IRC 2021
CONGRESSO NAZIONALE
16•17•18 DICEMBRE

NUOVE LINEE GUIDA 2021:
RIANIMAZIONE CARDIOPOLMONARE
POST-LOCKDOWN

IRC | Italian Resuscitation Council

ARRESTO CARDIACO IN SALA OPERATORIA

GABRIELLA ARLOTTA
Cardioanestesia e Terapia Intensiva Cardiochirurgica
Fondazione Policlinico Universitario A.Gemelli IRCCS, Roma

Perioperative cardiac arrest in the operating room environment: a review of the literature

Jochen HINKELBEIN [1] *, Janusz ANDRES [2], Karl-Christian THIES [3], Edoardo DE ROBERTIS [4]

Minerva Anestesiologica 2017 November;83(11):1190-8
DOI: 10.23736/S0375-9393.17.11802-X

"*No patient whose death is preventable should die in an operating room or in a hospital – ever*" wrote William R. Berry in his editorial in the Canadian Journal of Anaesthesia in the year 2012.

The Incidence and Risk Factors for Perioperative Cardiac Arrest Observed in the National Anesthesia Clinical Outcomes Registry (Anesth Analg 2015;120:364–70)

Mark E. Nunnally, MD, FCCM,* Michael F. O'Connor, MD, FCCM,* Hubert Kordylewski, PhD,† Benjamin Westlake, BS,† and Richard P. Dutton, MD, MBA*†

Cases from practices which report outcomes
N = 1,691,472

Total Incidents of Cardiac Arrest	Cardiac Arrest Survivors	Cardiac Arrest Resulting in Death
N = 951	N = 396	N = 555

