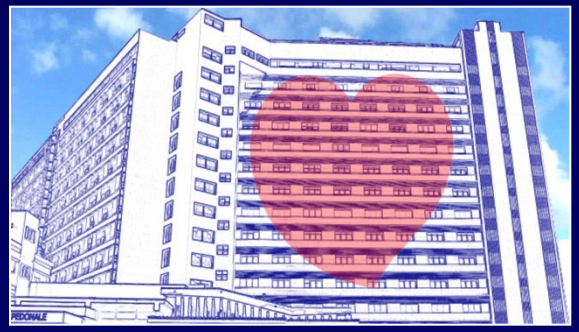
FROM OUT OF HOSPITAL RESUSCITATION TO HOSPITAL ADMISSION : HOW TO OPTIMIZE RESOURCES

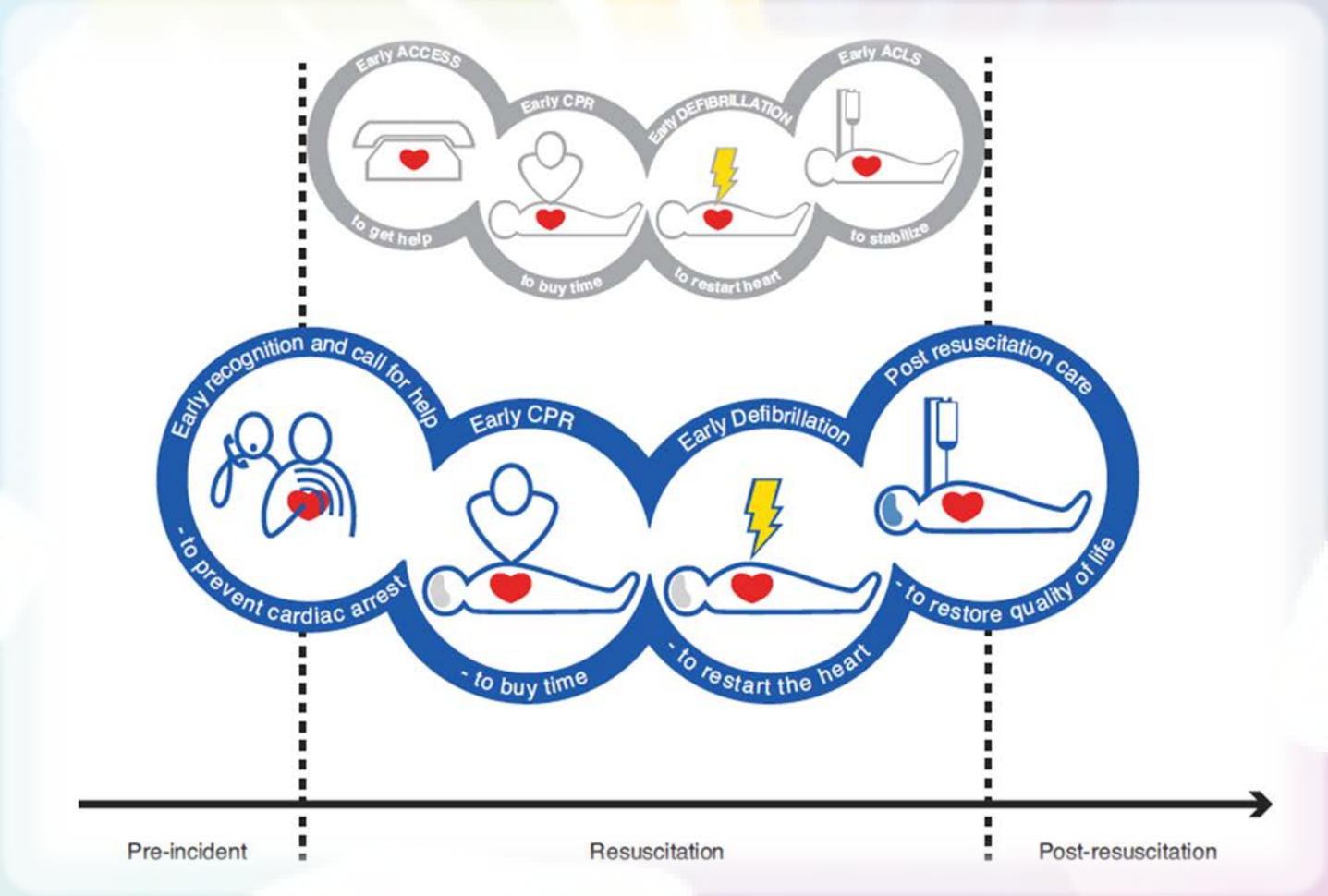
International Congress
"Advances in Cardiac Arrhythmias and Great Innovations in Cardiology"

Torino, 23rd October 2014

Giuseppe Di Pasquale, MD, FESC, FACC
Director Department of Medicine
Director Division of Cardiology
Maggiore Hospital, Bologna, Italy



Chain of Survival

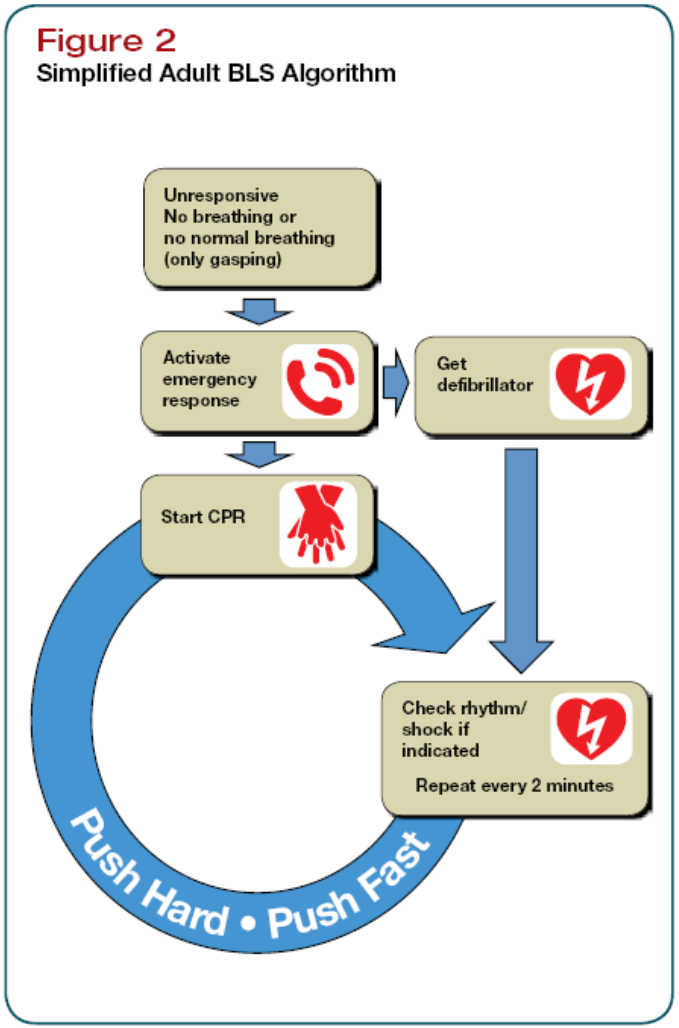


European Resuscitation Council Guidelines for Resuscitation 2010, Resuscitation 81 (2010) 1219–1276


Early recognition and call for help
- to prevent cardiac arrest
Early CPR
- to buy time


KEEP
CALM
call for help
and start
CPR

Part 5: Adult Basic Life Support: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations



EARLY RECOGNITION

Start CPR in all unconscious subjiects who do not breath normally:

- No puls control

- No consider agonic gasps

Circulation 2010;122;S298-S324

Dispatch Guided CPR

Dispatcher-assisted cardiopulmonary resuscitation: time to identify cardiac arrest and deliver chest compression instructions Lewis M et al Circulation 2013 Oct 1;128(14):1522-30.

Health Services and Outcomes Research

Dispatcher-Assisted Cardiopulmonary Resuscitation

Time to Identify Cardiac Arrest and Deliver Chest Compression Instructions

Miranda Lewis, BS; Benjamin A. Stubbs, MPH; Mickey S. Eisenberg, MD, PhD

Background—Dispatcher-assisted cardiopulmonary resuscitation (DA-CPR), in which 9-1-1 dispatchers provide CPR instructions over the telephone, has been shown to nearly double the rate of bystander CPR. We sought to identify factors that hampered the identification of cardiac arrest by 9-1-1 dispatchers and prevented or delayed the provision of dispatcher-assisted CPR chest compressions.

Methods and Results—We reviewed dispatch recordings for 476 out-of-hospital cardiac arrests occurring between January 1, 2011, and December 31, 2011. We found that the dispatcher correctly identified cardiac arrest in 80% of reviewed cases and 92% of cases in which they were able to assess patient consciousness and breathing. The median time to recognition of the arrest was 75 seconds. Chest compressions following dispatcher-assisted CPR instructions occurred in 62% of cases when the dispatcher had the opportunity to asses for consciousness and breathing and bystander CPR was not already started. The median time to first dispatcher-assisted CPR chest compression was 176 seconds.

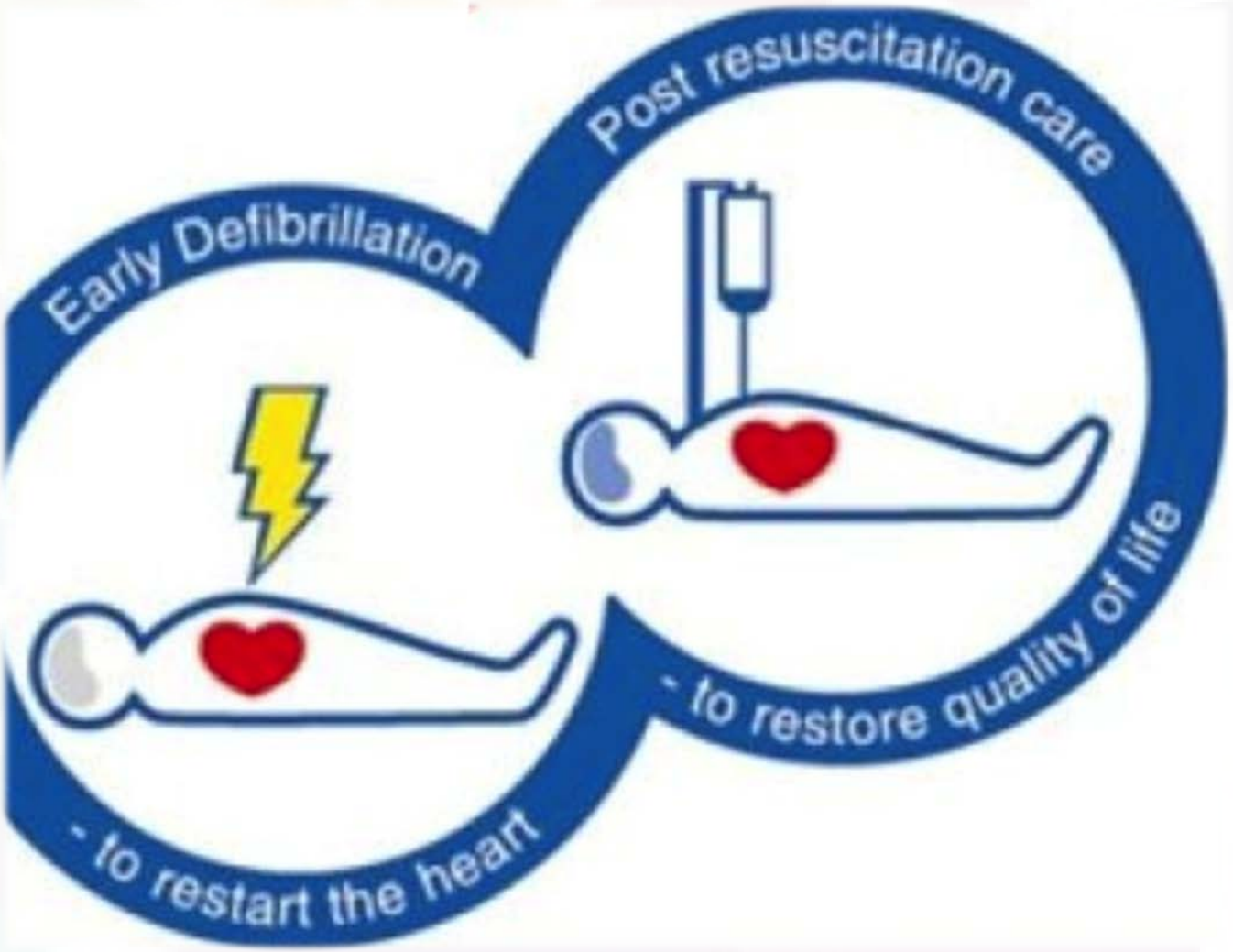
Conclusions—Dispatchers are able to accurately diagnose cardiac arrest over the telephone, but recognition is likely not possible in all circumstances. In some cases, recognition of cardiac arrest may be improved through training in the detection of agonal respirations. Delays in the delivery of dispatcher-assisted CPR chest compressions are common and are attributable to a mixture of dispatcher behavior and factors beyond the control of the dispatcher. Performance standards for the successful and quick recognition of cardiac arrest and delivery of first chest compressions should be adopted as metrics against which emergency medical services systems can measure their performance.

