; S. Ishimatsu, None; A. Sato, None; S. Hori, None; S. Kanesaka, None; Y. Hamabe, None; N. Kitamura, None.

P178

High Rates of Survival to Hospital Admission in Patients with Shock-Resistant Out-of-Hospital Ventricular Fibrillation Treated with Nifekalant Hydrochloride, a Novel and Pure Class III Agent: Report from J-PULSE Registry
Satoshi Yasuda, Tohoku Univ Graduate Sch of Med, Sendai, Japan; Hirotsuka Sawano, Senri Critical Care Medical Ctr, Suita, Japan; Hiroshi Hazui, Osaka Mishima Emergency and Critical Care Ctr, Takatsuki, Japan; Isao Ukai, Osaka Univ Hosp Trauma and Acute Critical Care Ctr, Suita, Japan; Hiroyuki Yokoyama, Natl Cardiovascular Ctr, Suita, Japan; Junko Ohashi, Tohoku Univ Graduate Sch of Med, Sendai, Japan; Kazuhiro Sase, Juntendo Univ Medical Sch, Tokyo, Japan; Akiko Kada, Hiroshi Nonogi, Natl Cardiovascular Ctr, Suita, Japan

Background; Nifekalant hydrochloride (NIF) is a novel intravenous class-III antiarrhythmic agent that purely blocks the K⁺ channel without inhibiting β -adrenergic receptors. NIF is easily soluble and its half life is relatively short, achieving rapid action (e.g., improvement in the defibrillation threshold) and clearance. The present study was designed to investigate the feasibility of NIF as an adjunct to defibrillation for victims of out-of-hospital cardiac arrest. **Methods;** This was a study from the multicenter registry, J-PULSE (Japanese Population-based Utstein-style study with basic and advanced Life Support Education) of four Japanese urban hospitals. Eligible patients were those treated with NIF because of persistent out-of-hospital ventricular fibrillation (VF) following 3 or more precordial shocks and intravenous epinephrine. **Results;** Between February 2006 and February 2007, 18 patients (M/F 16/2; mean [sSD] 67 \pm 11 years) were enrolled for the study. The median time from dispatch to the first shock was 9.5 minutes, and that from dispatch to NIF administration was 36 minutes. The median usage dose of NIF was 25 mg. The rate of admission alive to the hospital was 72% (n=13), whereas the rate of proarrhythmic torsade de pointes (TdP) owing to QT prolongation was only 5.5% (n=1). **Conclusions;** In this multicenter registry, the survival rate to hospital in out-of-hospital VF patients treated with NIF was over 70%. Intravenous administration of NIF seems to be feasible, can be adjunctive to advanced cardiac life-support measures, and therefore further study is warranted.

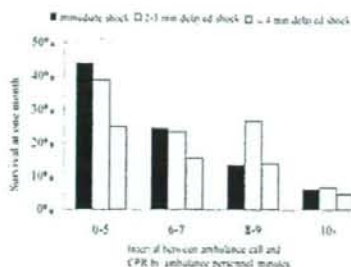
S. Yasuda, None; H. Sawano, None; H. Hazui, None; I. Ukai, None; H. Yokoyama, None; J. Ohashi, None; K. Sase, None; H. Nonogi, None.

P179

Effectiveness of CPR Prior to Electrical Shock to Out-of-Hospital Cardiac Arrest with Ventricular Fibrillation: A Population-Based Study in a Metropolitan Area in Japan—"The Utstein Osaka Project"
Tatsuya Nishiuchi, Senshu Critical Care Medical Ctr, Izumisano, Osaka, Japan; Yasuaki Hayashino, Shunichi Fukuhara, Kyoto Univ Sch of Public Health, Kyoto, Japan; Taku Iwami, Kyoto Univ Health Service, Kyoto, Kyoto, Japan; Yasuyuki Hayashi, Saiseikai Senri Hosp Senri Critical Care Medical Ctr, Suita, Japan; Kentaro Kajino, Osaka Univ Hosp Trauma and Acute Critical Care Ctr, Suita, Japan; Hisashi Ikeuchi, Osaka General Medical Ctr, Osaka, Japan; Atsushi Hiraide, Ctr for Medical Education, Kyoto Univ, Kyoto, Japan; Hidekazu Yukioka, Yukioka Hosp, Osaka, Japan; Tetsuya Matsuoka, Senshu Critical Care Medical Ctr, Izumisano, Osaka, Japan