58,4% mortality

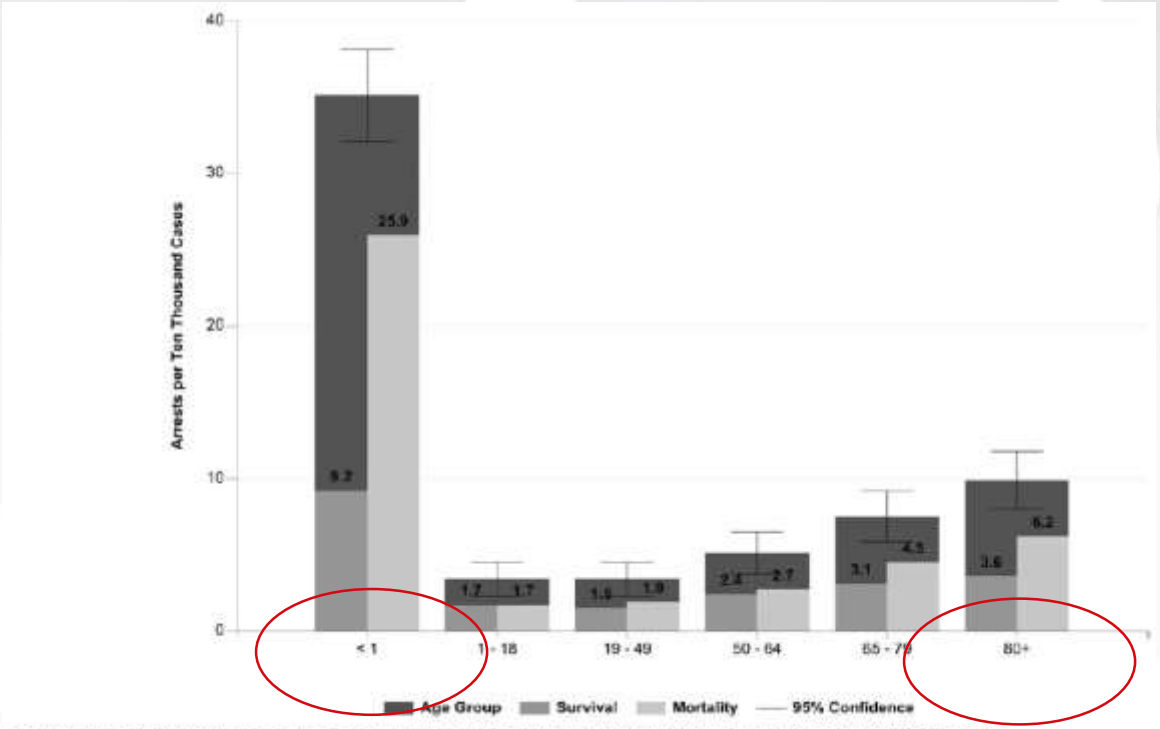


Figure 2. Cardiac arrest data by age group subdivided by outcome, expressed as arrests per 10,000 cases.

Italian Resuscitation Council

Table 2. Distribution of Arrests by Anatomic Region or Type of Surgery, Based on Individual Case Descriptions

Region	Cardiac arrests	Cases count	Percent of cardiac arrests	Cardiac arrests as percent of total population	Cardiac arrests as percent of patients undergoing surgery in this region
Upper abdomen	405	328,350	15.75	12.00	0.12
Intrathoracic	377	108,530	14.66	4.00	0.35
Lower abdomen	342	362,647	13.30	13.30	0.09
Head	209	329,209	8.13	12.10	0.06
Neck	175	91,099	6.81	3.30	0.19
Unknown	154	405,566	5.99	14.90	0.04
Upper leg (except knee)	141	70,843	5.48	2.60	0.20
Radiological procedures	124	67,316	4.82	2.50	0.18
Perineum	115	203,282	4.47	7.40	0.06
Thorax (chest wall and shoulder girdle)	87	135,472	3.38	5.00	0.06
Knee and popliteal area	76	155,034	2.96	5.70	0.05
Spine and spinal cord	71	78,334	2.76	2.90	0.09
Forearm, wrist, and hand	67	104,644	2.61	3.80	0.06
Anesthesia care not required	66	42,810	2.57	1.60	0.15
Lower leg (below knee, includes ankle and foot)	36	79,884	1.40	2.90	0.05
Shoulder and axilla	30	69,009	1.17	2.50	0.04
Unlisted code	28	23,310	1.09	0.90	0.12
Other procedures	17	3324	0.66	0.10	0.51
Unknown	16	37,447	0.62	1.40	0.04
Burn excisions or debridement	13	546	0.51	0.00	2.38
Upper arm and elbow	12	18,248	0.47	0.70	0.07
Pelvis (except hip)	8	6585	0.31	0.20	0.12
Radioloical services	2	1888	0.08	0.10	0.11

Rimini IRC 2021 CONGRESSO NAZIONALE 16•17•18 DICEMBRE NUOVE LINEE GUIDA 2021: RIANIMAZIONE CARDIOPOLMONARE POST-LOCKDOWN

Perioperative and anaesthetic-related mortality in developed and developing countries: a systematic review and meta-analysis

Daniel Bainbridge, Janet Martin, Miguel Arango, Davy Cheng, for the Evidence-based Peri-operative Clinical Outcomes Research (EPiCOR) Group

Han et al. Medicine (2017) 96:17

	Event rate per million (95%CI)		RR (95%CI)	p for subgroup interaction
	ASA grade 1–3	ASA grade 4–5		
Mortality	4793 (4533–5068)	93 268 (88 986–97 735)	48 (42–53)	<0·00001
Cardiac arrest	2114 (1925–2328)	86 830 (79 255–95 054)	61 (50–72)	<0·00001
Mortality or cardiac arrest	3887 (3704–4078)	91 865 (88 108–95 766)	50 (47–53)	<0·00001

ASA=American Society of Anesthesiologists. RR=relative risk of adverse outcome for patients with ASA grade 4–5 *vs* ASA grade 1–3.

