Research in OHCA – Past Developments & Current Research in KOREA

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Brief History of Emergency Medicine in KOREA

- 1989. The Korean Society of Emergency Medicine(KSEM) incorporated
- 1990. Premier issue of The Journal of Korean Society of Emergency Medicine (J Korean Soc Emerg Med)
- 1996. First certification exam of emergency physicians by Korean Board of Emergency Medicine

J Korean Soc Emerg Med 1990.-1999.

- 490 article published in J Korean Soc Emerg Med

- Original article about OHCA: 8 (1.63%)
- Animal study about CPR: 5

1992.

대한응급의학회지
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병원전 심정지환자의 심폐소생술 결과

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황성오 · 안무업 · 김영식 · 임경수 · 윤정한* · 최경훈*

= Abstract =

OUTCOME OF RESUSCITATION IN VICTIMS OF PREHOSPITAL CRIDIAC ARREST

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Background : In Korea, the victims with prehospital cardiac arrest have little chance to survive, because bystanders do not know how they resuscitate the victims and emergency medical system is incomplete. And there has been no report about resuscitation attempt and survival rate of the prehospital cardiac arrest in Korea.

Study Objectives : This study was undertaken to determine the overall survival rate and the factors influencing to survival when cardiopulmonary resuscitation was attempted to the victims of prehospital cardiac arrest.

Study Subjects : We studied prospectively 31 consecutive victims with prehospital cardiac arrest.

Results : Cardiac arrest were caused by trauma(52%), cardiac diseases(26%) and non-cardiac medical diseases(22%). Spontaneous circulation was restored (ROSC) in 12 victims(39%). And patient with non-traumatic cardiac arrest were more likely to restore spontaneous circulation(73%) than were patients with traumatic cardiac arrest(0.7%, $P<0.05$). Patients having ventricular fibrillation on ECG monitoring were more likely to restore spontaneous circulation(64.3%) than were other patients(13%, $P<0.05$). Mean circulatory arrest time was 19.1 ± 9.9 minutes and it was shorter in patients with ROSC(13.8 ± 5.3) than patients without ROSC(22.4 ± 10.7, $P<0.05$). Cutting point between two group was 19 minutes. Among 12 patients who restored spontaneous circulation, 6 patients had only transient ROSC, 5 patients died from brain death(two moribund discharge was included) and only 1 patient discharged alive without neurologic complication.

대한응급의학회지
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1996.

원주지역에서 발생한 비외상성 심정지의 일주변화

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이강현 · 김영식 · 황성오 · 임경수 · 이진웅 · 임종천** · 박금수** · 최경훈*

* Abstract *

DIURNAL VARIATION OF NON-TRAUMATIC CARDIAC ARREST PATIENTS IN WONJU CITY

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To estimate the quality of the emergency medical services system of Wonju City, we studied the diurnal variations of 179 non-traumatic cardiac arrest victims who received cardiopulmonary resuscitation at the emergency center of Wonju Christian Hospital.

Diurnal variations of non-traumatic cardiac arrest patients were as follows :

The occurence of cardiac arrest at day-time was higher than night-time: 18 cases (11%) from midnight to AM 4, 25 cases (14%) from AM 4 to AM 8, 42 cases (24%) from AM 8 to AM 12, 46 cases (25%) from AM 12 to PM 4, 35 cases (19%) from PM 4 to PM 8, 13 cases (7%) from PM 8 to midnight. Witness cardiac arrest was increased more during the day than night : 40% from midnight to AM 4, 48% from AM 4 to AM 8, 57% from AM 8 to AM 12, 52% from AM 12 to PM 4, 60% from PM 4 to PM 8, 38% from PM 8 to midnight. The transportation time at night-time cardiac arrest was more longer than day-time cardiac arrest : 30±12mins from midnight to AM 4, 26±9mins from AM 4 to AM 8, 27±12mins AM 8 to AM 12, 25±11mins from AM 12 to PM 4, 25±9mins from PM 4 to PM 8, 35±15mins from PM 8 to midnight. The rate of restoration of spontaneous circulation(ROSC) in day-time cardiac arrest was higher than the night-time cardiac arrest : 30% from midnight to AM 4, 36% from AM 4 to AM 8, 33% AM 8 to AM 12, 44% from AM 12 to PM 4, 41% from PM 4 to PM 8, 15% from PM 8 to midnight.

