



FN MOTOL

Mimonemocniční zástava oběhu

Jiří Karásek

XXXI. VÝROČNÍ SJEZD
ČESKÉ KARDIOLOGICKÉ
SPOLEČNOSTI





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EPIDEMIOLOGIE

Incidence 67-170 /100 tis.

- Resuscitace zahájena či pokračováno u 50-60%
- KPR svědky 58%, AED 28%
- 80% TANR
- Propuštění 8%

SYSTEMS SAVING LIVES GL 2021

5 TOP MESSAGES



1. RAISE AWARENESS ABOUT CPR AND DEFIBRILLATION

- Train as many citizens as possible
- Engage with World Restart a Heart Day
- Develop new and innovative systems and policies that will save more lives

2. USE TECHNOLOGY TO ENGAGE COMMUNITIES

- Implement technologies to alert first responders to cardiac arrests through smartphone apps / text messages
- Develop communities of first responders to help save lives
- Map and share the locations of public access defibrillators

3. KIDS SAVE LIVES

- Teach all school children to do CPR using "check, call and compress"
- Get children to teach their parents and relatives how to do CPR

4. CARDIAC ARREST CENTRES

- Where possible care for adult patients with OHCA in cardiac arrest centres

5. DISPATCH ASSISTANCE DURING CPR

- Provide telephone assisted CPR for people who are unresponsive with absent or abnormal breathing
- Work with dispatch staff to continually monitor and improve telephone assisted CPR



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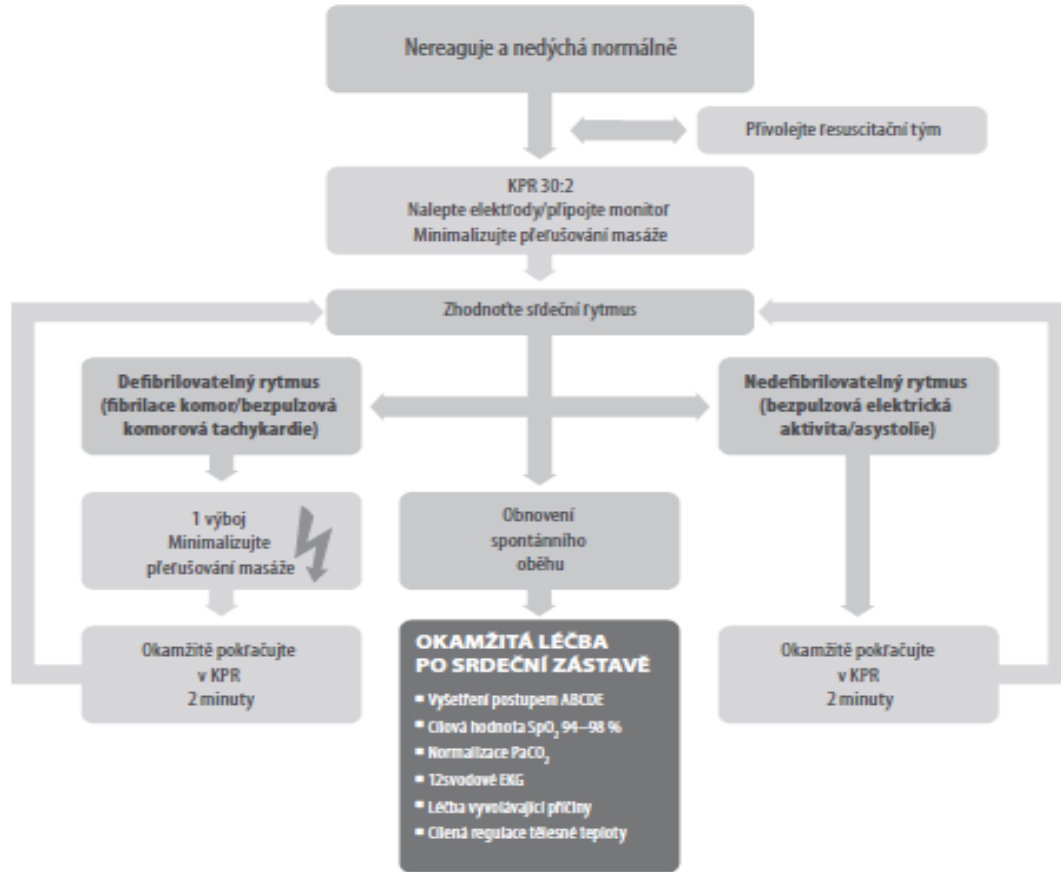
**European Resuscitation Council Guidelines 2021:
Epidemiology of cardiac arrest in Europe**



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Rozšířená neodkladná resuscitace