Table 3: **Mortality or cardiac arrest by high versus low American Society of Anesthesiologists subgroup**

Intraoperative cardiac arrest

A 10-year study of patients undergoing tumorous surgery in a tertiary referral cancer center in China

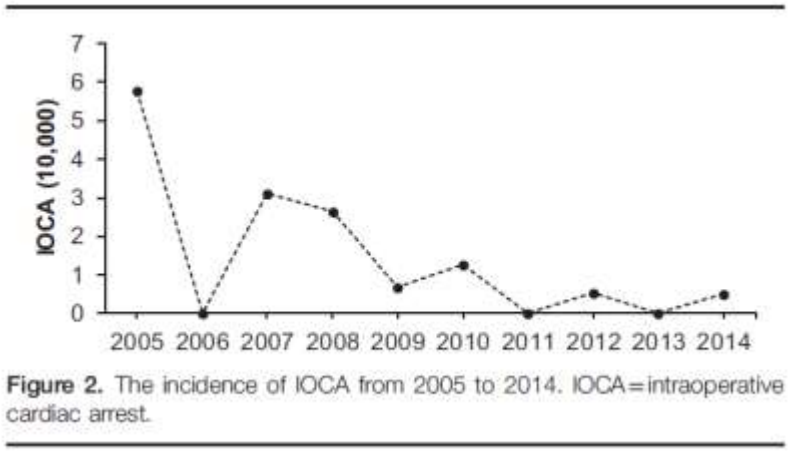


Figure 2. The incidence of IOCA from 2005 to 2014. IOCA=intraoperative cardiac arrest.

IRC Italian Resuscitation Council

RESEARCH ARTICLE

Incidence and prediction of intraoperative and postoperative cardiac arrest requiring cardiopulmonary resuscitation and 30-day mortality in non-cardiac surgical patients

Heiko A. Kaiser[1,2], Nahel N. Saied[3], Andreas S. Kokoefer[1,4], Lina Saffour[1], Jonathan K. Zoller[1], Mohammad A. Helwani[1]*