The survival rate of cardiac arrest has been correlated with collapse time, early bystander CPR, early advanced care. To improve outcome for prehospital cardiac arrest, we concluded that early bystander CPR, and early advanced life support should be performed at the scene and during the transportation especially at night.

1997.

2년간 응급실에 내원한 비외상성 병원전 심정지 환자에 대한 임상적 분석
- 광주 · 전남 지역을 중심으로 -

전남대학교의과대학 응급의학과
윤한덕 · 박주경 · 민용일

«Abstract»

Clinical Analysis of Nontraumatic Prebospital Cardiac Arrest for Two Years

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Background : Care for prehospital cardiac arrest is one of the major concerns of emergency medical services. But, in Korea, prehospital emergency medical service systems are not yet well established. We tried to offer one of the fundamental data for development of these systems.

Methods : After application of exclusion criteria, 183 patients who transferred to emergency center of our hospital after cardiac arrest in consecutive 24 months from Jan, 1,1994 to Dec, 31,1995 were included in this study. Retrospective review of the hospital charts of these patients was done. For statistical analysis, we divided patients to some categories. t-test or chi-square analysis was used.

Results : 24 patients of the 183 patients were secondary visitors(cardiac arrest was occurred during transfer from other hospitals), 159 patients were primary visitors. In the primary visitor group, only one third was ambulance visitors, and there is no statistical differences between arrest time of ambulance visitors and non-ambulance visitors(35±27 vs 37±24 min, p=NS). No organized bystander CPR was done. After arrival, 131 patients received CPR and 87 patients(66.4%) were not responded, 31 patients(23.1%) experienced transient ROSC, 13 patients(10.0%) survived until discharge, and only 2 patients(1.5%) were returned to their lives.

Conclusion : We failed to find significant statistical survival differences between ambulance visitors and non-ambulance visitors, between presumed cardiac etiology group and non-cardiac etiology group. Survival rate was high in witnessed arrest group than unwitnessed arrest group(14.5% vs 2.1%, p=0.015).

1999.

병원 전 심정지 환자의 심폐소생술 성적
- 경인 - 서부 지역 3개 병원 -

이대 부속 목동 병원 응급의학과, 이화여대 부속 서울병원 응급의학과*, 가천의대 부속 길병원 응급의학과**
유지영 · 김무수 · 정구영 · 박규남* · 이 근**

= Abstract =

The Outcomes of the Out-of-Hospital Cardiac Arrest
- A collaborative research of three hospitals -

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Catholic University Medical College St. Mary Hospital, Kachon University Chung Ang Gil Hospital***

Background : There has been a lot of changes in prehospital medical environment with development of EMSS(emergency medical service systems). Especially in out-of-hospital cardiac arrest, the patients could survive when they are moved to the hospitals earlier. The purpose of this research is to know the status of EMSS in Korea by analyzing CPR(cardiopulmonary resuscitation) outcomes of out-of-hospital cardiac arrest patients at 3 hospitals in the western area of Seoul and Incheon.

Methods : From July 1997 to June 1998, we collected data about out-of-hospital cardiac arrest victims at Ewha Womens University Mokdong Hospital, Catholic University Medical College St. Mary Hospital, and Kachon University Chung Ang Gil Hospital. We used same record form based on the "Utstein Style".

Results : CPR were performed in 205 out-of-hospital cardiac arrest patients at 3 hospitals. One hundred twelve(62.9%) patients recovered the spontaneous circulation at least once and eight(3.9%) patients discharged alive. One hundred ninety four(73.2%) patients died of medical causes, one hundred two(38.5%) cardiogenic and ninety two(34.7%) non-cardiogenic, and seventy(26.4%) patients died of traumatic causes. Initial EKG showed VT/VF(ventricular tachycardia/ventricular fibrillation) in thirty one(11.7%) patients, asystole in one hundred fifty one(57.0%) patients and other rhythms in eighty three(31.3%) patients. Among one hundred two cardiogenic cardiac arrest patients, two(2.0%) patients was discharged alive.

Conclusion : Overall survival rate of out-of-hospital cardiac arrest patients was 3% which was poorer than that of the western country. The proportion of the cardiogenic cause was 39% which was only half of the western country. VT/VF is relatively not common as a initial EKG rhythm. These differences might be due to difference in the prevalence pattern of out-of-hospital cardiac arrest as well as prematurity of the EMSS.