Circulation 2013;128:1522-1530

CPR education for bystanders

Bystander CPR

Bystander CPR and survival, Leong BS Singapore Med J 2011 Aug;52(8):573-5
How best to teach CPR to schoolchildren: a systematic review, Plant N, Taylor K Resuscitation 2013 Apr;84(4):415-21
Progetto VIVA, Italian Resuscitation Council


Early Defibrillation
- to restart the heart
Post resuscitation care
- to restore quality of life

Early defibrillation…

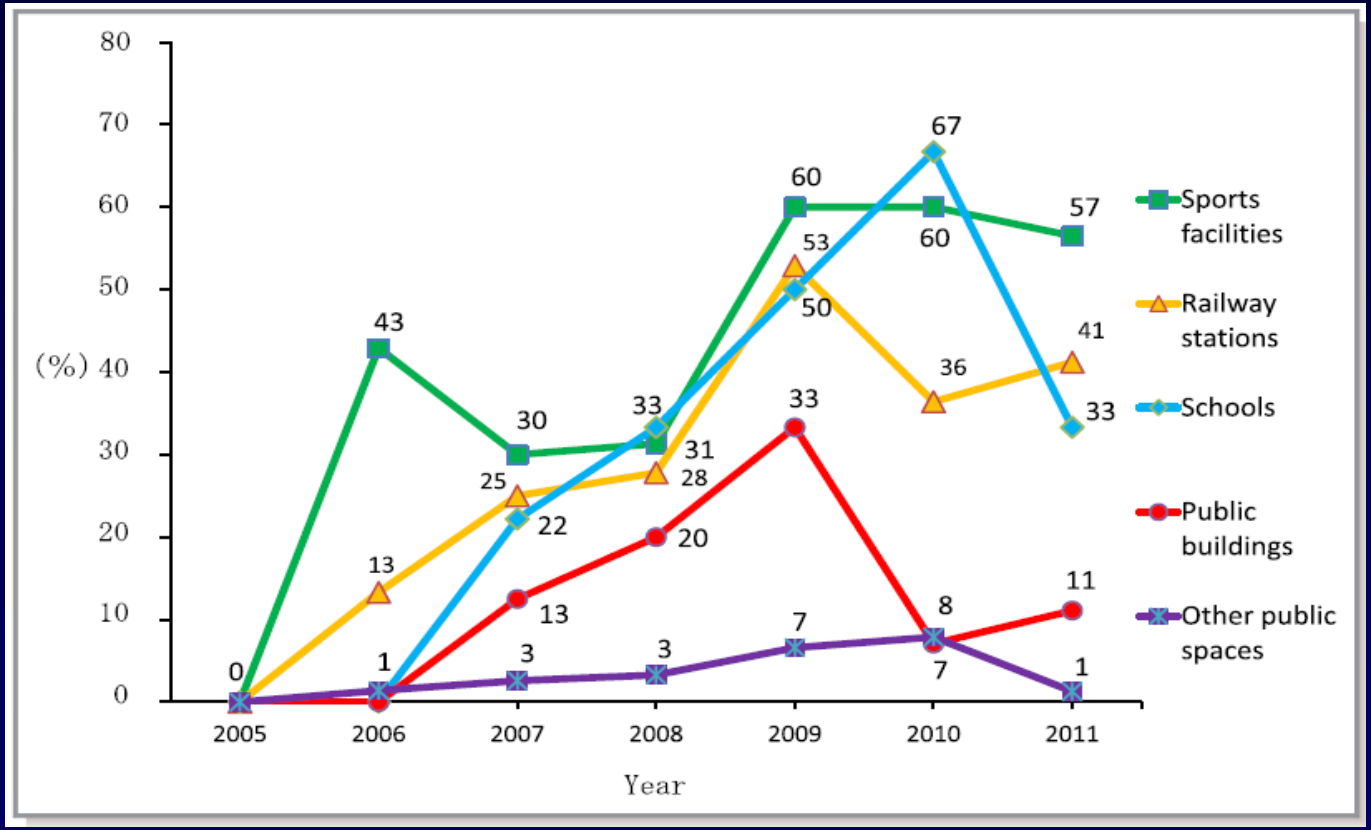
- PAD Projects

  (Public Access Defibrillation)

Isola d'Elba
Golfo della Biodola

Outcomes of Out-of-Hospital Cardiac Arrest by Public Location in the Public-Access Defibrillation Era

Yukiko Murakami, RN, MPH; Taku Iwami, MD, PhD; Tetsuhisa Kitamura, MD, MSc, DPH; Chika Nishiyama, RN, PhD; Tatsuya Nishiuchi, MD, PhD; Yasuyuki Hayashi, MD, PhD; Takashi Kawamura, MD, PhD; for the Utstein Osaka Project*



Trends in the proportion of public-access AED use by laypersons among bystander-witnessed OHCAs of cardiac origin in public places

J Am Heart Assoc. 2014

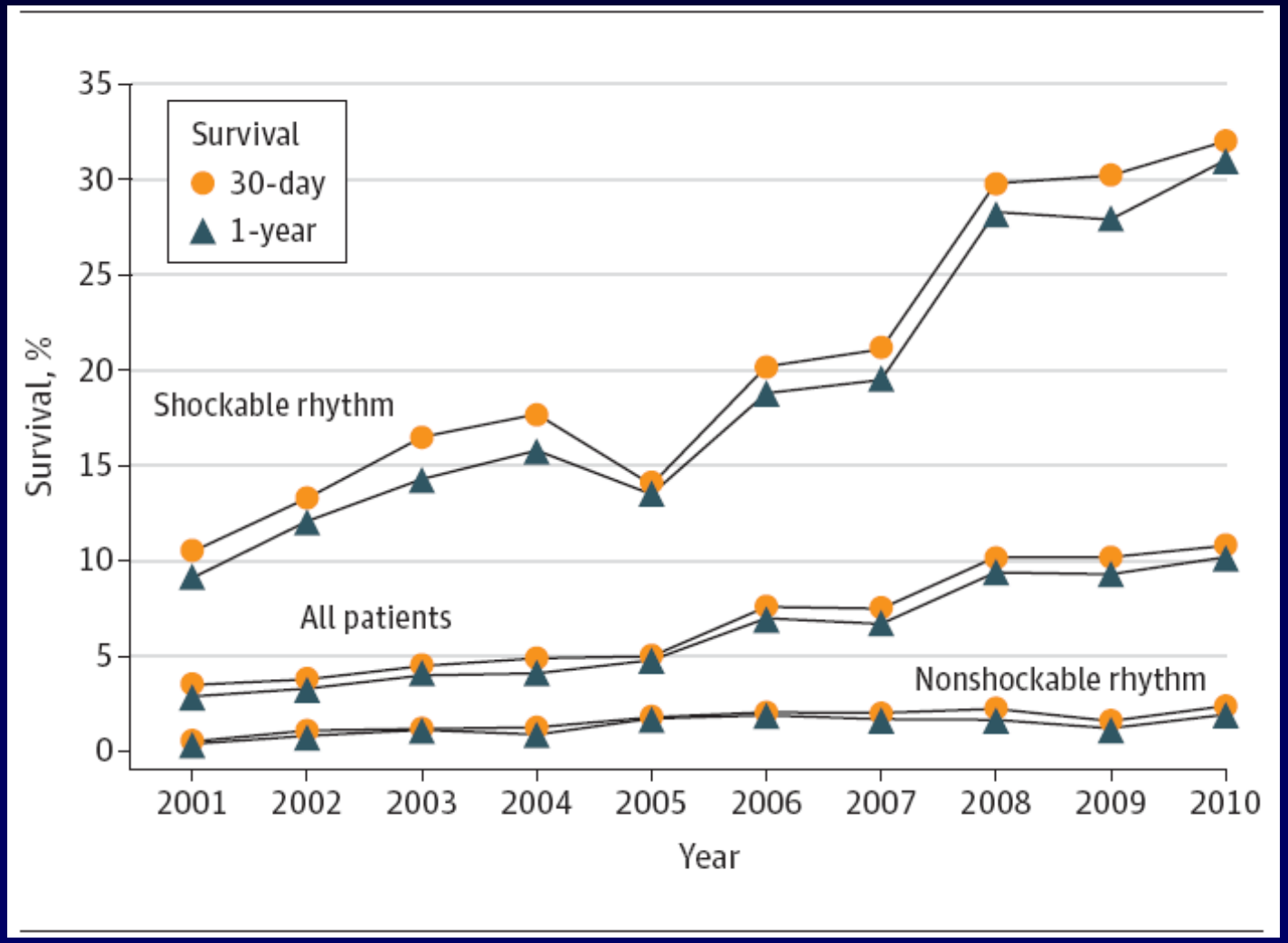
Original Investigation

Association of National Initiatives to Improve Cardiac Arrest Management With Rates of Bystander Intervention and Patient Survival After Out-of-Hospital Cardiac Arrest

Mads Wissenberg, MD; Freddy K. Lippert, MD; Fredrik Folke, MD, PhD; Peter Weeke, MD; Carolina Malta Hansen, MD; Erika Frischknecht Christensen, MD; Henning Jans, MD; Poul Anders Hansen, MD; Torsten Lang-Jensen, MD; Jonas Bjerring Olesen, MD; Jesper Lindhardsen, MD; Emil L. Fosbol, MD, PhD; Søren L. Nielsen, MD; Gunnar H. Gislason, MD, PhD; Lars Kober, MD, DSc; Christian Torp-Pedersen, MD, DSc