Plos One 2020; 22: 1-14

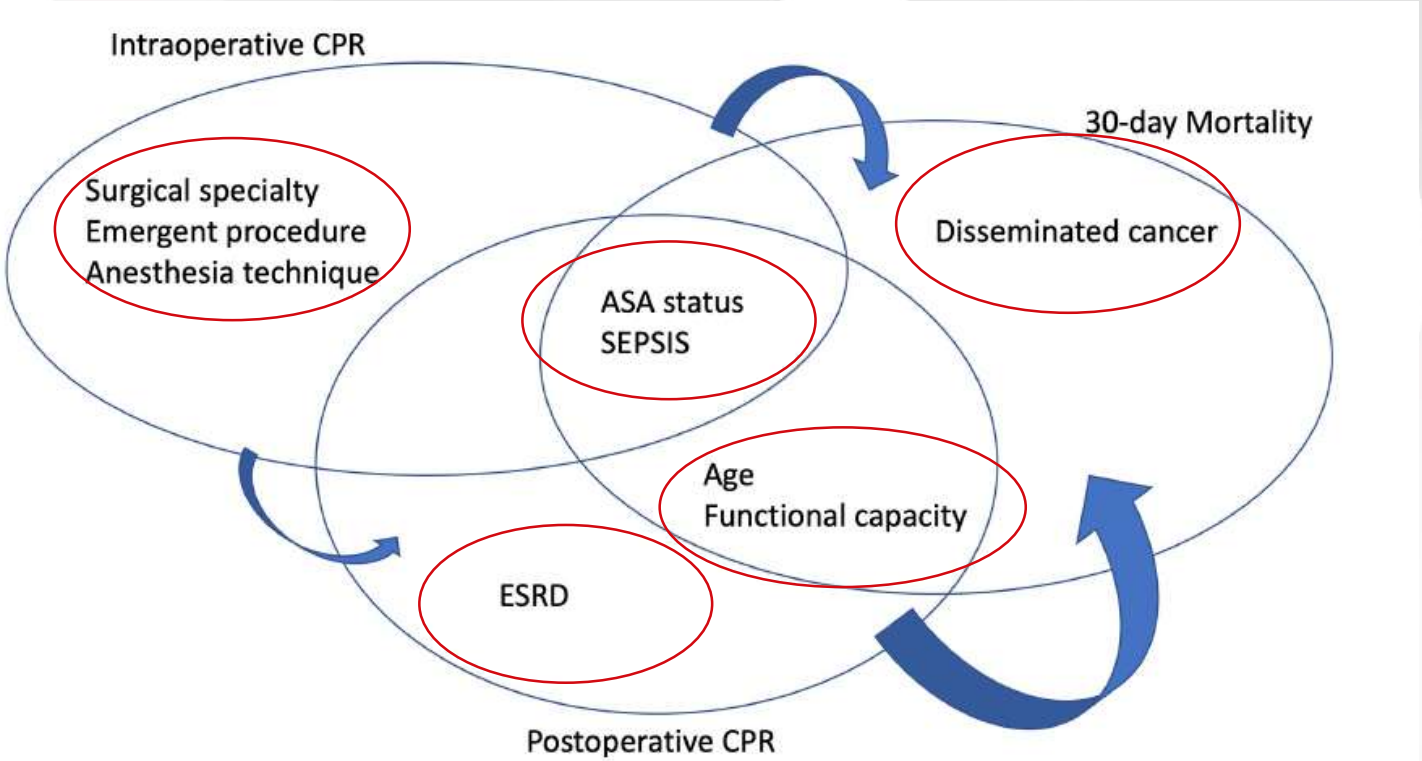


Fig 2. Schematic summary of the 5 main factors for prediction of intraoperative CPR, postoperative CPR and 30-day mortality.

Results

Among about 1.86 million non-cardiac operations, the incidence rate of intraoperative CPR was 0.03%, and for postoperative CPR was 0.33%. The 30-day mortality incidence rate was 1.25%. The incidence rate of events decreased overtime between 2008–2012. Of the 29

Perioperative cardiac arrest in the operating room environment: a review of the literature

Jochen HINKELBEIN [1 *], Janusz ANDRES [2], Karl-Christian THIES [3], Edoardo DE ROBERTIS [4]

Minerva Anestesiologica 2017 November;83(11):1190-8
DOI: 10.23736/S0375-9393.17.11802-X

TABLE I.—*Common situations and problems associated with perioperative cardiac arrests in adults [modified from Moitra* et al.*[3]].*

Anesthesia-related problems
– Anesthetic drug overdose (*e.g.*, inhalation or intravenous)
– Neuraxial block with sympathicolysis
– Systemic toxicity of local anaesthetic drugs
– Malignant hyperthermia
– Drug administration errors (*e.g.*, dosage)
Respiratory problems
– Hypoxemia
– Severe bronchospasm
Cardiovascular problems
– Vasovagal reflex (*e.g.*, bradycardia, asystoly)
– Hypovolemic and/or hemorrhagic shock
– Gas embolism
– Acute electrolyte imbalance (high K+, low Ca++)
– Transfusion-related or anaphylactic reaction
– Acute coronary syndrome (cardiac shock)
– Pulmonary thromboembolism
– Severe pulmonary hypertension
– Pacemaker failure (*e.g.*, bradycardia, asystole)
– Prolonged Q-T syndrome
– Oculo-cardiac reflexes
– Electroconvulsive therapy (*e.g.*, bradycardia, asystole)
– Tako-Tsubo Syndrome
Severely reduced blood flow (acute reduced blood flow)
– Increased intra-abdominal pressure
– Tension pneumothorax
– High positive end-exspiratory pressure
– Surgical maneuvres

Rimini IRC 2021 CONGRESSO NAZIONALE 16•17•18 DICEMBRE NUOVE LINEE GUIDA 2021: RIANIMAZIONE CARDIOPOLMONARE POST-LOCKDOWN

Available online at www.sciencedirect.com

Resuscitation

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

EUROPEAN RESUSCITATION COUNCIL

ELSEVIER

European Resuscitation Council Guidelines 2021: Cardiac arrest in special circumstances