J Korean Soc Emerg Med 2000.-2010.

- 1,064 article published in J Korean Soc Emerg Med

- Original article about OHCA: 31 (2.91%)
- Case report of OHCA: 5
- Animal study about CPR: 6

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Volume 15, Number 6, December, 2004

2004. 병원 전 비외상성 노인심정지환자의 특성과 심폐소생술 결과

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김 현 · 김선휴 · 오성범 · 차경철 · 김호중 · 이서영 · 이광현 · 황성오 · 조준휘*

Resuscitation Outcomes and Clinical Characteristics of Non-traumatic Out-of-Hospital Geriatric Cardiac Arrest

Hyun Kim, M.D., Sun Hyu Kim, M.D., Sung Bum Oh, M.D., Kyung Cheol Cha, M.D., Ho Jung Kim, M.D., Seo Young Lee, M.D., Kang Hyun Lee, M.D., Sung Oh Hwang, M.D., Jun Hwi Cho, M.D.*

Purpose: This study was to investigate the resuscitation outcomes and the clinical characteristics of geriatric non-traumatic out-of-hospital cardiac arrest by analyzing data from a single institution's registry.

Methods: We conducted a retrospective study of 804 patients who came to the emergency department with non-traumatic out-of-hospital cardiac arrest during the period 1991-2002. Only patients over 18 years of age were included. Clinical characteristics, variables associated with cardiac arrest, and data during resuscitation were obtained from our cardiac arrest database. Patients were divided into two age groups: less than 65 years of age (non-geriatric group, n=530), and over 65 years of age (geriatric group, n=274).

Results: The proportion of cardiac etiology was higher with the geriatric group than with the non-geriatric group (48% vs 39%, x^2=0.013). A lower incidence of ventricular arrhythmia was observed in the geriatric group (8% vs 13%, x^2=0.037). The arrest time, the CPR time, the witnessed arrest, the epinephrine doses, and total defibrillation energy were not different between two groups. Spontaneous circulation was restored in 127 (46%) patients in the geriatric group and in 255 (48%) patients in the non-geriatric group (x^2=0.382). The patients discharged alive numbered were 33 (6%) in the non-geriatric group and 10 (4%) in the geriatric group (x^2=0.138).

Conclusions: Cardiac etiology was predominant in geriatric cardiac arrest and a lower incidence of ventricular arrhythmia was observed. An older age (over 65 years) did not affect the resuscitation outcome.

Key Words: Cardiopulmonary resuscitation, Aged, Heart arrest

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서 론

인구의 고령화로 인하여 65세 이상의 노인 인구는 해마다 증가하고 있다. 1960년도 우리나라의 노인인구는 726,000명으로 전체인구의 2.0%를 차지했지만 1990년도에는 5.1%, 2000년도에는 3,400,000명으로 7.1%로 증가하였다(2000년 통계청 통계). 미국에서도 1990년도의 노인인구는 12%였지만 2030년에는 55,000,000명으로 전체인

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2004.

병원 전 심정지로 내원한 영아의 심폐소생술에 대한 고찰

전남대학교 의과대학 응급의학교실

윤영윤 · 김홍재 · 한승철 · 염경인 · 문정이 · 전병조 · 허 탁 · 민용일

Clinical Analysis of CPR in Infants with Out-of-Hospital Cardiopulmonary Arrest

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Purpose: Since 1960 pediatric advanced life support (PALS) has been studied and applied to clinical situations, ILCOR guidelines 2000 for CPR and ECC was achieved. Pediatric cardiopulmonary arrest differs from adult arrest in etiologies, mechanisms, and managements. This study was performed to identify the clinical manifestations and real picutre of CPR to recognize the need of standard CPR method that increases the survival in infants with out-of-hospital arrest.

Methods: This study was planned by retrospectively reviewed the records of all children who arrived without spontaneous respiration and palpable pulse at the emergency room of the three Hospitals from January 1996 to July 2003.

Results: During that period, 45 infants presented with out-of-hospital cardiopulmonary arrest. Overall, there was a return of vital signs in 15 of the 45 patients; 6 survived to discharge from hospital.

1. Out-of-hospital arrest in infants demonstrated that 60% were male, mean age was 133.4 days. Of these, 71.1% of the arrests occured in the home with family members presents, those family members didn't perform basic CPR in only 1 case.