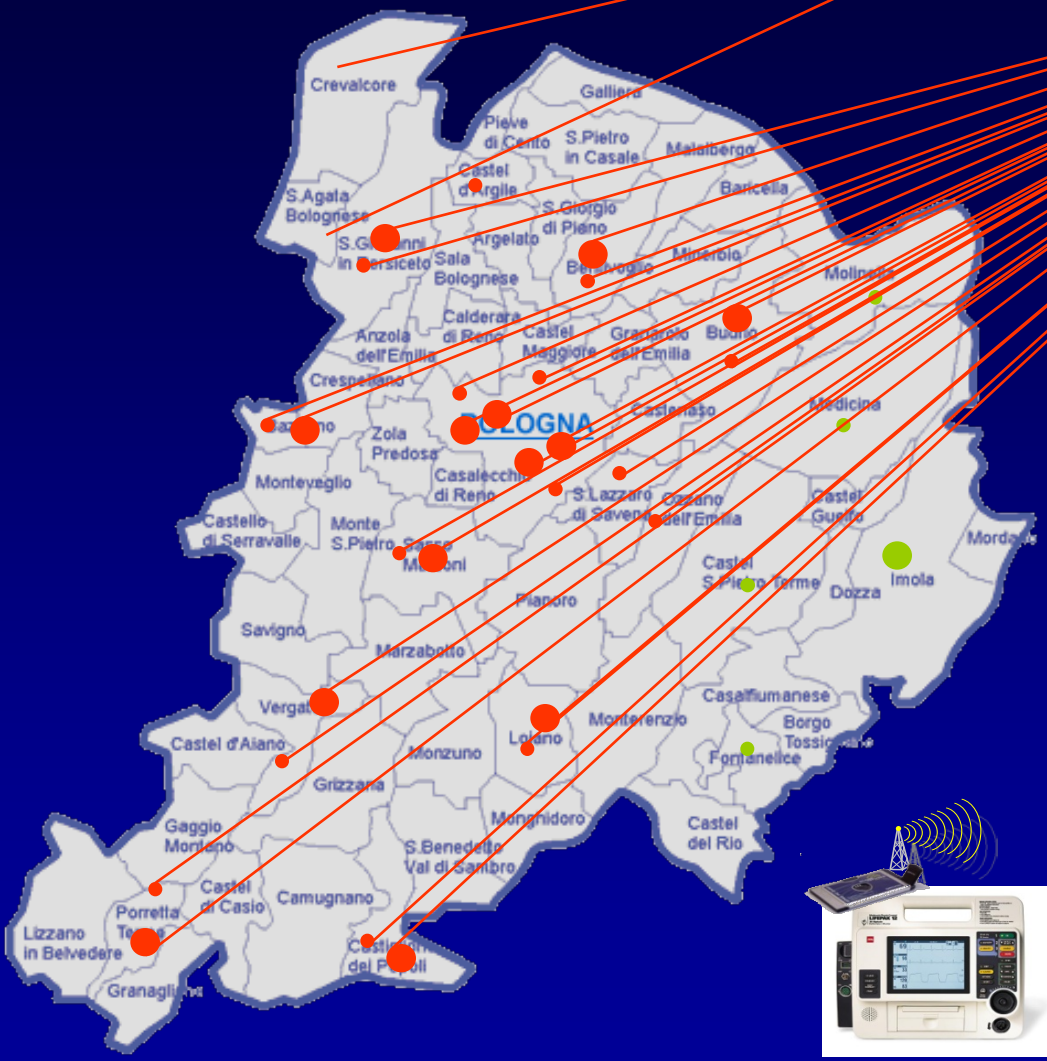
JAMA 2013;310:1377-84

Survival Following OHCA, 2001 - 2010

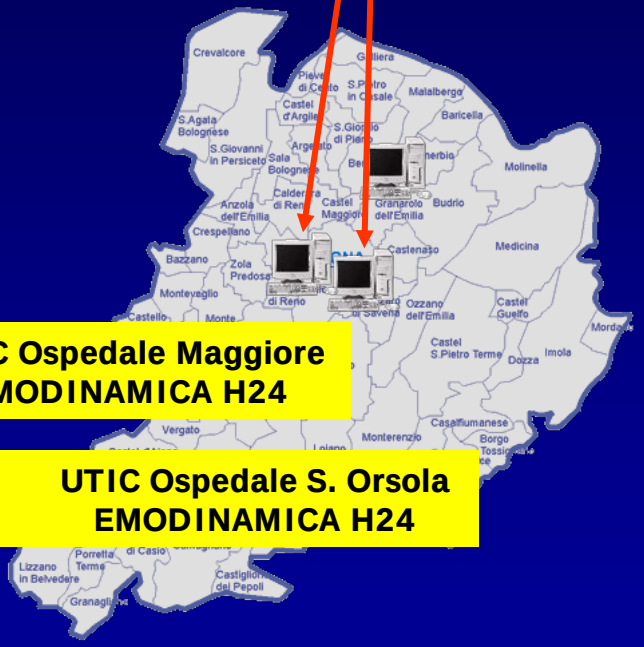


Wissenberg M et al JAMA 2013;310:1377-84

Bologna 2004 Telemedicine



Globetrotter



UTIC Ospedale Maggiore
EMODINAMICA H24

UTIC Ospedale S. Orsola
EMODINAMICA H24

Cardiopulmonary Resuscitation
AHA Guidelines

The New Chain of Survival

Postresuscitation care center

AHA Guidelines for CPR and ECC. Circulation 2010; 122: S768-S786

ICU – Maggiore Hospital “C.A. Pizzardi”, Bologna

Resuscitation Science

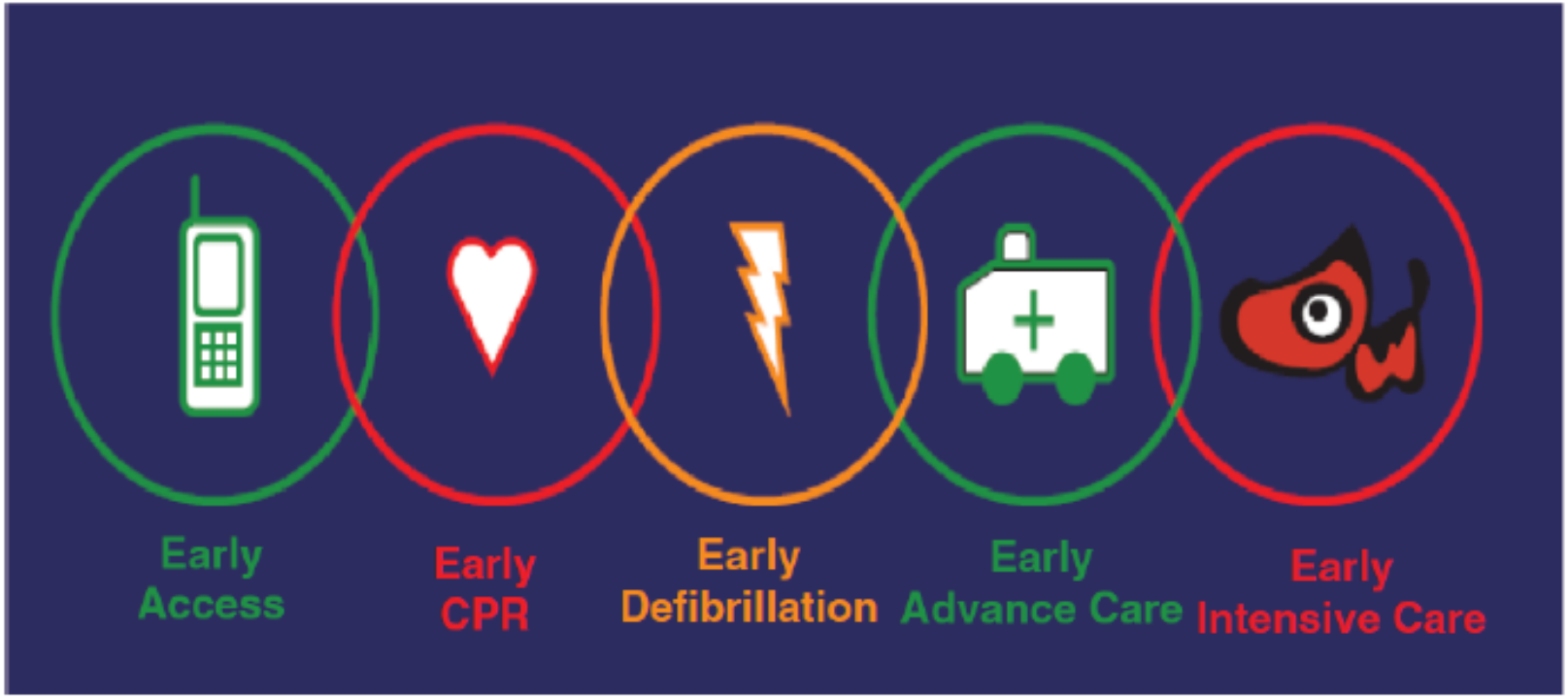
Implementation of the Fifth Link of the Chain of Survival Concept for Out-of-Hospital Cardiac Arrest

Takashi Tagami, MD, PhD; Kazuhiko Hirata, MD; Toshiyuki Takeshige, MD, PhD; Junichiroh Matsui, MD, PhD; Makoto Takinami, MD, PhD; Masataka Satake, MD; Shuichi Satake, MD; Tokuo Yui, MD; Kunihiro Itabashi, MD; Toshio Sakata, MD; Ryoichi Tosa, MD; Shigeki Kushimoto, MD, PhD; Hiroyuki Yokota, MD, PhD; Hisao Hirama, MD

Circulation 2012;126:589-97

Aizu Chain of Survival Concept Campaign

New Regional System of Care for Out-of-Hospital Cardiac Arrest



Tagami T et al Circulation 2012;126:589-97

Post-cardiac Arrest Syndrome

- Anoxic brain injury
- Myocardial dysfunction
- Systemic ischemic / reperfusion response
- Persistent precipitating pathology

Nolan JP et al, Resuscitation 2008; 79: 350-379

Post-cardiac Arrest Syndrome

- **Anoxic brain injury**
- **Myocardial dysfunction**
- **Systemic ischemic / reperfusion response**
- **Persistent precipitating pathology**

Nolan JP et al, Resuscitation 2008; 79: 350-379

Cardiac arrest

Recommendations	Class	Level
All medical and paramedical personnel caring for a patient with suspected myocardial infarction must have access to defibrillation equipment and be trained in cardiac life support.	I	C
It is recommended to initiate ECG monitoring at the point of FMC in all patients with suspected myocardial infarction.	I	C
Therapeutic hypothermia is indicated early after resuscitation of cardiac arrest patients who are comatose or in deep sedation.	I	B
Immediate angiography with a view to primary PCI is recommended in patients with resuscitated cardiac arrest whose ECG shows STEMI.	I	B
Immediate angiography with a view to primary PCI should be considered in survivors of cardiac arrest without diagnostic ECG ST-segment elevation but with a high suspicion of ongoing infarction.	IIa	B

ECG = electrocardiogram; FMC = first medical contacts; PCI = percutaneous coronary intervention; STEMI = ST-segment elevation myocardial infarction.