Carsten Lott[a,], Anatolij Truhlář[b,c], Annette Alfonzo[d], Alessandro Barelli[e], Violeta González-Salvado[f], Jochen Hinkelbein[g], Jerry P. Nolan[h,i], Peter Paal[j], Gavin D. Perkins[k,l], Karl-Christian Thies[m], Joyce Yeung[k,l], David A. Zideman[n], Jasmeet Soar[o], the ERC Special Circumstances Writing Group Collaborators[†]*

PREPARARSI E PREVENIRE

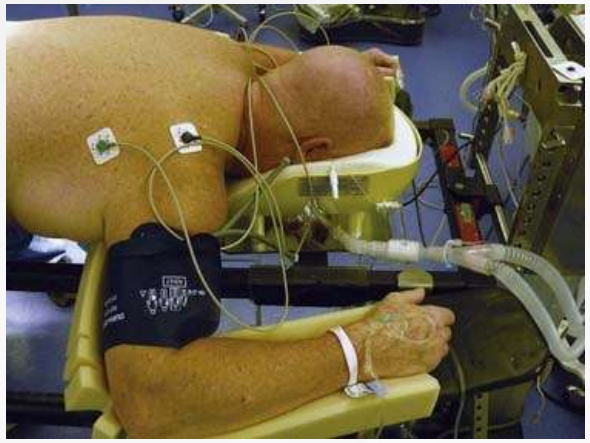
Deakins C, Resuscitation 2018 126, 80-82DOI: (10.1016/j.resuscitation.2018.02.012)

- ✓ Considerare precocemente il deterioramento e avvertire il team
- ✓ Considerare monitoraggio della pressione arteriosa invasivo
- ✓ Considerare placche adesive per defibrillazione prima del campo operatorio e defibrillatore prontamente disponibile
- ✓ Considerare accesso venoso adeguato
- ✓ Avere rapidamente disponibili i farmaci del protocollo di gestione dell'arresto cardiaco, i fluidi, emazie

IRC Italian Resuscitation Council

CONFERMA ARRESTO CARDIACO PIU' IMMEDIATA

MASSAGGIO CARDIACO PRECOCE ED EFFICACE



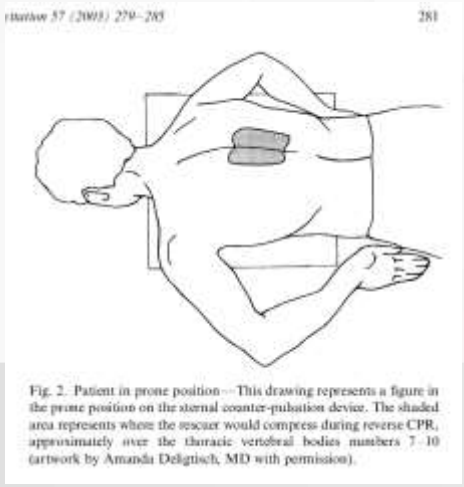


Fig. 2. Patient in prone position—This drawing represents a figure in the prone position on the sternal counter-pulsation device. The shaded area represents where the rescuer would compress during reverse CPR, approximately over the thoracic vertebral bodies numbers 7–10 (artwork by Amanda Deligtisch, MD with permission).

Reverse CPR: a pilot study of CPR in the prone position

Sean P. Mazer [a], Myron Weisfeldt [c], Diane Bai [a], Carol Cardinale [a], Rohit Arora [d], Cecilia Ma [a], Robert R. Sciacca [b], David Chong [b], LeRoy E. Rabbani [a,*]