2. In any ROSC group, the interval between the arrest and arrival at the hospital was 14.4 minutes. In ROSC never achieved group, the interval was 32.0 minutes.

3. Two of the 15 patients with SIDS(13.3%) and four of the 13 patients with respiratory arrest(30.8%) survived to hospital discharge.

Conclusion: Factors that predicted survival to discharged alive included a death caused by respiratory disease, a short interval between the arrest and arrival at the hospital, and a short duration of resuscitation efforts in the ER. We found that need of standard guideline and commonly applied CPR techniques.

Key Words: Infant, Out-of-hospital arrest, Cardiopulmonary resuscitation

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서 론

1960년대부터 심폐소생술에 대한 지속적인 연구와 임상적인 적용이 광범위하게 이루어져 현재 국제적으로 합의된 심폐소생술 지침 2000이 제시되었는데, 주된 내용은 성인 심폐소생술에 관한 것이 대부분을 차지하고 있고, 소아 심폐소생술과 관련된 부분은 영아와 소아의 심폐에 대한 해부학적, 생리학적 특성에 입각하여 성인 심폐소생술 지침을 변형시켜 제시하였을 뿐이다[1].

성인에서의 심정지는 대부분 심장질환에서 기시하므로 심

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2007.

병원외 심정지 소아의 심폐소생술에 대한 고찰

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윤성현 · 이경미 · 김지혜 · 김준식 · 백진휘 · 김 훈 · 신동운* · 김아진 · 한승백

Outcome of Pediatric Out-of-Hospital Cardiac Arrest

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Purpose: We analyzed the characteristics and outcome of pediatric out-of-hospital cardiac arrest.

Methods: Pediatric out-of-hospital cardiac arrest from January 2000 to December 2006 at two tertiary hospitals were described and evaluated using the Utstein style. We reviewed the records retrospectively and analyzed the outcome variables which were any return of spontaneous circulation (ROSC), sustained ROSC, survived event, and survival to hospital discharge. Neurologic outcome was assessed by the Pediatric Cerebral Performance Category (PCPC) scale.

Results: The study included 62 children with out-of-hospital cardiac arrest. Any ROSC was achieved in twenty patients (32.3%). Sustained ROSC of any ROSC group was achieved in sixteen patients (80.0%). Of the sustained ROSC group, fourteen patients (87.5%) were admitted to hospital, and only four patients (28.6%) of survived event group survived to hospital discharge. The prevalent etiology were injuries. Although 35 children (56.5%) of the arrests occurred at home with family members present, only 1 patients received bystander CPR. Nonshockable rhythm (96.8%) were showed more than shockable rhythm (3.2%). In any ROSC group, time to initiation of CPR was 9.3 minutes, duration of total CPR was 20.4 minutes.

Conclusion: Mortality of pediatric out-of-hospital cardiac arrest was high and neurologic outcome was poor. Factors that increased survival rate were prevention of injuries, enhanced education programs of bystander CPR, rapid initiation of CPR.

Key Words: Children, Out-of-hospital cardiac arrest, Resuscitation

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서 론

병원외 심정지의 경우 소아는 성인에 비해 보다 젊은 사망률과 이환율을 갖고 있다고 보고되고 있으나, 국내에서 보고된 바는 교등다[1]. 병원외 심정지 소아의 약 2%에서 10%정도가 생존하며, 신경학적 손상 정도도 성인에 비해 심하다고 알려져 있다[2]. 1963년 미국심장협회(American Heart Association, AHA)와 미국소아과학회(American Academy of Pediatrics)에서는 심폐소아소생술(Pediatric Advanced Life Support, PALS)에는 서로를 제시했고, 약 5년마다 새로운 지침을 발표하고 있다[3]. 그러나 심폐소생술을 시행 받은 병원외 심정지 소아에 대한 역학적 자료의 조사가 많이 이루어지지 않아 지침에 대한 분석과 평가가 어려운 부분이 있다. 1991년 성인의 병원외 심정지에 관한 보고서가도 "Utstein style"이

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2008. 일개 대도시에서의 119 구급대가 자동제세동기를 사용한 병원 전 심정지 환자들에 대한 연구

경북대학교 의과대학 응급의학교실, 대구 그린간호병원 응급의학과, 대구응급의료정보센터, 영남대학교 의과대학 응급의학교실, 계명대학교 의과대학 응급의학교실*, 대구 가톨릭대학교 의과대학 응급의학교실*

이현희 · 서강석 · 정재명 · 박정배 · 류현욱 · 김홍근* · 서준석* · 이상범* · 최우익* · 이경원*

Study of Out-of-hospital Cardiac Arrest Patients for whom 119 Rescuers used an Automated External Defibrillator in the Metropolitan Area

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Purpose: To report characteristics of out-of-hospital cardiac arrest (OHCA) patients in whom 119 rescuers used an automated external defibrillator (AED) in the metropolitan area.