BĚHEM KPR

- Zajištěte vysokou kvalitu srdeční masáže
- Minimalizujte přerušování srdeční masáže
- Podejte kyslík
- Použijte kapnografii
- Po zajištění dýchacích cest pomocí kámi nepřerušujte srdeční masáž
- Vstup do cévního řečiště (intravenózní nebo intraoséální)
- Podejte adrenalin každých 3-5 min
- Podejte amiodaron po 3. výboji

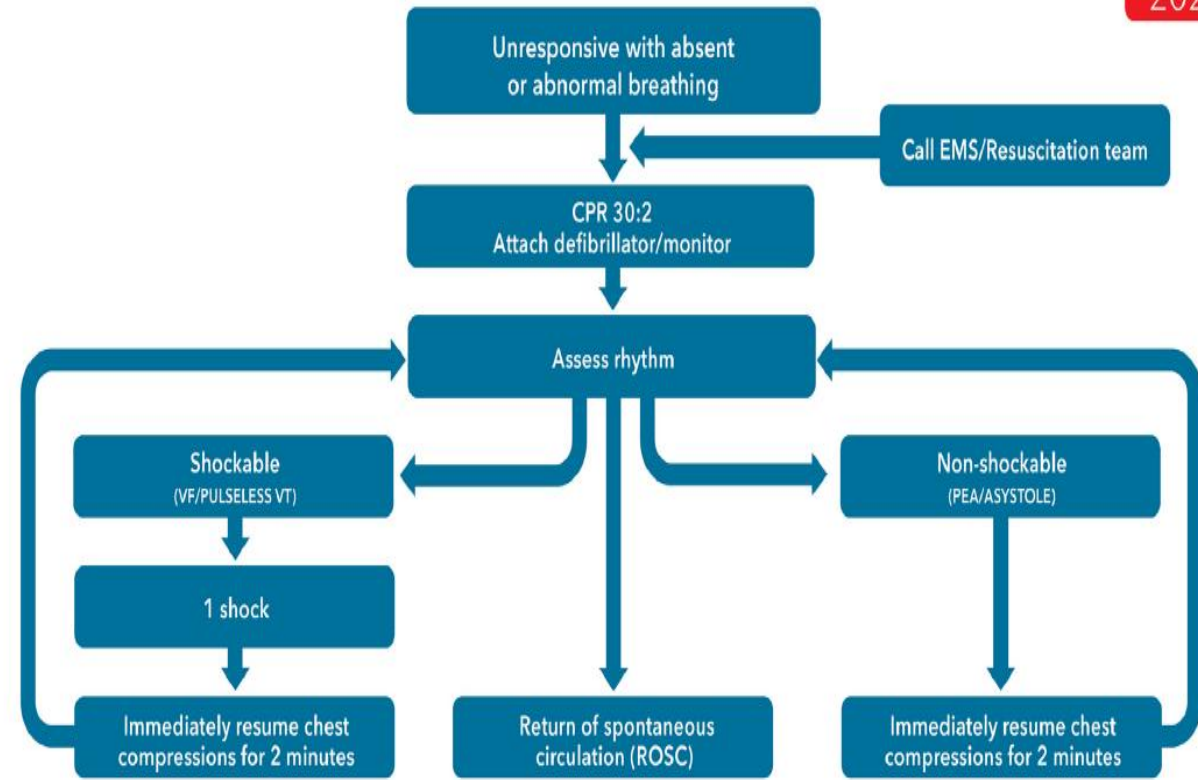
ZAJISTĚTE LÉČBU REVERZIBILNÍCH PŘÍČIN

Hypoxie	Trombóza (koronární tepny/plicní embolie)
Hypovolemie	Tenzní pneumotorax
Hypokalcémie/hyperkalémie/metabolické příčiny	Tamponáda srdeční
Hypotermie/hypertermie	Toxické látky (Intoxikace)

ZVAŽTE

- Ultrasonografické vyšetření
- Mechanickou srdeční masáž k usnadnění transportu a další léčby
- Koronární angiografii a percutánní koronární intervenci
- Mimošestní KPR

ADVANCED LIFE SUPPORT



Give high-quality chest compressions and

- Give oxygen
- Use waveform capnography
- Continuous compressions if advanced airway
- Minimise interruptions to compressions
- Intravenous or intraosseous access
- Give adrenaline every 3-5 min
- Give amiodarone after 3 shocks
- Identify and treat reversible causes

Identify and treat reversible causes

- Hypoxia
 - Hypovolaemia
 - Hypo-/hyperkalemia/metabolic
 - Hypo-/hyperthermia
 - Thrombosis - coronary or pulmonary
 - Tension pneumothorax
 - Tamponade- cardiac
 - Toxins
- Consider ultrasound imaging to identify reversible causes