European Heart Journal (2012) 33, 2569–2619
doi:10.1093/eurheartj/ehs215

Hypothermia and coronary angiography in the post anoxic coma OHCA

Strategies applied in the Emilia Romagna centers

Centro REAL	Protoc. Arresto	Ipotermia Terapeutica	Coro ≤ 6 ore	Criteri PCI nel coma post-ROSC	Terapia antitrombotica	N. Casi 2013
Bologna, Maggiore	Si	**Si, Ria**	**Quasi tutti**	Solo se "culprit" occlusa o TIMI<3	Meno aggressiva PCI primaria	>25
Bologna, Policlinico	Si	**Si, Ria**	**Quasi tutti**	Solo se "culprit" occlusa o TIMI<3	Valutazione clinica individuale	10-25
Modena, Baggiovara	Si	**Si, Ria**	**Quasi tutti**	Anche "culprit" critica con TIMI 3	Meno aggressiva PCI primaria	10-25
Piacenza	Si	**Si, Ria**	**Quasi tutti**	Solo se "culprit" occlusa o TIMI<3	Analoga a PCI primaria	10-25
Reggio Emilia	No	**Si, Ria**	**STEMI**	Anche "culprit" critica con TIMI 3	Meno aggressiva PCI primaria	<10
Ravenna	Si	**Si, Ria**	**Quasi tutti**	Anche "culprit" critica con TIMI 3	Analoga a PCI primaria	<10
Rimini	In corso	**Si, Ria**	**Quasi tutti**	Anche "culprit" critica con TIMI 3	Più aggressiva PCI primaria	10-25
Parma	No	**Si, Ria**	**TV/FV**	Anche "culprit" critica con TIMI 3	Più aggressiva PCI primaria	10-25
Forlì	Si	**Si, anche UTIC**	**Quasi tutti**	Anche "culprit" critica con TIMI 3	Analoga a PCI primaria	>25
Ferrara	Si	**Si, Ria**	**Quasi tutti**	Anche "culprit" critica con TIMI 3	Più aggressiva PCI primaria	10-25

OHCA Protocol

Territorio

Ospedale

Medico Responsabile: RIANIMATORE

Ipotermia Terapeutica

OHCA (FV/TV)
Coma post ROSC

Criteri esclusione:
- ROSC non persistente
- Malattia terminale

Valutazione 118
ECG pre-H

Saletta Emergenza PS
Valutazione congiunta
Rianimatore & Cardiologo

STEMI-ECG

No STEMI-ECG

Saletta Emergenza PS
TAC encefalo & Ecocardiogramma

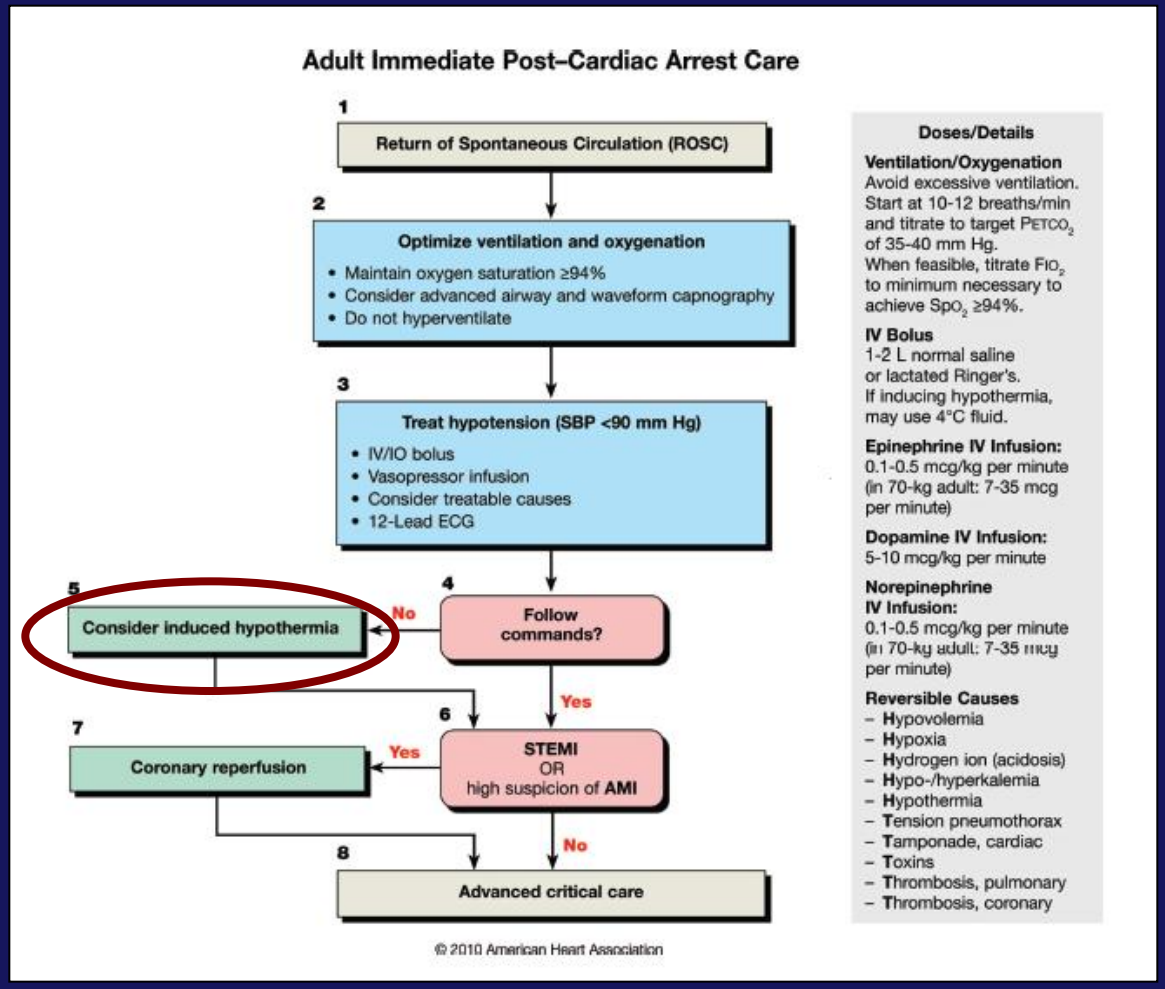
Diagnosi SCA - NSTEMI

Altre Diagnosi

Emodinamica
Coronarografia in emergenza (+ PCI)

Rianimazione

AHA Guidelines 2010



AHA guidelines for CPR and ECC. Circulation 2010; 122: S768-S786

Therapeutic hypothermia

Therapeutic Hypothermia:
First trials

TABLE 2. NEUROLO

OUTCOME

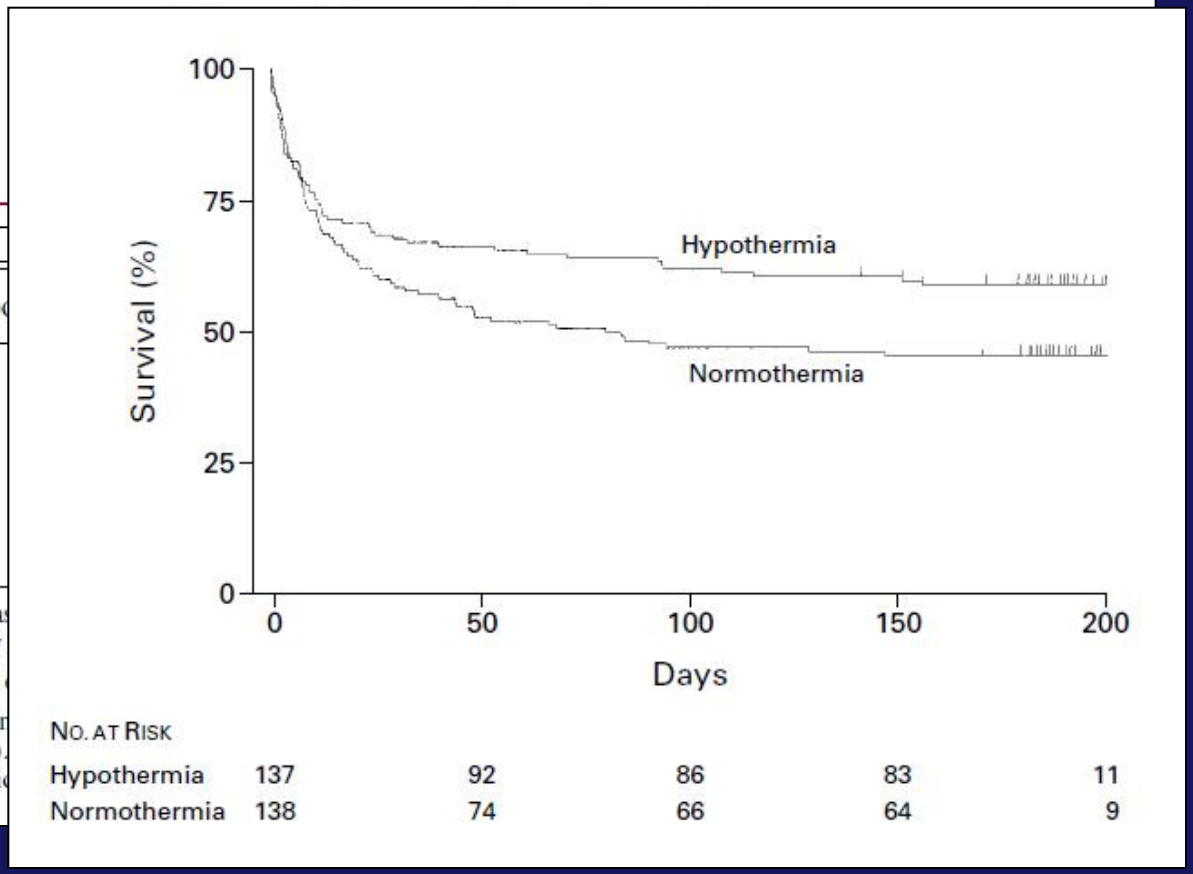
Favorable neurologic outcome‡

Death

*The risk ratio was calculated a
the hypothermia group divided by

†Two-sided P values are based

‡A favorable neurologic outcor
covery) or 2 (moderate disability).
mia group were lost to neurologi



Hypothermia After Cardiac Arrest (HACA) Study Group. NEJM 2002; 346: 549-556

Therapeutic Hypothermia post OHCA neuroprotection

VOLUME 38, NUMBER 6 — NOVEMBER-DECEMBER, 1959 423

THE USE OF HYPOTHERMIA AFTER CARDIAC ARREST

DONALD W. BENSON, M.D.
G. RAINEY WILLIAMS, JR., M.D.
FRANK C. SPENCER, M.D.
ADOLPH J. YATES, M.D. Baltimore, Maryland*

Anesthesia and Analgesia 1959;38 (6): 423

273 ROSC pts. post OHCA (FV/TV)

RCT's: IHypothermia (32-34° C) vs normothermia

Mortality reduction

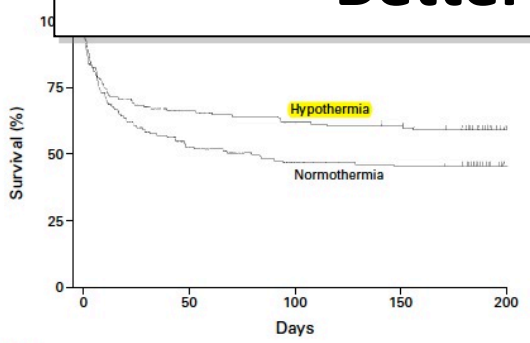
Better neurological outcome

Non randomized trials

TABLE 2. NEUROLOGIC OUTCOME AND MORTALITY AT SIX MONTHS.