Methods: 1,685 OHCA patients were transferred to hospitals by 119 rescuers between 1 January and 31 December, 2006. Among them, 108 OHCA patients for whom 119 rescuers used an AED were enrolled retrospectively.

Results: Shockable rhythm with AED use was 70.6%, witnessed arrest was 46.2%, and bystander cardiopulmonary resuscitation (CPR) was 8.6%. The most common location of cardiac arrest was in the home, at 74.8%. Response time was 7.1(±3.9) minutes. Chest compression during transport was done by 119 rescuers in 87.7% of cases, and assisted ventilations such as advanced airway management and bag valve mask ventilation were performed by 119 rescuers in 17.0%. Initial ECG findings at ED were asystole(59.4%), PEA(25.5%), VF/pulseless VT(8.5%), sinus rhythm(4.7%), and others(1.9%). The most common etiology of cardiac arrest was presumed cardiac origin in 88.9% of cases. Sustained return of spontaneous circulation (ROSC) was 26.4%. The proportion of patients discharged alive was 11.3%.

Conclusion: The performance of bystander CPR and usage of AED, and appropriate CPR done by 119 rescuers were unsatisfactory in metropolitan Daegu. There is a marked need to establish basic life support education in the areas of bystander CPR, and a quantitative and qualitative development of 119 rescue capability.

Key Words: Heart Arrest, Cardiopulmonary resuscitation, Automated external defibrillators (AEDs)

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서 론

원내적 최이회 심폐소생술의 기원은 1950년대 Jude와

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2009.

서울시 병원전 심정지 환자의 심폐소생술에 대한 전향적 다기관 평가

대한심폐소생협회 ACLS 위원회, 연세대학교 원주의과대학 응급의학교실, 건국대학교 충주병원*, 건양대학교병원†, 서울의료원‡, 건국대학교병원§, 경희의료원∥, 강남세브란스병원¶, 서울성모병원**, 서울대학교병원††, 삼성서울병원‡‡, 이화여자대학교 의학전문대학원§§, 중앙대학교병원∥∥, 한양대학교병원¶¶, 분당서울대학교병원***

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Prospective Multi-center Evaluation and Outcome of Cardiopulmonary Resuscitation for Victims of Out-of-Hospital Cardiac Arrest in Seoul

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Purpose: To evaluate the quality of prehospital CPR (cardiopulmonary resuscitation) performed by 119 rescue personnel and bystanders in Seoul and to recognize the present problems in the pre-hospital emergency medical service system (EMS).

Methods: We enrolled all patients in cardiac arrest visiting the emergency rooms of 9 university hospitals in Seoul via 119 rescue services from 15 October to 28 November 2006, prospectively investigating the environments in which arrest occurred and the factors associated with CPR.

Results: Among 73 patients, the most common place of arrest was in the home(45.2%). CPR by bystander was performed in 8 cases(10.7%), endotracheal intubation by EMS personnel was performed in 10 cases(14.1%). Average time from call to CPR was 11.9 minutes and the number of discharges alive was 3 cases(4.1%).

Conclusion: To improve the rate of alive discharges, development of CPR education program for lay rescue, education in basic and advanced life support, and management of quality for EMS personnel are needed.

Key Words: Cardiopulmonary resuscitation, Education, CPR quality, Emergency medical services

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SCI indexed Journals

- 2001. animal study about CPR:
  Korean Emergency Physician 1st published

- OHCA
- 2007-2009. 3 articles published
- 2010. 5 articles published

2001.

Resuscitation. 2001 Mar;48(3):293-9.

Simultaneous sternothoracic cardiopulmonary resuscitation: a new method of cardiopulmonary resuscitation.