Objective: To evaluate the effectiveness of CPR prior to electrical shock stratified by the duration from ambulance call to CPR in witnessed out-of-hospital cardiac arrest patients with VF. **Study Design:** Population-based observational study (May 1, 1998-December 31, 2006). **Settings:** Osaka, Japan with a population of 8.8 million. **Subjects:** We analyzed the Utstein Style data on patients who met the following inclusion criteria: 1) witnessed by citizens, 2) 18 years or older, 3) initial recorded cardiac rhythm was VF or pulseless VT, 4) bystander CPR was not performed. **Methods:** Subjects were divided into three groups according to the duration from the initiation of CPR by ambulance personnel to first electrical shock; immediate shock group: first electrical shock were given in 0-1 minute after CPR was initiated; 2-3 min delayed group: first electrical shock were given in 2-3 minutes after CPR initiated; and \geq 4 min delayed group: first electrical shock were given in more than 4 minutes. **Main outcome measure:** Survival at one month. **Results:** 909 patients were included in the current analysis. In immediate shock group, survival at one month decreased with an increase in interval between ambulance call and the initiation of CPR. In contrast, 2-3 min delayed group had better prognosis than immediate shock group if CPR was initiated between 8-9 minutes after ambulance call (13% vs. 27% of one month survival; OR 2.50; 95% CI, 1.02-6.00; P=0.045). **Conclusion:** Our findings suggested that 2-3 minute-delayed electrical shock was associated with better prognosis

compared with immediate electrical shock if CPR by ambulance personnel was initiated in 8-9 minutes from ambulance call.



T. Nishiuchi, None; Y. Hayashino, None; S. Fukuhara, None; T. Iwami, None; Y. Hayashi, None; K. Kajino, None; H. Ikeuchi, None; A. Hiraide, None; H. Yukioka, None; T. Matsuoka, None.

P180

The Risk of Infectious and Septic Complications from Trauma Are Age Associated: An Analysis of the National Trauma Database

Christian D McClung, Joseph Dubose, Amin A Abdi, M Jim Yen, Sean O Henderson, Los Angeles County-USC Medical Ctr, Los Angeles, CA

INTRODUCTION: Understanding the immune response to injury may allow us to better characterize tolerance to injury and shock.

OBJECTIVE: To evaluate the relationship between age and infectious morbidity associated with injuries by investigating if the risk of pneumonia, bacteremia and acute respiratory distress syndrome (ARDS) differ across age groups in patients with traumatic injuries.

METHODS: Patients were identified by using the National Trauma Database (2000-2004) which is the largest aggregation of trauma registry data. This database represents over 75% of the level I and level II trauma centers in the nation. Patients were included if they were at least 5 years old and did not include subjects with burns nor unidentified mechanisms of injury. Multivariate logistic regression adjusted for gender, injury severity score, days of ventilation, chest abbreviated injury severity, and mechanism were done to compare age groups. Children between 5 to 12 years old were used as the comparison group. **RESULTS:** There were 863,393 patient visits analyzed for this study. The mortality rate was 4.6%. The patient characteristics are summarized as averages for age 39.9 years, 66% male, and 60% Caucasian. The complication rates of pneumonia 1.6%, bacteremia 0.1%, and ARDS 0.5% were noted. Table 1 lists the adjusted odds ratios for pneumonia. The adjusted odds ratio for bacteremia and ARDS have similar values and each age group was observed to have a statistically significant increased risk.

CONCLUSION: There is an ordinal risk of pneumonia, bacteremia, and ARDS with age among injured patients after controlling for multiple confounding variables. These findings suggest that the immune response to trauma differs between age groups and further suggests that there is a neuroendocrine axis of response.

LIMITATIONS: Post-traumatic complications are likely under-reported and therefore the observed associations are likely diminished, representing conservative estimations.

Age (years)	Adjusted-Odds Ratio	95% Confidence Interval
Child (5-12)	1.0	—
Adolescent (13-17)	2.6	2.1-3.1
Young Adult (18-22)	3.4	2.9-4.1
Early Adult (23-29)	3.7	3.1-4.4
30-39	4.1	3.5-4.8
40-49	4.8	4.1-5.7
50-59	5.7	4.8-6.8
60-69	6.6	5.5-7.8
70-79	7.8	6.6-9.3

adjusted for gender, mechanism, ISS, chest-AIS, and ventilation days

C.D. McClung, None; J. Dubose, None; A.A. Abdi, None; M.J. Yen, None; S.O. Henderson, None.