Consider

- Coronary angiography/percutaneous coronary intervention
- Mechanical chest compressions to facilitate transfer/treatment
- Extracorporeal CPR

After ROSC

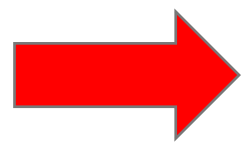
- Use an ABCDE approach
- Aim for SpO₂ of 94-98% and normal PaCO₂
- 12 Lead ECG
- Identify and treat cause
- Targeted temperature management

A Randomized Trial of Epinephrine in Out-of-Hospital Cardiac Arrest

G.D. Perkins, C. Ji, C.D. Deakin, T. Quinn, J.P. Nolan, C. Scomparin, S. Regan, J. Long, A. Slowther, H. Pocock, J.J.M. Black, F. Moore, R.T. Fothergill, N. Rees, L. O'Shea, M. Docherty, I. Gunson, K. Han, K. Charlton, J. Finn, S. Petrou, N. Stallard, S. Gates, and R. Lall, for the PARAMEDIC2 Collaborators*

Table 3. Primary and Secondary Outcomes.*

Outcome	Epinephrine	Placebo	Odds Ratio (95% CI)†	
			Unadjusted	Adjusted
Primary outcome				
Survival at 30 days — no./total no. (%)‡	130/4012 (3.2)	94/3995 (2.4)	1.39 (1.06–1.82)	1.47 (1.09–1.97)
Secondary outcomes				
Survival until hospital admission — no./total no. (%)§	947/3973 (23.8)	319/3982 (8.0)	3.59 (3.14–4.12)	3.83 (3.30–4.43)
Median length of stay in ICU (IQR) — days				
Patients who survived	7.5 (3.0–15.0)	7.0 (3.5–12.5)	NA	NA
Patients who died¶	2.0 (1.0–5.0)	3.0 (1.0–5.0)	NA	NA
Median length of hospital stay (IQR)				
Patients who survived	21.0 (10.0–41.0)	20.0 (9.0–38.0)	NA	NA
Patients who died	0	0	NA	NA
Survival until hospital discharge — no./total no. (%)	128/4009 (3.2)	91/3995 (2.3)	1.41 (1.08–1.86)	1.48 (1.10–2.00)
Favorable neurologic outcome at hospital discharge — no./total no. (%)	87/4007 (2.2)	74/3994 (1.9)	1.18 (0.86–1.61)	1.19 (0.85–1.68)
Survival at 3 mo — no./total no. (%)	121/4009 (3.0)	86/3991 (2.2)	1.41 (1.07–1.87)	1.47 (1.08–2.00)
Favorable neurologic outcome at 3 mo — no./total no. (%)	82/3986 (2.1)	63/3979 (1.6)	1.31 (0.94–1.82)	1.39 (0.97–2.01)