[Article in English, Portuguese]

Hwang SO, Lee KH, Cho JH, Oh BJ, Gupta DS, Ornato JP, Lee SH, Yoon J, Choe KH.

Department of Emergency Medicine, Wonju College of Medicine, Yonsei University, 162 Ilsandong Wonju, South Korea.

Abstract

No existing device for cardiopulmonary resuscitation (CPR) is designed to exploit both the "cardiac pump" and the "thoracic pump" effect simultaneously. Th sternothoracic cardiopulmonary resuscitation (SST-CPR) device that could compress the sternum and constrict the thoracic cavity simultaneously in a canin randomized to receive standard CPR (n=12) or SST-CPR (n=12). SST-CPR generated a new pattern of the aortic pressure curve presumed to be the result o higher mean arterial pressure than standard CPR (68.9+/-16.1 vs. 30.5+/-10.0 mmHg, P<0.01). SST-CPR generated higher coronary perfusion pressure tha also higher during SST-CPR than standard CPR (11.6+/-6.1 vs. 2.17+/-3.3 mmHg, P<0.01). In this preliminary animal model study, simultaneous sternothor closed chest cardiopulmonary resuscitation.

2007.

Resuscitation (2007) 73, 309–313

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RESUSCITATION

www.elsevier.com/locate/resuscitation

CASE REPORT

Successful extracorporeal life support in cardiac arrest with recurrent ventricular fibrillation unresponsive to standard cardiopulmonary resuscitation☆

Jae-Seung Shin[a], Sung-Woo Lee[b,*], Gap-Su Han[b], Won-Min Jo[a], Sung-Hyuk Choi[b], Yun-Sik Hong[b]

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2009.

Resuscitation 80 (2009) 778–781

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Clinical paper

Out-of-hospital cardiac arrest due to drowning: An Utstein Style report of 10 years of experience from St. Mary's Hospital☆

Chun Song Youn[a], Seung Pill Choi[a], Hyeon Woo Yim[b], Kyu Nam Park[a,*]

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[b] CMC Clinical Research Coordinating Center, Department of Preventive Medicine, The Catholic University of Korea, Seoul, Republic of Korea

2010.

Choi et al. Critical Care 2010, 14:R17
http://ccforum.com/content/14/1/R17

CRITICAL CARE

RESEARCH Open Access

Diffusion-weighted magnetic resonance imaging for predicting the clinical outcome of comatose survivors after cardiac arrest: a cohort study

Seung Pill Choi[1], Kyu Nam Park[1*], Hae Kwan Park[2], Jee Young Kim[3], Chun Song Youn[1], Kook Jin Ahn[3], Hyeon Woo Yim[4]

2010.

Resuscitation 81 (2010) 312–317

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Clinical paper

Pediatric out-of-hospital cardiac arrest in Korea: A nationwide population-based study☆,☆☆

Chang Bae Park[a], Sang Do Shin[a,*], Gil Joon Suh[a], Ki Ok Ahn[b], Won Chul Cha[c], Kyoung Jun Song[d], Soo Jin Kim[e], Eui Jung Lee[f], Marcus Eng Hock Ong[g]

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2010.

Resuscitation 81 (2010) 974–981

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Clinical paper

Epidemiology and outcomes from non-traumatic out-of-hospital cardiac arrest in Korea: A nationwide observational study☆

Ki Ok Ahn[a], Sang Do Shin[b,*], Gil Joon Suh[b], Won Chul Cha[c], Kyoung Jun Song[d], Soo Jin Kim[e], Eui Jung Lee[b], Marcus Eng Hock Ong[f]