P181

Factors Associated with Implantable Cardioverter-Defibrillator Implantation

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Introduction: While implantable cardioverter-defibrillators (ICDs) have been shown to reduce mortality in high risk populations (EF \leq 35%), the percentage of eligible candidates receiving ICDs has not been well studied. We sought to identify the clinical variables that were associated with ICD implants at our center. **Methods:** Over a one year period (2005) we analyzed 13,920 echos and 3061 ventriculograms performed at our institution. Of these studies 4814 echos and 297 LV grams had EF \leq 35%. We randomly examined 5% of our echo data (200 echos) in the group with EF \leq 35%. As a result, 497 patients were included in our initial combined analysis. Student T test and Chi-X testing was used for statistical analysis. **Results:** Of these 497 patients, 145 patients were ultimately implanted. Pt characteristics that were associated with the implant group and were statistically significant include a history of, coronary heart disease (CAD) (p=0.04), congestive heart failure (p< 0.001), coronary artery bypass surgery (CABG) (p=0.001), and ventricular tachycardia (VT) (non-sustained and sustained) (p= 0.005). Pts with chronic renal insufficiency (creatinine >1.5 mg/dl) (p=0.03), and wide QRS complexes (\geq 130ms) (p<0.001) were also associated with higher rate of implants. Patient medicines associated with ICD implant included; Aspirin (p= 0.03), ACE inhibitor (p=0.009), statin (p=0.001), diuretic (p<0.001), oral hypoglycemic (p=0.02). Tobacco use was negatively correlated with implant of ICD (p=0.02). **Conclusions:** At our center, ICD implant rates correlated positively in patients who have a history of CAD, CHF, CABG, chronic renal insufficiency, non-sustained/sustained VT, and wide QRS. ICD implants also correlate positively with patients on cardiac medications, which may identify populations with risk factors. Interestingly, ICD implants correlate negatively with tobacco use.

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Usefulness of Mobile Telemedicine System in Real-Time Transmission of Out-of-Hospital 12-Lead ECG

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[Purpose] AHA/ACC guidelines recommend routine use of 12-lead ECG and advance notification for patients with acute coronary syndrome. However, transmission of out-of-hospital 12-lead ECG to emergency department is still not spread and ECG interpretation on the prehospital and emergency department is not established.

Therefore, we have developed and tested the clinical usefulness of the mobile telemedicine system to transmit 12-lead ECG between moving ambulances and physicians in cardiovascular emergency.

[Method] We set up the mobile telemedicine using the third-generation digital mobile phone to promote communications between an ambulance and diverse hospital. Compatibility issue among device vendors was solved by the implementation of open-standard medical waveform encoding rule with motion noise-reduction system. Real time 12-lead ECG was transferred together with vital signs and live video during transfer the patient by an ambulance. The performance of the mobile telemedicine system in the field-test was checked to transfer 12-lead ECG in different scenarios such as transferred ECG from a volunteer moving hand or leg, coughing or twisting body in an ambulance driving on common road or highway. In the next step, we set up the mobile telemedicine on an ambulance to promote communications between moving 5 ambulances in Suita-city and National Cardiovascular Center since 2008 June 2. To establish the efficacy of real-time transmission of out-of-hospital 12-lead ECG, the time-line from the onset of acute myocardial infarction to reperfusion is analyzed. **[Results]** Totally 36 patterns of 12-lead ECG were checked in the field test and all of them were comparable than those

original one in the ambulance. Time-delay for transmission of 12 lead ECG was within 10seconds and for one-lead ECG monitoring and vital signs including BP, HR and oxygen saturation was 1 second without the difficulties for the interpretation. [Conclusion] Those results indicate the usefulness and reliability of transmission of 12-lead ECG using the mobile telemedicine system from the ambulance. Further investigation is on-going to determine the efficacy in clinical conditions to reduce the treatment delay for acute myocardial infarction.

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P183

Physical Stress Does Not Increase Ventilation Rate During Resuscitation in a Manikin Model