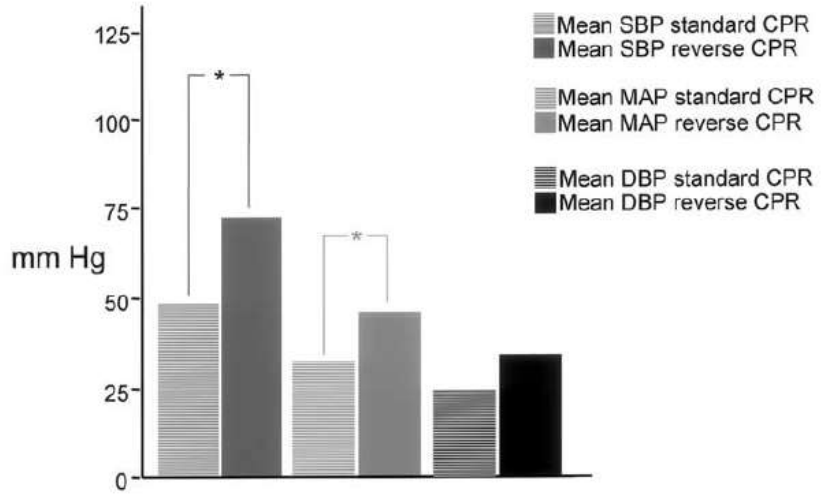
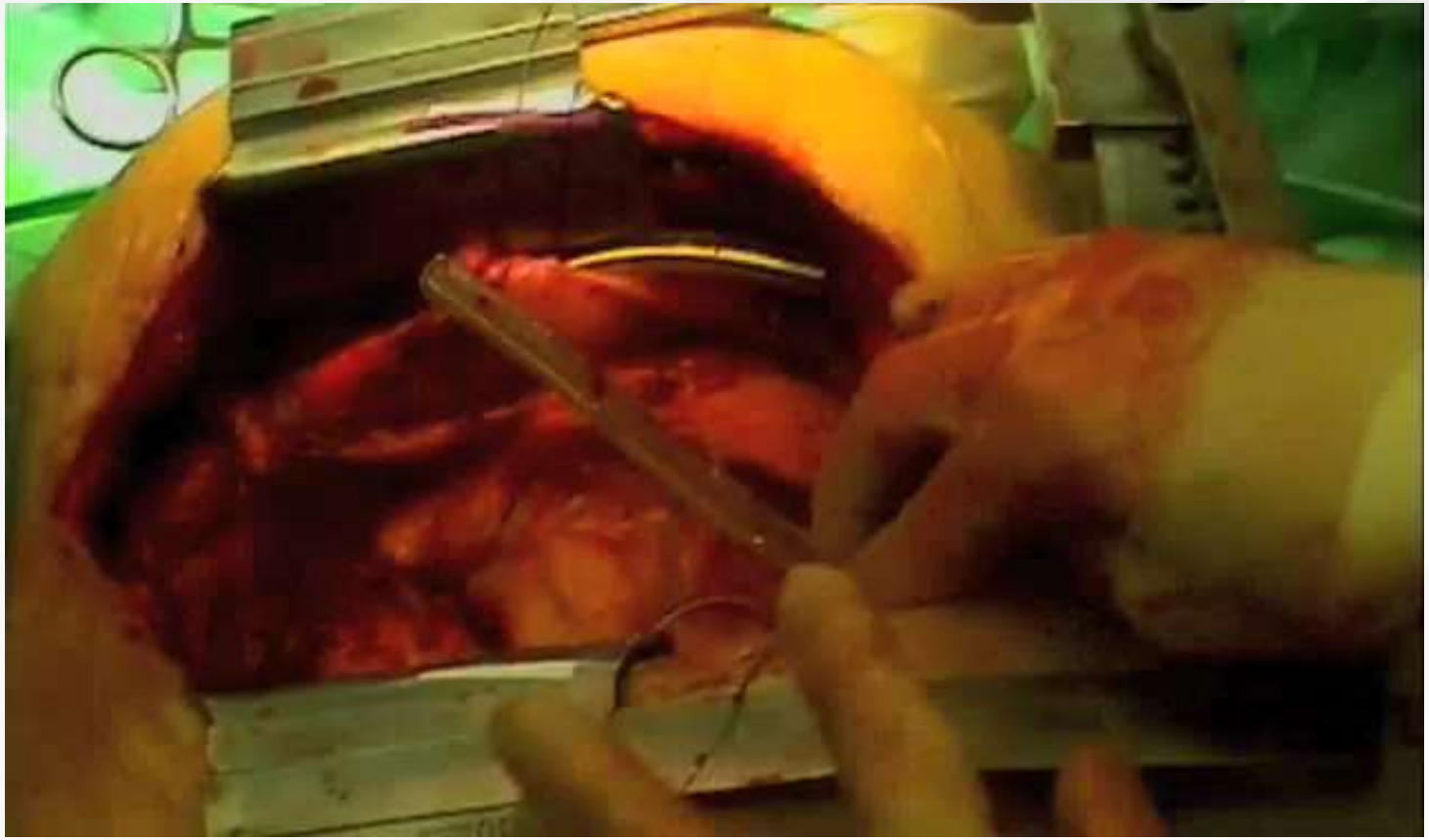
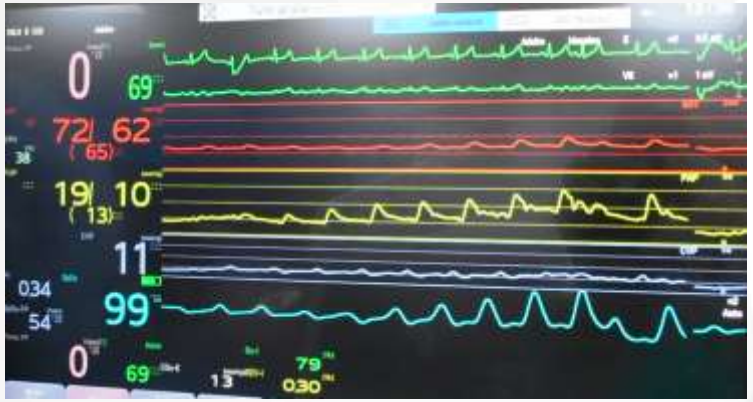