OUTCOME	NORMOTHERMIA	HYPOTHERMIA	RISK RATIO (95% CI)*	P VALUE†
	no./total no. (%)			
Favorable neurologic outcome‡	54/137 (39)	75/136 (55)	1.40 (1.08–1.81)	0.009
Death	76/138 (55)	56/137 (41)	0.74 (0.58–0.95)	0.02

*The risk ra
the hypotherm
†Two-sided
‡A favorable
covery) or 2 (r
mia group wer



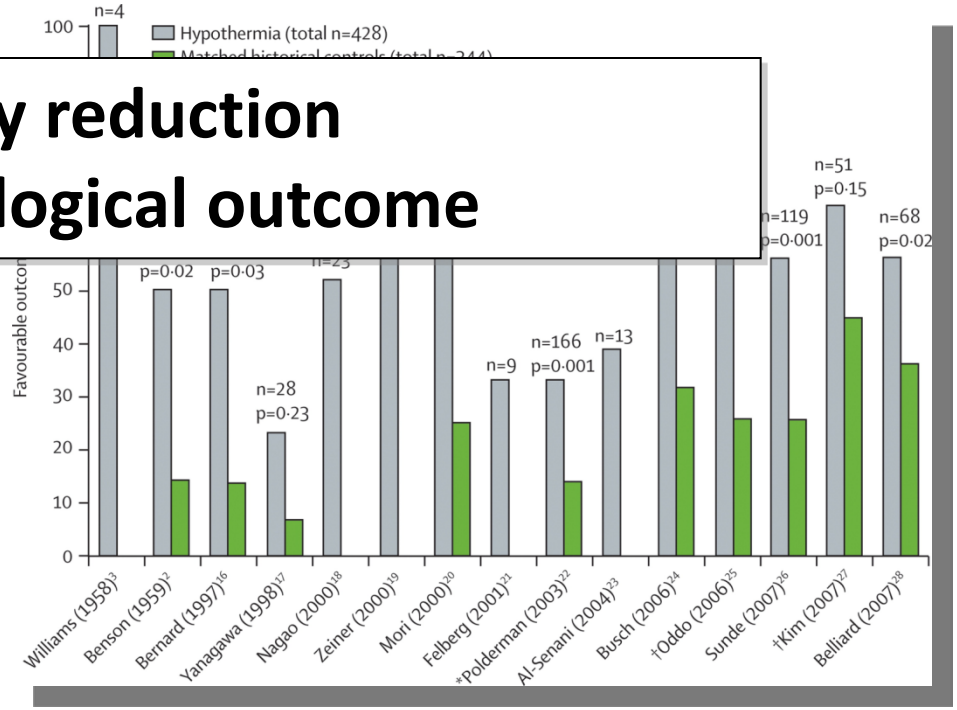
NO. AT RISK

Hypothermia	137	92	86	83	11
Normothermia	138	74	66	64	9

Figure 2. Cumulative Survival in the Normothermia and Hypothermia Groups. Censored data are indicated by tick marks.

HACA study group

N Engl J Med 2002; 346: 549-556



Polderman KH. *Lancet* 2008; 371:1955-1969

Early and Rapid Induction

Therapeutic Hypothermia After Out-of-Hospital Cardiac Arrest

Evaluation of a Regional System to Increase Access to Cooling

Michael R. Mooney, MD; Barbara T. Unger, RN; Lori L. Boland, MPH;
M. Nicholas Burke, MD; Kalie Y. Kebed, BS; Kevin J. Graham, MD; Timothy D. Henry, MD;
William T. Katsiyiannis, MD; Paul A. Satterlee, MD; Sue Sendelbach, PhD, RN, CCNS;
James S. Hodges, PhD; William M. Parham, MD

Increased mortality of 20% for each hour of delay in initiating therapeutic hypothermia

Circulation 2011; 124: 206-214

Holzer M. NEJM 2010; 363: 1256-1264

Therapeutic Hypothermia

MARTEDÌ 9 LUGLIO 2013 il Resto del Carlino

IL FREDDO SALVAVITA

IL KIT PERMETTE DI ATTUARE UN TRATTAMENTO IN IPOTERMIA, CIOÈ RAFFREDDA L'ORGANISMO FINO A 32-34 ° PER TENERE A RIPOSO IL CERVELLO

I VANTAGGI

PERMETTE AI CARDIOLOGI DI INTERVENIRE SUBITO SULLE CORONARIE, SALVAGUARDANDO PER PIÙ TEMPO DALLA SCARSA OSSIGENAZIONE

Partono i soccorsi — ore 9.30

Parte un'ambulanza e subito dopo, avuto qualche particolare in più, un'automedica Intanto all'uomo viene praticato un messaggio cardiaco da una persona presente. Alle 9.48 i soccorsi sono sul posto

Defibrillato e 'congelato' — ore 9.48

Il giovane viene defibrillato, stabilizzato e intubato. Poi viene avviata la procedura di ipotermia per abbassare la temperatura a 35°: viene usato un kit adesivo speciale

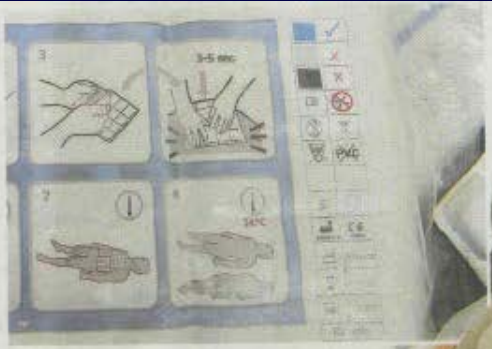
L'arrivo al Maggiore — ore 10.47

Il paziente è accolto all'unità di Emodinamica dell'ospedale Maggiore: la sua temperatura è scesa a 33° e la coronarografia non evidenzia danni alle coronarie

Il risveglio il giorno dopo

Dopo una giornata in Rianimazione in ipotermia al risveglio è accolto nella Utic, dove sono attualmente in corso gli esami per approfondire la natura dell'arresto cardiaco e stabilire la terapia

LA TECNICA
A sinistra, Giuseppe Di Pasquale, direttore dell'Unità Operativa di Cardiologia del Maggiore
A destra, il nuovissimo kit adesivo di raffreddamento utilizzato dal 118 Bologna Soccorso



Ha un malore: congelato per salvarlo

Il kit per l'ipotermia usato su un uomo in arresto cardiaco. Primo caso

di VALERIO BARONCINI e GILBERTO DONDI

STAVA per morire a causa di un arresto cardiaco che l'aveva colpito mentre sosteneva un esame post universitario. Invece il ragazzo, 27 anni, è stato salvato grazie a un'innovativa tecnica con cui i medici del Maggiore l'hanno 'congelato'. Ora il giovane sta benissimo, non ha riportato danni neurologici e il suo caso è il primo in Italia di questo tipo. Sì, perché è stato impiegato un kit di raffreddamento 'a placche' che in Italia ha solo l'ospedale Maggiore e che

damentale perché fa affluire meno sangue al cervello del paziente, rallentando così l'attività e, in sostanza, facendolo 'consumare di meno'. In questo modo si riducono i possibili danni cerebrali.

LA VICENDA è avvenuta la settimana scorsa in un paese della prima cintura bolognese e si è risolta positivamente grazie alla sinergia fra il 118, la rianimazione e la cardiologia dell'Ausl. Il ragazzo stava sostenendo un esame di abilitazione professionale quando è stato colto da un malore ed è anda-

do di praticare il massaggio cardiaco che si è messa subito all'opera, salvandogli (la prima volta) la vita. La chiamata al 118 è partita alle 9,30 e gli operatori dell'ambulanza e dell'automedica dopo 18 minuti erano già sul posto. Il giovane è stato trattato con il defibrillatore e intubato poi, prima del trasporto al Maggiore, i medici hanno utilizzato la nuova tecnica per l'ipotermia. Hanno applicato al paziente 7-8 placche adesive rettangolari, contenenti un gel speciale in grado di ridurre velocemente la temperatura corporea. E

no fra i 32 e i 34 gradi il livello da raggiungere. Prima servivano spesso oltre quattro ore con i metodi tradizionali, come spugnature di ghiaccio e alcol. Invece, grazie all'innovativo kit di produzione austriaca, i medici hanno ottenuto l'obiettivo in tempi rapidissimi, facendo nel frattempo tutto il resto: manovre rianimatorie, trasporto in ambulanza e ricovero in ospedale.

UNA VOLTA arrivato al Maggiore, il ragazzo è stato sottoposto a coronarografia, che ha escluso danni alle coronarie (dunque non si è trat-

PreHospital Induction

Original Investigation

Effect of Prehospital Induction of Mild Hypothermia on Survival and Neurological Status Among Adults With Cardiac Arrest
A Randomized Clinical Trial

Francis Kim, MD; Graham Nichol, MD, MPH; Charles Maynard, PhD; Al Hallstrom, PhD; Peter J. Kudenchuk, MD; Thomas Rea, MD, MPH; Michael K. Copass, MD; David Carlbom, MD; Steven Deem, MD; W. T. Longstreth Jr, MD; Michele Olsufka, RN; Leonard A. Cobb, MD

Although use of prehospital cooling reduced core temperature
by hospital arrival and reduced the time to reach a temperature of 34°C, it did not improve survival or neurological status.

JAMA 2014

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

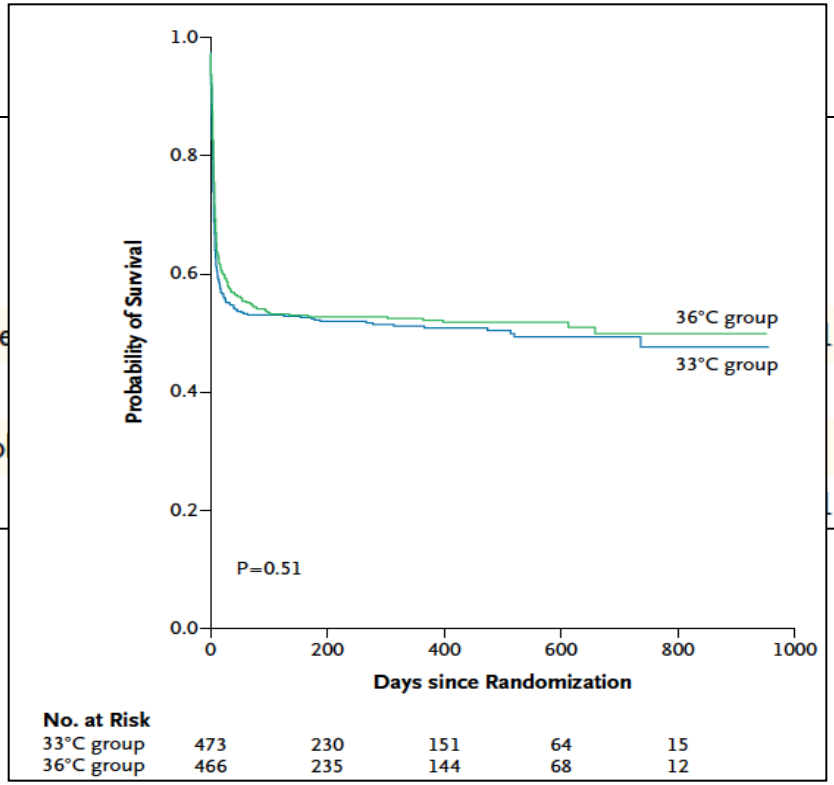
Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest

Niklas Nielsen, M.D., Ph.D., Jørn Wetterslev, M.D., Ph.D., Tobias Cronberg, M.D., Ph.D., David Erlinge, M.D., Ph.D., Yvan Gasche, M.D., Christian Hassager, M.D., D.M.Sci., Janneke Horn, M.D., Ph.D., Jan Hovdenes, M.D., Ph.D., Jesper Kjaergaard, M.D., D.M.Sci., Michael Kuiper, M.D., Ph.D., Tommaso Pellis, M.D., Pascal Stammet, M.D., Michael Wanscher, M.D., Ph.D., Matt P. Wise, M.D., D.Phil., Anders Åneman, M.D., Ph.D., Nawaf Al-Subaie, M.D., Søren Boesgaard, M.D., D.M.Sci., John Bro-Jeppesen, M.D., Iole Brunetti, M.D., Jan Frederik Bugge, M.D., Ph.D., Christopher D. Hingston, M.D., Nicole P. Juffermans, M.D., Ph.D., Matty Koopmans, R.N., M.Sc., Lars Køber, M.D., D.M.Sci., Jørund Langørgen, M.D., Gisela Lilja, O.T., Jacob Eifer Møller, M.D., D.M.Sci., Malin Rundgren, M.D., Ph.D., Christian Rylander, M.D., Ph.D., Ondrej Smid, M.D., Christophe Werer, M.D., Per Winkel, M.D., D.M.Sci., and Hans Friberg, M.D., Ph.D., for the TTM Trial Investigators*

ORIGINAL ARTICLE

Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest

Outcome	Hazard Ratio or Risk Ratio (95% CI)*	P Value
Primary outcome: deaths at e	.06 (0.89–1.28)	0.51
Secondary outcomes		
Neurologic function at fo		
CPC of 3–5	.02 (0.88–1.16)	0.78



Nielsen N. et al. NEJM 2013

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest

Niklas Nielsen, M.D., Ph.D., Jørn Wetterslev, M.D., Ph.D., Tobias Cronberg, M.D., Ph.D., David Erlinge, M.D., Ph.D., Yvan Gasche, M.D., Christian Hassager, M.D., D.M.Sci., Jan Frederik Bugge, M.D., Ph.D., Christopher D. Hingston, M.D., Nicole P. Juffermans, M.D., Ph.D., Matty Koopmans, R.N., M.Sc., Lars Køber, M.D., D.M.Sci., Jørund Langørgen, M.D., Gisela Lilja, O.T., Jacob Eifer Møller, M.D., D.M.Sci., Malin Rundgren, M.D., Ph.D., Christian Rylander, M.D., Ph.D., Ondrej Smid, M.D., Christophe Werer, M.D., Per Winkel, M.D., D.M.Sci., and Hans Friberg, M.D., Ph.D., for the TTM Trial Investigators*

In unconscious survivors of out-of-hospital cardiac arrest of presumed cardiac cause, hypothermia at a targeted temperature of 33°C did not confer a benefit as compared with a targeted temperature of 36°C.

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIAL

Temperature Management and Modern Post–Cardiac Arrest Care

Jon C. Rittenberger, M.D., and Clifton W. Callaway, M.D., Ph.D.

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIAL

Temperature Management and Modern Post–Cardiac Arrest Care

Jon C. Rittenberger, M.D., and Clifton W. Callaway, M.D., Ph.D.

The most important message to take from this trial is that modern, aggressive care that includes **attention to temperature** works, making survival more likely than death when a patient is hospitalized after CPR

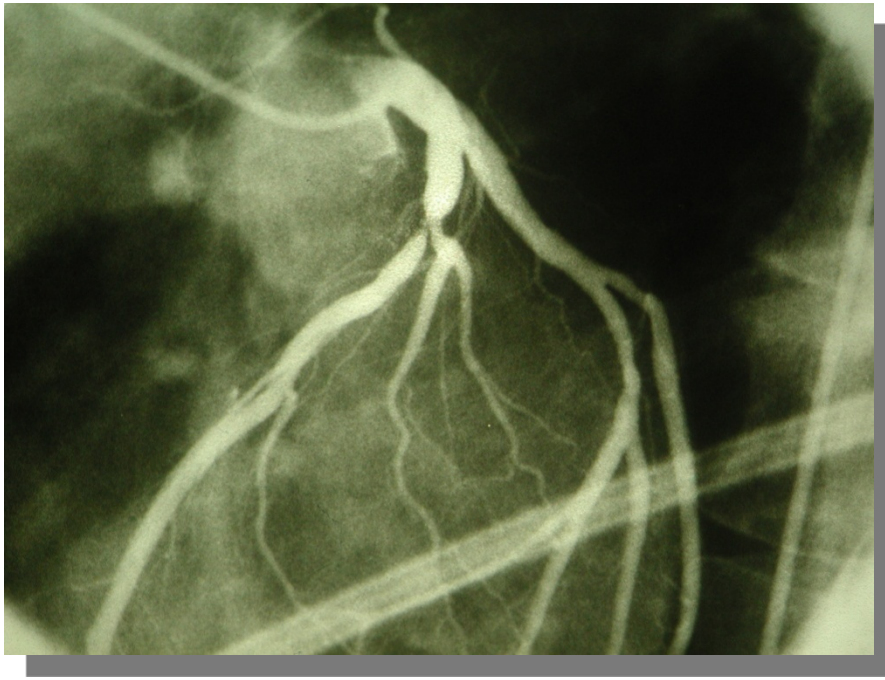
IMMEDIATE CORONARY ANGIOGRAPHY IN SURVIVORS OF OUT-OF-HOSPITAL CARDIAC ARREST

CHRISTIAN M. SPAULDING, M.D., LUC-MARIE JOLY, M.D., ALAIN ROSENBERG, M.D., MEHRAN MONCHI, M.D., SIMON N. WEBER, M.D., JEAN-FRANÇOIS A. DHAINAUT, M.D., PH.D., AND PIERRE CARLI, M.D.

Acute coronary artery occlusion is frequent in survivors of out of hospital cardiac arrest

Urgent coronary angiography (84 pz)

Normal coronary arteries	**17 (20%)**
CAD insignificant	**7 (8%)**
CAD significant	**60 (71%)**
Single vessel disease	**22**
Multivessel	**37**
TC	**1**
Coronary occlusion	**40 (48%)**

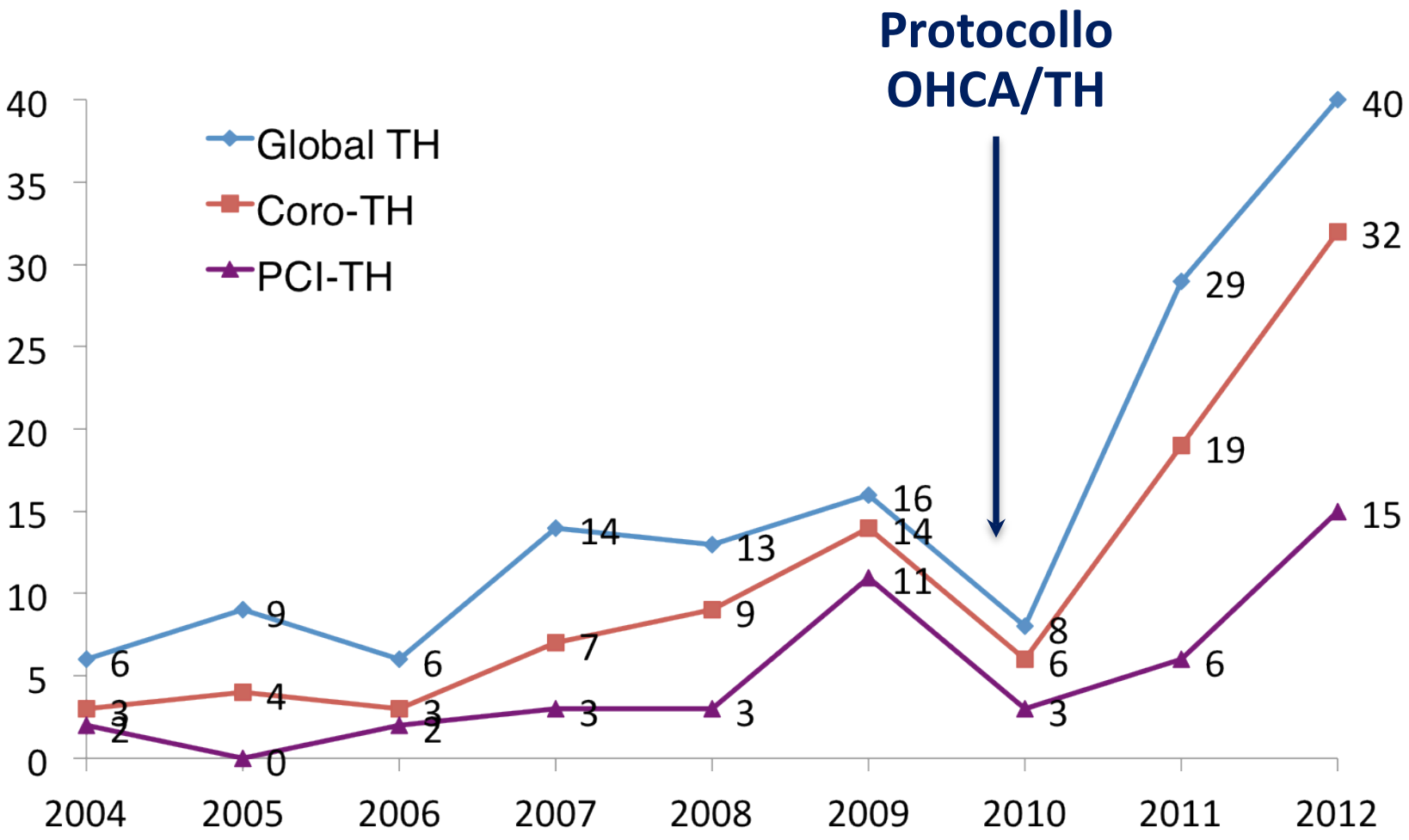


In the 42% of case STEMI on ECG post-ROSC

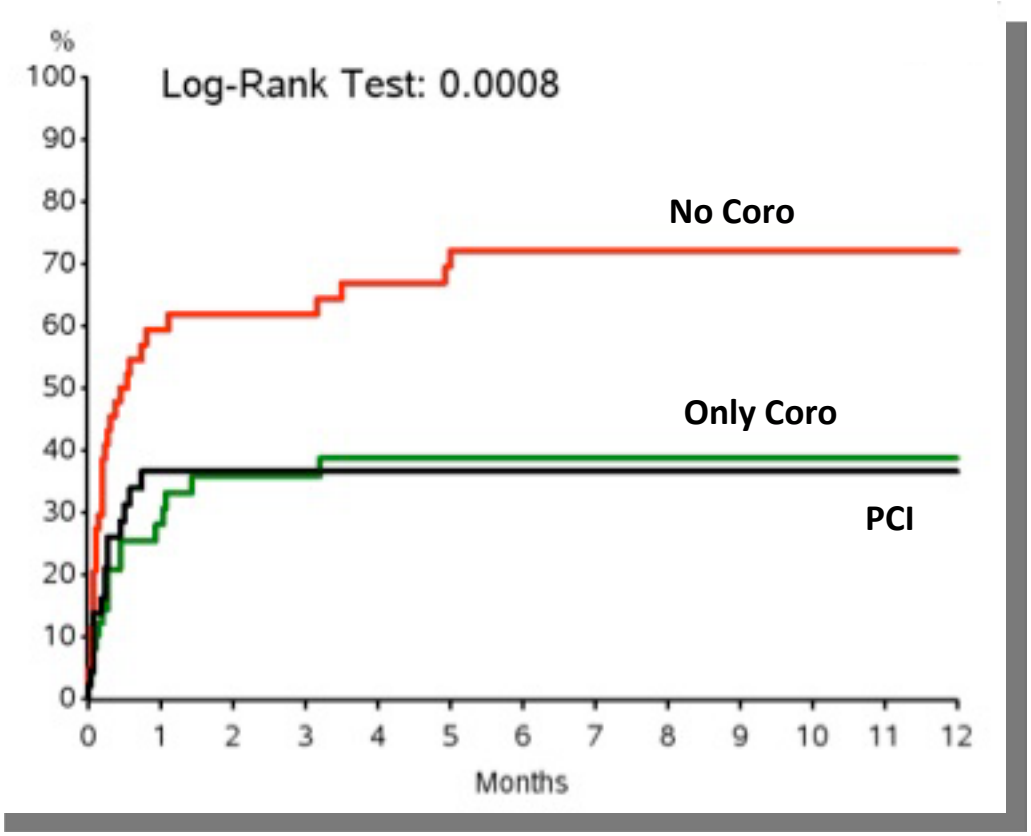
Spaulding CM, et al. *N Engl J Med* 1997; 336: 1629-1633