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BACKGROUND: Studies indicate that trained medical personnel often deliver manual ventilations at excessive rates while performing advanced cardiac life support (ACLS). Excessive ventilation rates may contribute to increased mortality among these patients. We seek to uncover if physical stress affects our perception of ventilation rate. **HYPOTHESIS:** We hypothesized that physical stress would increase the ventilation rate during simulated cardiac arrest in a manikin model. **METHOD:** Six persons at Laerdal Medical were asked to ventilate an intubated manikin (Laerdal ResucAnne PC SkillReporting system) for three minutes under two different conditions. For the first condition the participants were asked to perform strenuous physical exercise (running up and down a stairway for several minutes) immediately prior to ventilating the manikin. For the second condition all participants were allowed to rest before performing ventilations. Participants had to deliver ventilations at what they felt were 10 ventilations per minute (vpm). No clock or other time keeping means were available. Heart rate and breathing rate of the participants were measured using ECG and trans-thoracic impedance signals from a defibrillator (Philips HeartStart MRx). Statistics are derived using the average rate values from each participant. **RESULTS:** The participants did not ventilate faster after physical stress (Mean rate = 7.00 vpm, SD = 1.94) than during the condition at rest (Mean rate = 7.14 vpm, SD = 1.10; $t_{(5)} = -0.20$, 95% CI of mean difference -1.83, 1.57; Cohen's $d = 0.085$; $p = 0.85$). On the average, no participants ventilated faster than the recommended rate of 10-12 vpm during any condition. Both the participants' heart rate and respiration rate were significantly different during the two conditions; mean (SD) heart rate 112 (10.7) vs. 82 (5.3) bpm ($p=0.002$), mean (SD) respiration rate 21.2 (5.98) vs. 14.5 (3.44) breaths per minute ($p=0.010$). **CONCLUSIONS:** Ventilation rates do not seem to be elevated by physical stress of the provider. Causes of hyperventilation should be sought elsewhere, e.g. amongst mental stressors.

J. Eilevstjøn, Laerdal Medical AS, Significant, 1. Employment; J. Nysæther, Laerdal Medical AS, Significant, 1. Employment; H. Myklebust, Laerdal Medical AS, Significant, 1. Employment.

P184

Novel SCN5A Mutations and SNP in Patients with Brugada Syndrome

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Background: Sodium channel alpha 5 subunit (SCN5A) mutations are important genetic abnormalities of Brugada syndrome (BS). Here we report novel SCN5A mutations in patients with BS. **Methods and Results:** Genomic mutations in the SCN5A gene were analyzed by PCR and direct sequencing in 121 patients with BS (119 men and 2 women). Thirteen (11%) of the patients had SCN5A mutation and five (4%) of the patients had single nucleotide polymorphisms (SNP) associated with BS. Eleven patients had single point mutations, one patient had a deletion (1380 del N) and one patient had a mutation within the splicing junction (IVS21+1 g>a). The whole-cell patch clamp technique revealed that four novel mutations (F532C, R814Q, G833R, R878C) showed loss of function, and peak I_{Na} of a novel SNP (L1988R) transiently expressed in HEK 293 cells was significantly reduced ($P<0.05$). RT-PCR analysis revealed that the intronic mutation (IVS21+1 g>a) resulted in exon 21 deletion of

SCN5A in cardiac biopsy specimens from the patient (Figure).

Conclusions: We detected five novel SCN5A mutations (1380 del N, F532C, R814Q, G833R, R878C) and a novel disease-associated SNP (L1988R) in patients with BS. We showed a novel analysis of splicing mutation (IVS21+1 g>a) that resulted in exon skipping in the heart.



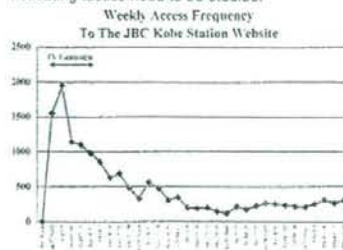
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TV Campaign for Automated External Defibrillator Promotion in Hyogo Prefecture, Japan

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PURPOSE: In Japan, limited number of public access defibrillation (PAD) has been reported after the governmental approval in 2004. Our aim is to promote AED to the residents in our prefecture with 5.6 million populations. **METHODS:** To provide information of AED, we collaborated with Japan Broadcasting Corporation (JBC) Kobe Station for a TV campaign covering Hyogo prefecture. The campaign consisted of 5 TV spots of 1 minute and 4 news programs of 6 minutes. We also managed special pages in JBC Kobe Station website. To assess the impact of the campaign, we evaluated access frequency to the website and made questionnaires in BLS training courses in the prefecture by local fire departments until March of 2008. **RESULTS:** The campaign was carried out from 27th August to 28th September in 2007, with 39 on airs of the TV spots and 4 on airs of the news programs. In the website, weekly access frequency showed nearly 2,000 in the first two weeks, then declined gradually to around 200 in two months and stayed at that level thereafter (Figure). We collected 24,610 questionnaire sheets from 1,131 courses by 30 local fire departments. Recognition rate of AED information in JBC broadcast elevated from 18.7 in August to 24.8% in September, then declined to around 20% thereafter. But the rate of motivation source for people to attend BLS courses was minimal in JBC broadcast (0.4%) and maximal in organization sponsorship (53.3%). **CONCLUSION:** Our TV campaign was recognized fairly well by Hyogo residents, but its impact was temporary. People's positive action seemed to depend on supports of local organizations or communities, but not on their personal motivations. Continuous motivating tactics need to be studied.