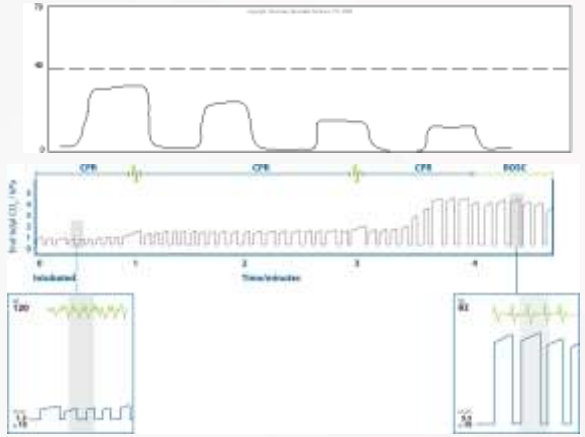
Fig. 3. Mean blood pressure—This bar graph presents the mean SBP, MAP and DBP for all the patients enrolled in the study. The (*) denotes data where the comparison between reverse and standard CPR has a calculated P value < 0.05.

MASSAGGIO CARDIACO PRECOCE ED EFFICACE





QUALITÀ DEL MASSAGGIO CARDIACO
ROSC



PRESIDI DI SUPPORTO DEL CIRCOLO ECLS

DEFIBRILLAZIONE PRECOCE

TRE SHOCK CONSECUTIVI IN
ARRESTO CARDIACO MONITORIZZATO TESTIMONIATO
CON DEFIBRILLATORE DISPONIBILE ENTRO 1 MINUTO

Italian Resuscitation Council

Anesth Analg 2018 Mar;126(3):889-903

CAUSE REVERSIBILI

- ✓ **Ipossia: gestione vie aeree, laringospasmo, broncospasmo**
- ✓ **Ipovolemia:**
  - **emorragia (ecografia, endoscopia, angiografia)**
  - **anafilassi (bloccanti neuromuscolari 60%)**
- ✓ **Tossici:**
  - **somministrazione accidentale di farmaci**
  - **tossicità sistemica da anestetici locali**
- ✓ **Trombosi:**
  - **polmonare (venosa, grassosa, gassosa)**
  - **coronarica**
- ✓ **Iperkaliemia (pediatrica, emotrasfusione o grave acidosi metabolica)**
- ✓ **Pneumotorace iperteso: CVC**
- ✓ **Trauma/Tamponamento cardiaco**
- ✓ **Ipertermia maligna (anestetici volatili, succinilcolina)**