Therapeutic hypothermia and coronary angiography

Bologna Maggiore Hosp Experience

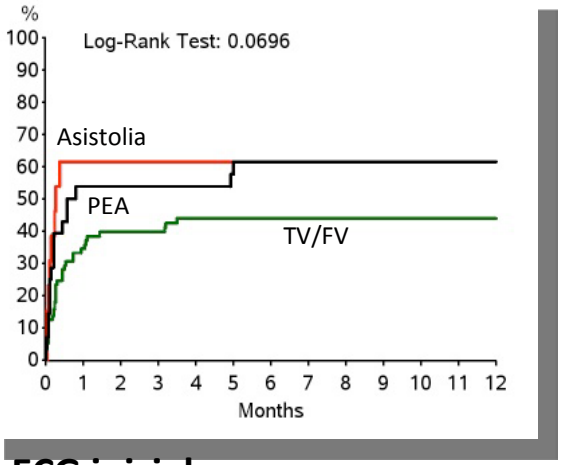


Emergency coronary angiography /PCI in the setting of OHCA

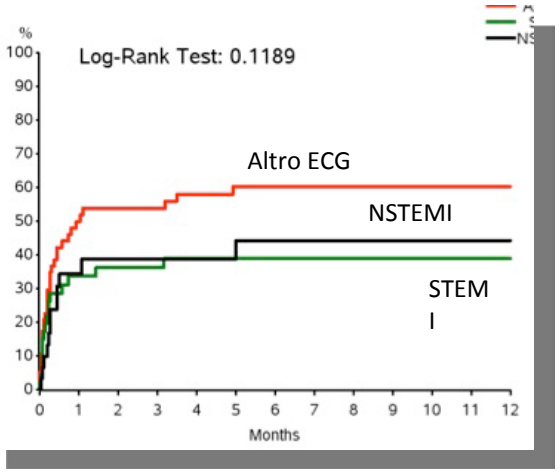


Period of the study: 27/03/2004 – 31/12/2012

Ritmo iniziale



ECG iniziale



Post-cardiac Arrest Syndrome

- Anoxic brain injury
- Myocardial dysfunction
- Systemic ischemic / reperfusion response
- Persistent precipitating pathology

Nolan JP et al, Resuscitation 2008; 79: 350-379

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Post-arrest haemodynamic instability

Nolan JP et al, Resuscitation 2008; 79: 350-379

Management of postcardiac arrest myocardial dysfunction

Wulfran Bougouin[a,b,c] *and Alain Cariou*[a,b,c]

*"Rappresenta una **forma particolare di stunning** miocardico che porta ad una disfunzione miocardica grave ma reversibile"*

Curr Opin Crit Care 2013; 19: 195-201

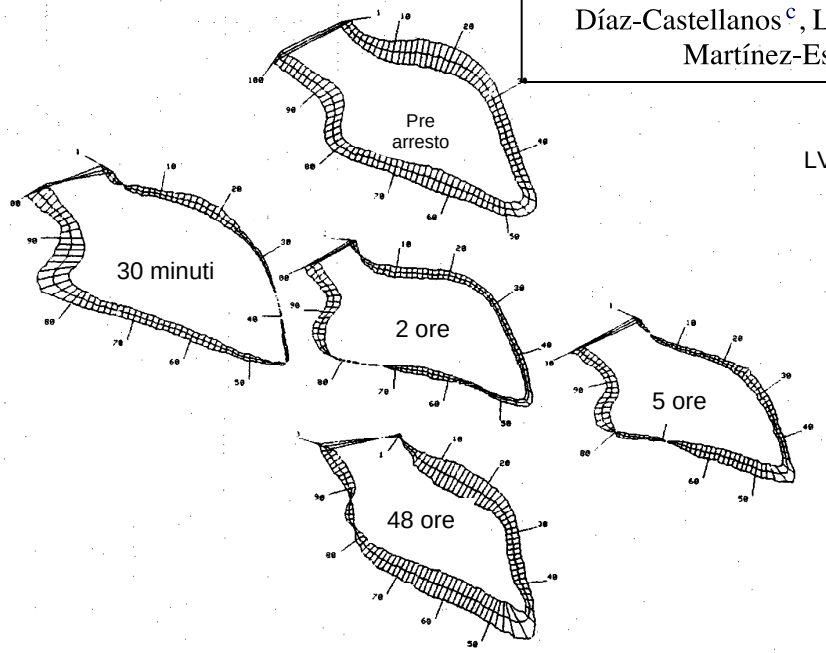
Timing and reversibility of systolic dysfunction

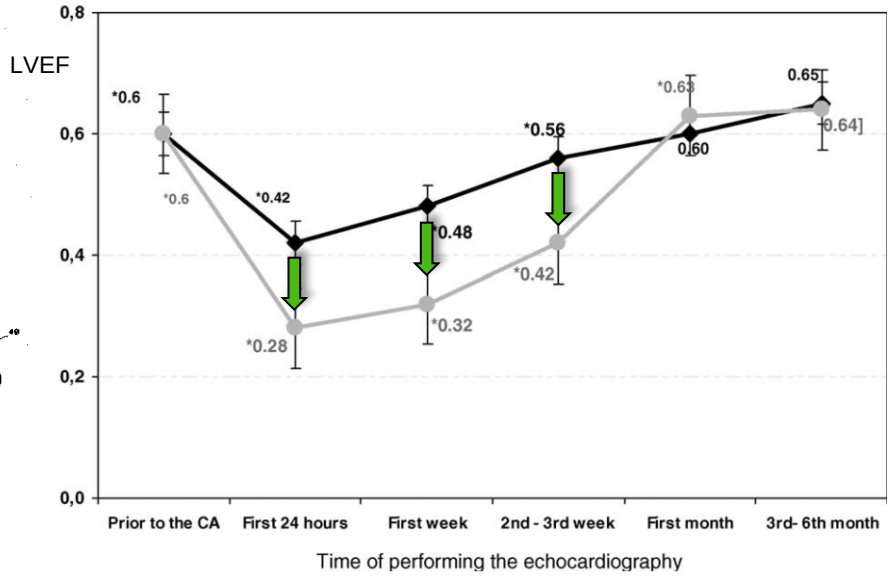
Myocardial Dysfunction After Resuscitation From Cardiac Arrest: An Example of Global Myocardial Stunning

KARL B. KERN, MD, FACC, RONALD W. HILWIG, DVM, PHD,* KYOO H. RHEE, MD, ROBERT A. BERG, MD

Reversible myocardial dysfunction after cardiopulmonary resuscitation☆

Manuel Ruiz-Bailén[a, *], Eduardo Aguayo de Hoyos[b], Silvia Ruiz-Navarro[a], Miguel Ángel Díaz-Castellanos[c], Luis Rucabado-Aguilar[a], Francisco Javier Gómez-Jiménez[d], Sergio Martínez-Escobar[e], Rafael Melgares Moreno[f], Javier Fierro-Rosón[c]





JACC 1996; 28: 232-240
Resuscitation 2005; 66: 175-181

COINVOLGIMENTO VASCOLARE POST ARRESTO CARDIACO

Postresuscitation disease after cardiac arrest: a sepsis-like syndrome?

Christophe Adrie,[a] Ivan Laurent,[b] Mehran Monchi,[b] Alain Cariou,[c] Jean-François Dhainaou[c] and Christian Spaulding[d]

Conclusion

The postresuscitation phase after out-of-hospital cardiac arrest is characterized by a systemic inflammatory response similar to that observed in other systemic inflammatory conditions such as severe sepsis.

L'insufficienza circolatoria post arresto cardiaco è aggravata da un concomitante stato vasoplegico che impone l'utilizzo di vasopressori e infusione di liquidi

Curr Opin Crit Care 2004; 10: 208-212
JACC 2002; 40: 2110-2116

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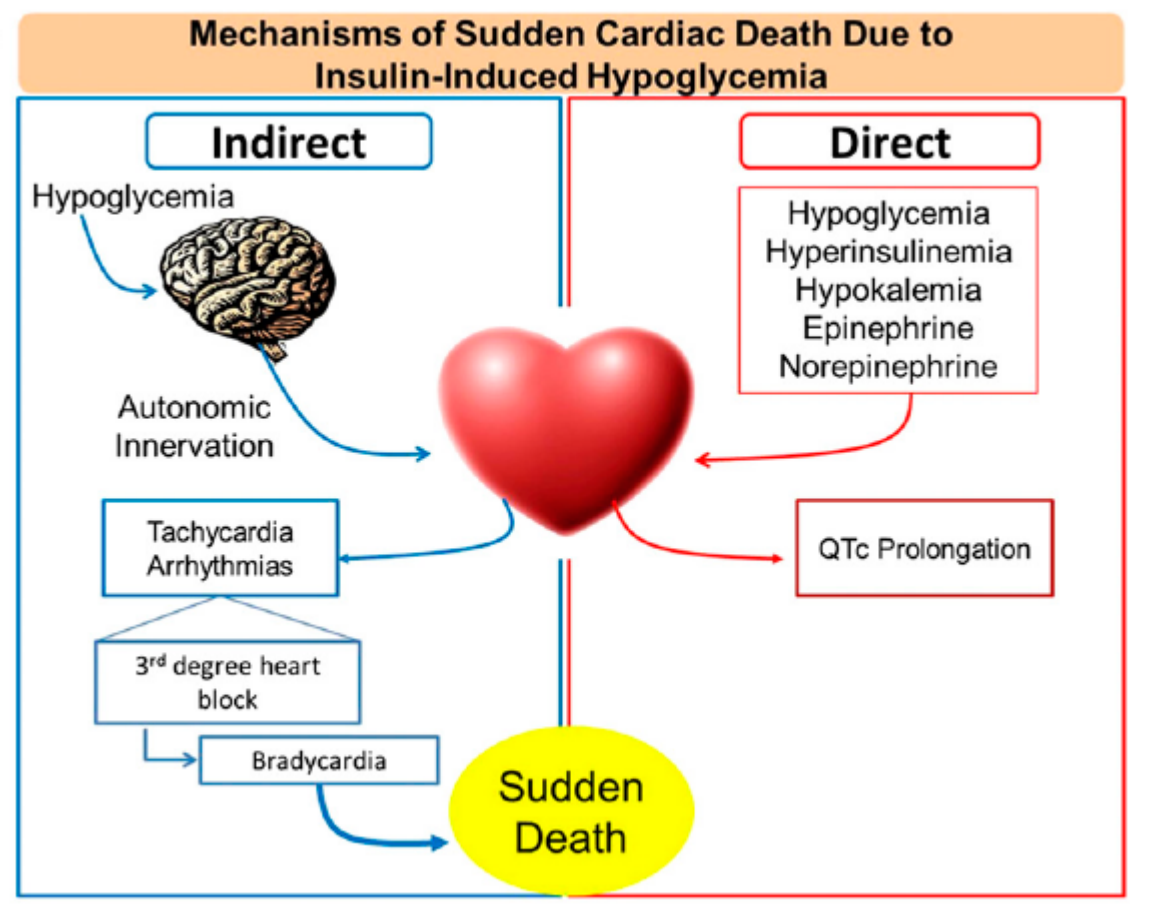
ORIGINAL ARTICLE