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"Chain of survival" saves lives, lessens damage in out-of-hospital cardiac arrest patients in Japan

DALLAS, Jan. 27, 2009 — Improvements to the "chain of survival" increased survival and decreased residual neurological damage in out-of-hospital cardiac arrest patients in Japan, researchers report in *Circulation: Journal of the American Heart Association*.

Researchers considered 8,782 bystander-witnessed cardiac arrests from May 1998 to December 2006 in Osaka, Japan. During this time period, Japanese citizens received training in cardiopulmonary resuscitation (CPR), dispatcher instruction in CPR was introduced and procedures were changed to allow emergency service personnel to deliver shocks with a defibrillator without online physician oversight and to intubate patients in the field. Intubation is the placement of a flexible plastic tube into the trachea to protect the patient's airway and provide a means of mechanical ventilation.

As a result, the researchers said:

- One-month survival of witnessed cardiac arrests rose from 5 percent to 12 percent, an improvement over past reports in which out-of-hospital cardiac arrest survival doesn't exceed 5 percent in most communities and only 3 percent in urban areas.
- The median time from collapse to CPR decreased from 9 to 7 minutes due to citizen training.
- Bystander-initiated CPR increased from 19 percent to 36 percent.
- The neurologically intact one-month survival after witnessed ventricular fibrillation (VF) arrest increased from 6 percent to 17 percent.
- The median time from collapse to calling emergency services decreased from 4 to 2 minutes.
- The median time from collapse to first shock dropped from 19 to 9 minutes.
- Median time to intubation remained at 25 minutes, but only took 15 minutes when specially trained paramedics were available.

"This study proves that improvement in the 'chain of survival' results in increased survival from out-of-hospital cardiac arrest in the real world," said Taku Iwami, M.D., lead author of the study and an assistant professor at Kyoto University Health Service. "The improvement is mainly due to the improvement in the first three links of the chain, but there was some incremental benefit in the fourth link of advanced life support."

The links in the chain of survival are:

- 1) Early recognition of the emergency and activation of the emergency medical services "phone 9-1-1".
- 2) Early bystander CPR.
- 3) Early delivery of a shock with a defibrillator
- 4) Early advanced life support followed by post resuscitation care delivered by healthcare providers.

For each minute of delay in starting CPR, the chance of neurologically intact survival decreased 11 percent, researchers said. For each minute of delay in shock for ventricular fibrillation, researchers found a 16 percent decrease in survival. For every minute of delay to intubation, survival decreased 4 percent.

In Osaka (population, 8.8 million), about 120,000 citizens per year participated in conventional CPR training. There were no programs to train in compression-only CPR during this study period.

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Only 24 patients received shocks administered by bystanders during this period, but the researchers expect this to increase with further spread of AEDs and training of the general public.

"We need to increase the number of automated external defibrillators in public places as well as train people in not only CPR but in use of AEDs," Iwami said. "In many areas of the world, there are serious delays in the use of CPR and AEDs. We hope this study encourages other EMS systems to start or continue their efforts to improve based on objective data."

In the United States, nearly 300,000 cardiac arrest victims are treated outside the hospital by EMS per year, according to the American Heart Association. About 8 percent of cardiac arrest victims survive to hospital discharge.

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Co-authors are: Graham Nichol, M.D., M.P.H.; Atsushi Hiraide, M.D., Ph.D.; Yasuyuki Hayashi, M.D., Ph.D.; Tatsuya Nishiuchi, M.D.; Kentaro Kajino, M.D., Ph.D.; Hiroshi Morita, M.D., Ph.D.; Hidekazu Yukioka, M.D., Ph.D.; Hisashi Ikeuchi, M.D., Ph.D.; Hisashi Sugimoto, M.D., Ph.D.; Hiroshi Nonogi, M.D., Ph.D.; and Takashi Kawamura, M.D., Ph.D. Individual author disclosures are available on the manuscript.

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Editor's note: The American Heart Association's guidelines recommend hands-only CPR for anyone who is unwilling or unable to provide ventilations while providing chest compressions. Experts continue to promote a combination of rescue breathing and chest compressions for victims of cardiac arrest due to non-cardiac causes, like near-drowning or electrocution, and for all victims of pediatric cardiac arrest. To find a CPR training class, visit www.americanheart.org/cpr.

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