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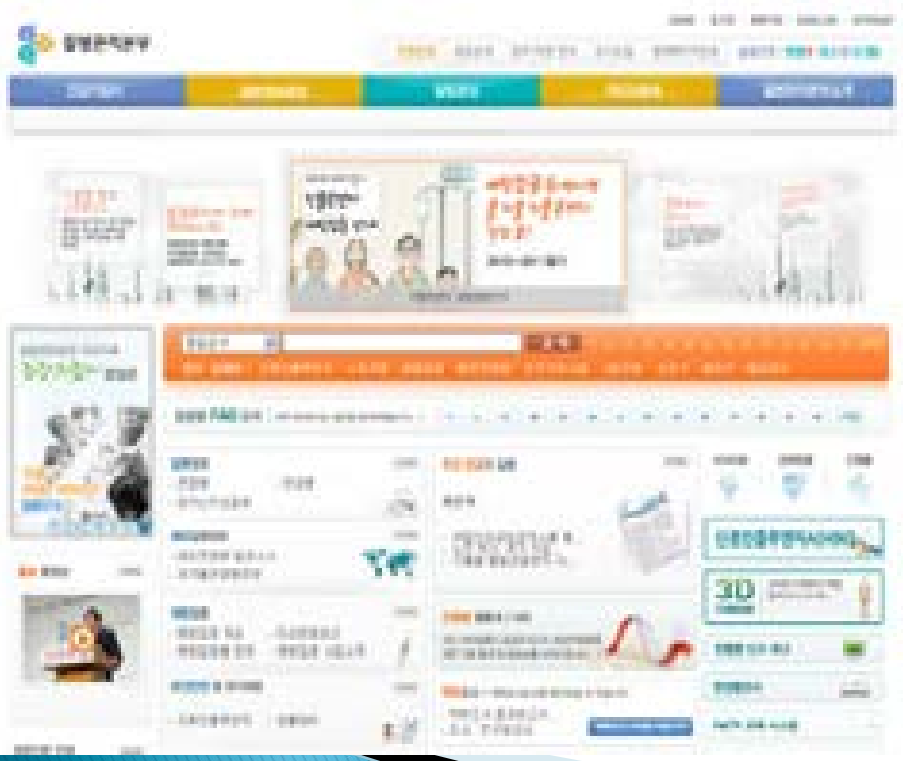
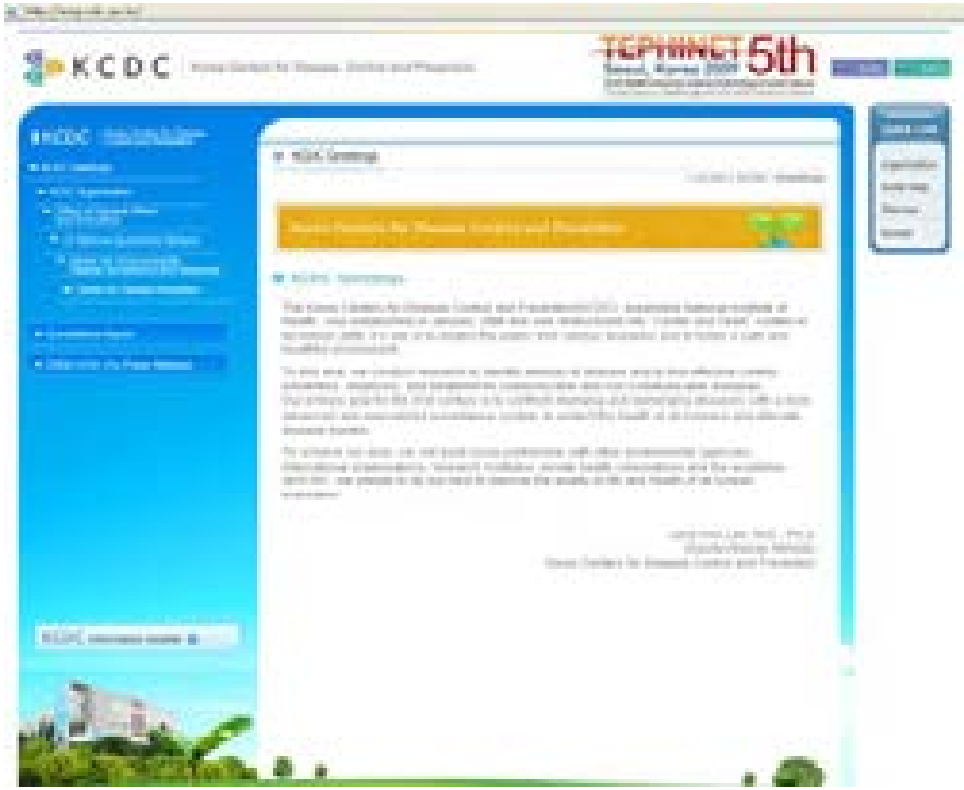