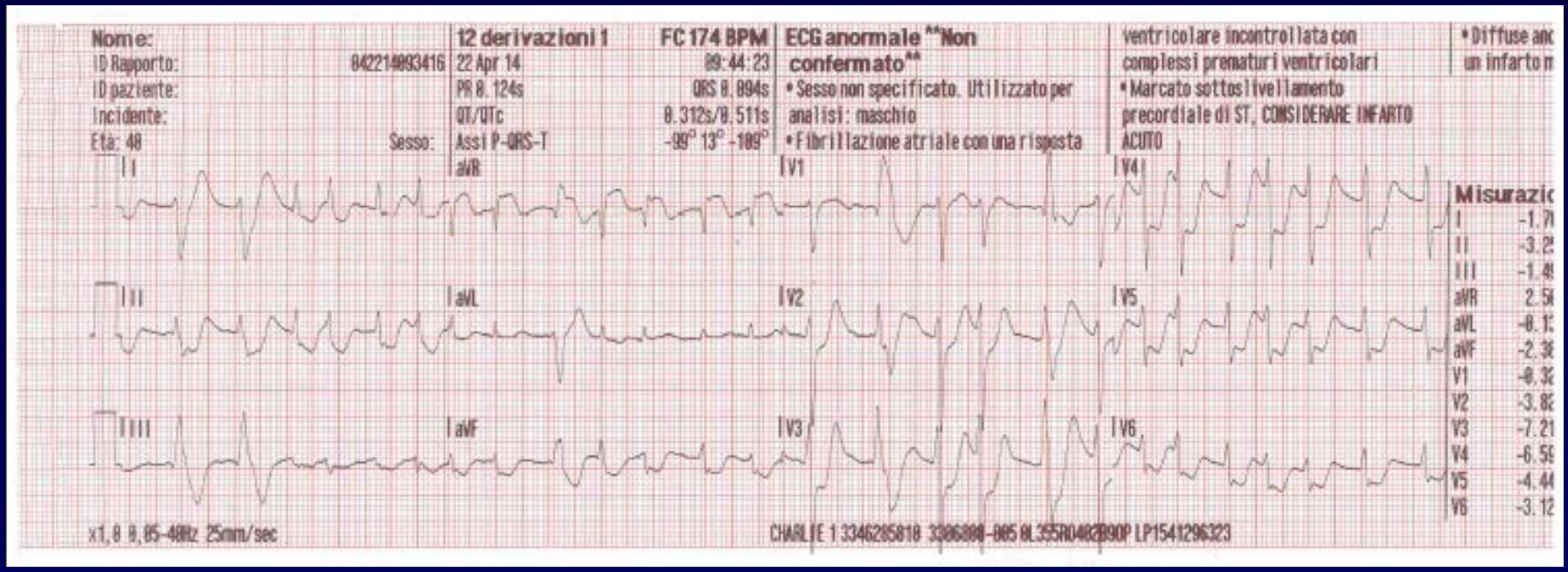
Severe Hypoglycemia–Induced Lethal Cardiac Arrhythmias Are Mediated by Sympathoadrenal Activation

Candace M. Reno,[1] Dorit Daphna-Iken,[1] Y. Stefanie Chen,[1] Jennifer VanderWeele,[1] Krishan Jethi,[1] and Simon J. Fisher[1,2]

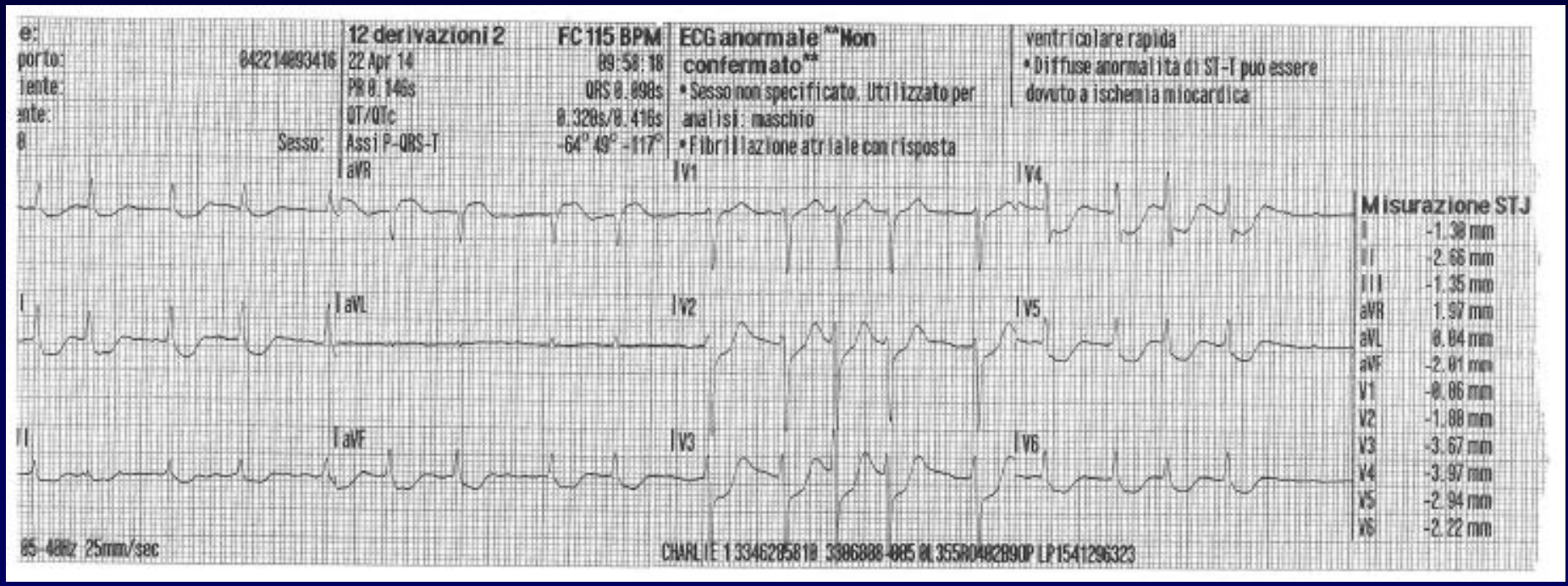


Diabetes 2013;62:3570-81

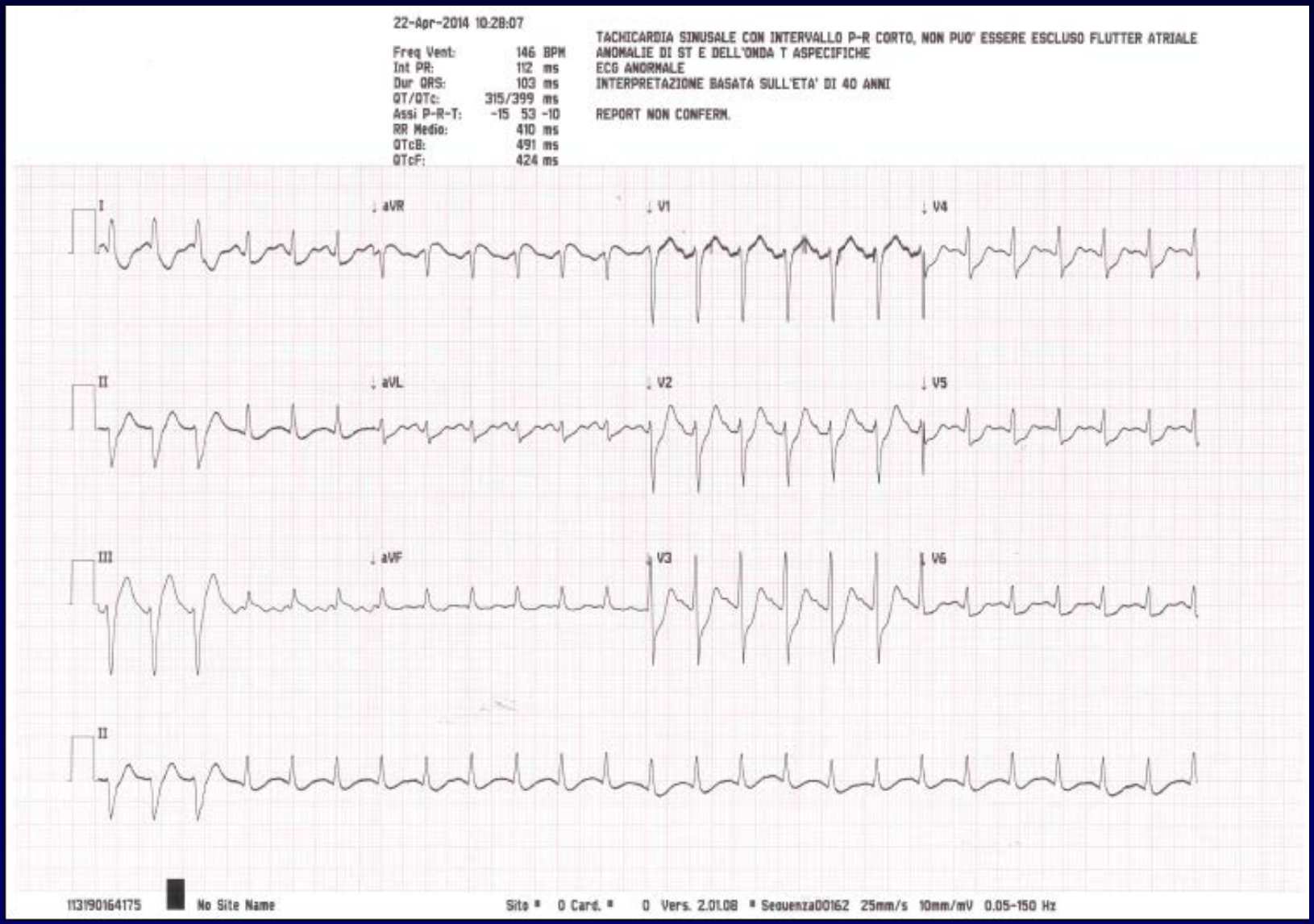
Man, 45 years old, physiotherapist, regular physical activity
Witnessed cardiac arrest, rhythm onset: PEA



After ROSC


e:
porto:
ente:
nte:
0
842214693416
Sesso:
12 derivazioni 2
22 Apr 14
PR 0.146s
QT/QTc
Assi P-QRS-T
aVR
FC 115 BPM
09:58:18
QRS 0.098s
0.320s/0.416s
-64° 49° -117°
ECG anormale **Non confermato**
• Sesso non specificato. Utilizzato per analisi: maschio
• Fibrillazione atriale con risposta ventricolare rapida
• Diffuse anormalità di ST-T può essere dovuto a ischemia miocardica
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
Misurazione STJ
I -1.38 mm
II -2.66 mm
III -1.35 mm
aVR 1.97 mm
aVL 0.04 mm
aVF -2.01 mm
V1 -0.86 mm
V2 -1.88 mm
V3 -3.67 mm
V4 -3.97 mm
V5 -2.94 mm
V6 -2.22 mm
85 40Hz 25mm/sec
CHARLIE 1 3346285818 3386888 005 0L 355R0402B90P LP1541296323

At hospital arrival



How to Improve Survival After OHCA

Key Areas for the Next 10 Years

- Identification of high-risk patients

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- Determining which patients should undergo immediate coronary angiography
- Determine the importance of ECMO during CPR