Teamwork e ruoli predefiniti

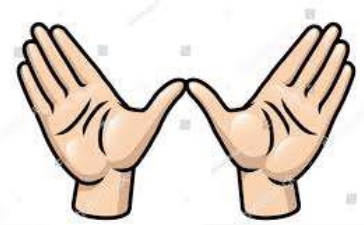
Non Technical Skills

Improve perception and **Enlarge the picture** (Situation Awarness)

Comunicate and Coordinate (Team Working)

Plan and Identify (Task Managment)

Act and Asses result (Decision Making)



Resuscitation 129 (2018) 48–54

Contents lists available at ScienceDirect

Resuscitation

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

Review

Impact of adult advanced cardiac life support course participation on patient outcomes—A systematic review and meta-analysis

Andrew Lockey[a,*], Yiqun Lin[b], Adam Cheng[b]

[a] Calderdale & Huddersfield Foundation Trust, Salterhebble, Halifax HX3 0PW, UK
[b] University of Calgary, KidSim-ASPIRE Research Program, Section of Emergency Medicine, Department of Pediatrics, Alberta Children's Hospital, 2888 Shaganappi Trail NW, Calgary, Alberta T3B 6A8, Canada

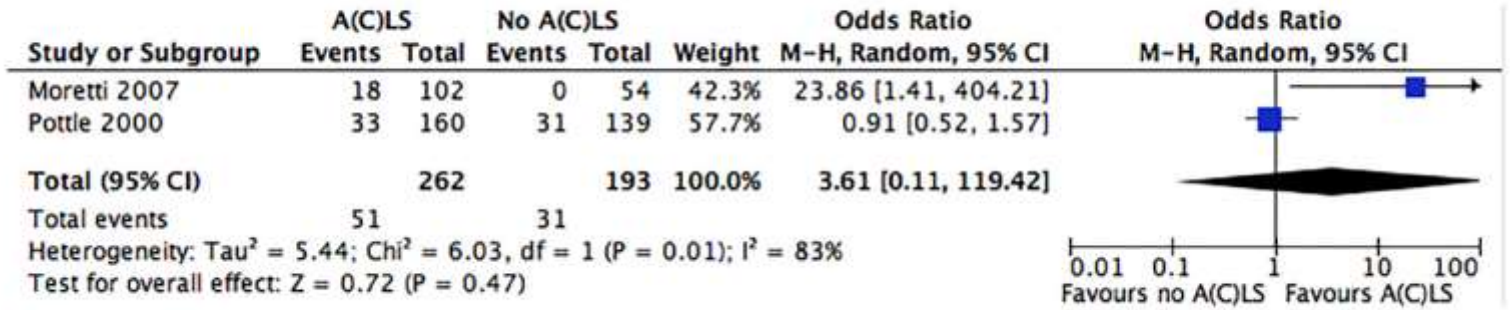


Fig. 3. Survival to 1 year.

RIASSUMENDO

- ✓ L'arresto cardiaco in ambiente monitorizzato può essere diagnosticato e trattato precocemente
- ✓ Nei ritmi defibrillabili si deve considerare la tripletta di shock invece del singolo primo shock
- ✓ Monitoraggio invasivo della pressione arteriosa ed EtCO2 per un massaggio cardiaco di qualità
- ✓ Garantire un massaggio cardiaco efficace (considerare massaggio in posizione prona, massaggio cardiaco interno)
- ✓ In sala operatoria, in terapia intensiva e in sala di emodinamica disponibili dispositivi per il massaggio meccanico ed eventuale ECLS
- ✓ Importante il lavoro in team e le non technical skills. Protocolli dedicati, ruoli prestabiliti
- ✓ Formazione

GRAZIE
E
ARRIVEDERCI

Italian Resuscitation Council

www.ircouncil.it

Italian Resuscitation Council