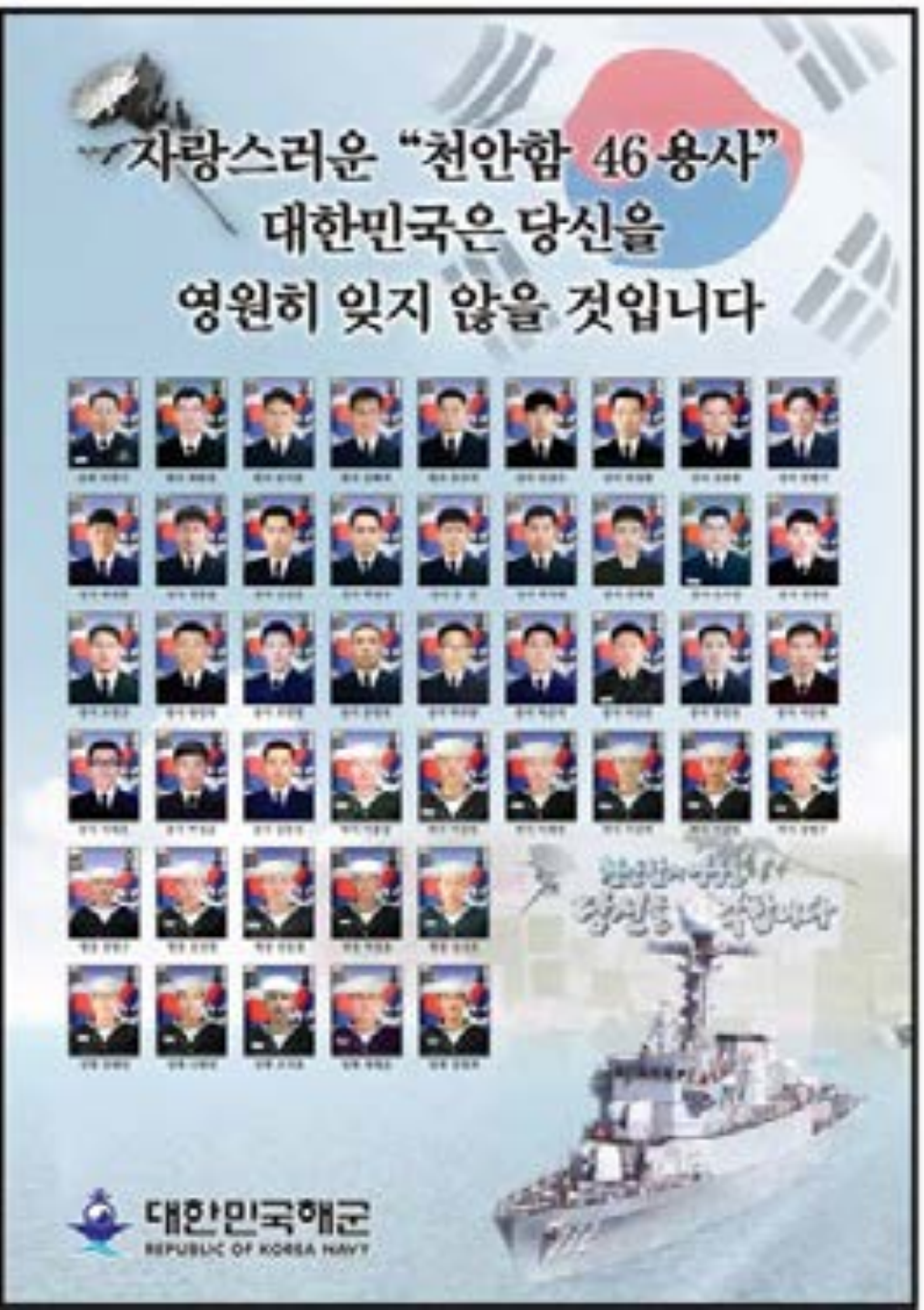


Nationwide OHCA cohort

- We have a nationwide OHCA cohort data from 2006 to 2008.
- Currently, we are conducting the 2009 to 2010 OHCA database.
- Most of research team in this project are now participating in this PAROS-Korea study.

Future directions: community interventional trial

- 1st agenda: the PAD project: (2011- 2015) for a nationwide implementation with enhancing bystander CPR education.
- 2nd agenda: the real-time or on-going CPR quality assurance program collaborating with fire departments in PAROS-Korea study sites.
- 3rd agenda: the regionalization strategy for post resuscitation optimal care, which was not initiated, but academic discussions are now expanded.



PAROS

We Never forget you, "Chon An".