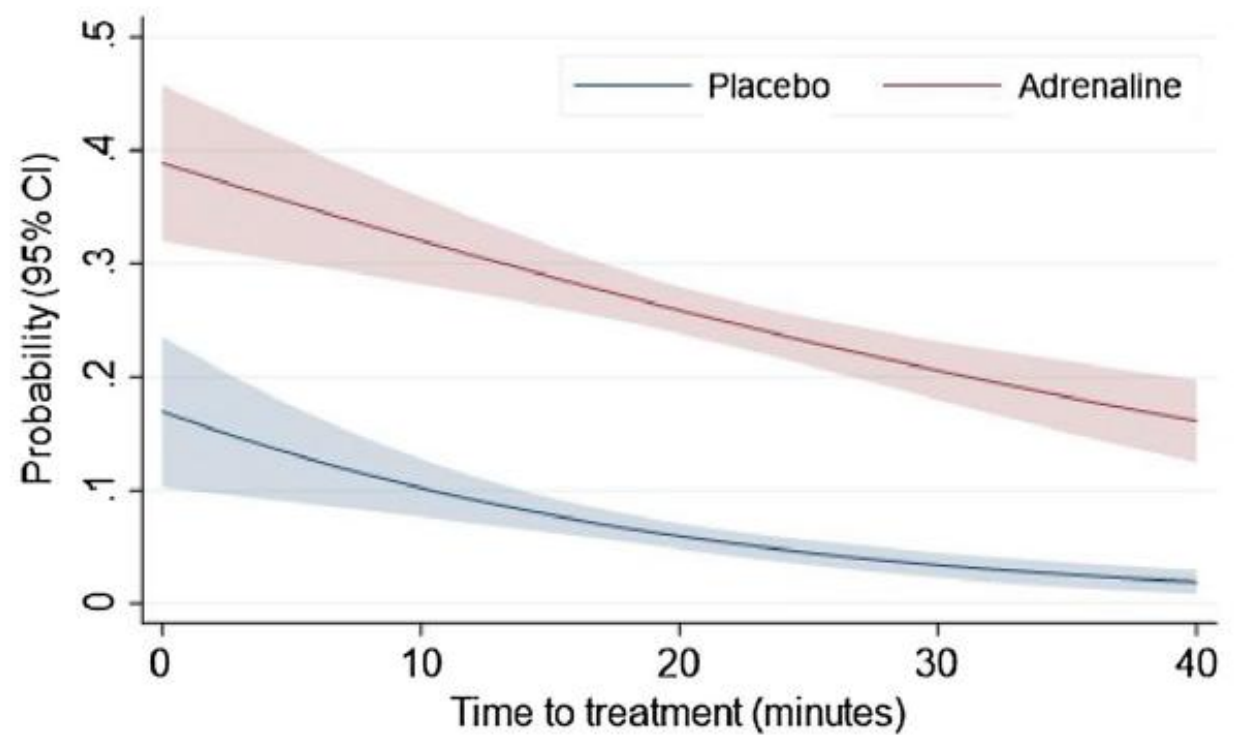


ORIGINAL

The influence of time to adrenaline administration in the Paramedic 2 randomised controlled trial

Gavin D. Perkins^{1,2*}, Claire Kenna¹, Chen Ji¹, Charles D. Deakin^{3,4}, Jerry P. Nolan^{1,5}, Tom Quinn⁶, Charlotte Scomparin¹, Rachael Fothergill^{1,7}, Imogen Gunson⁸, Helen Pocock⁹, Nigel Rees⁹, Lyndsey O'Shea⁹, Judith Finn¹⁰, Simon Gates¹¹ and Ranjit Lall¹

Probability of ROSC over time by treatment arm (non-shockable rhythms only)

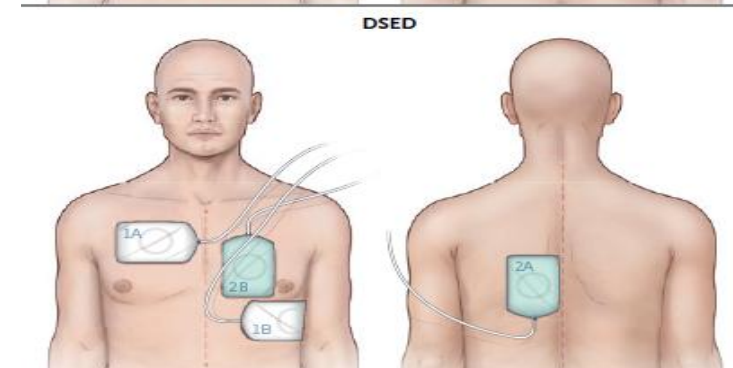
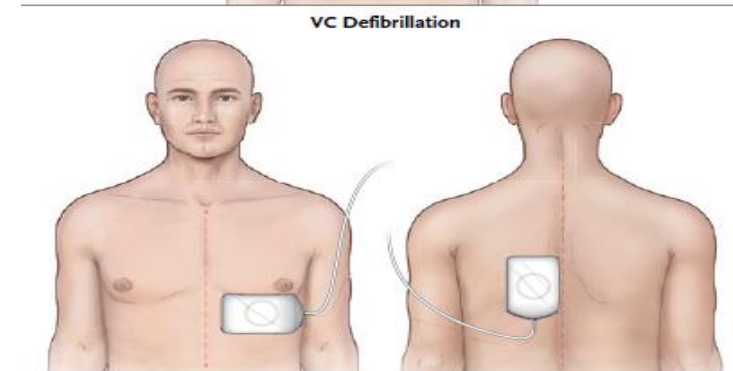
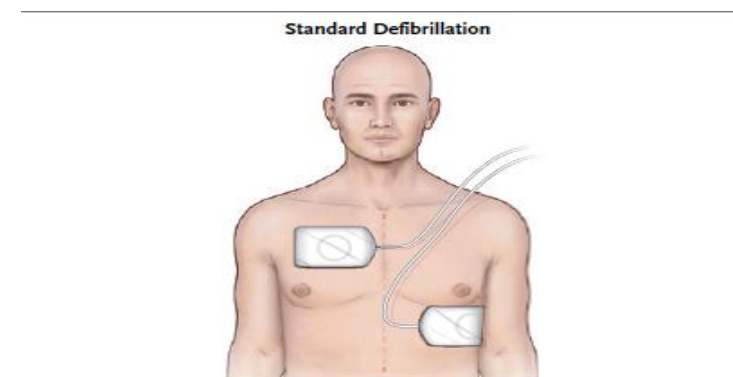


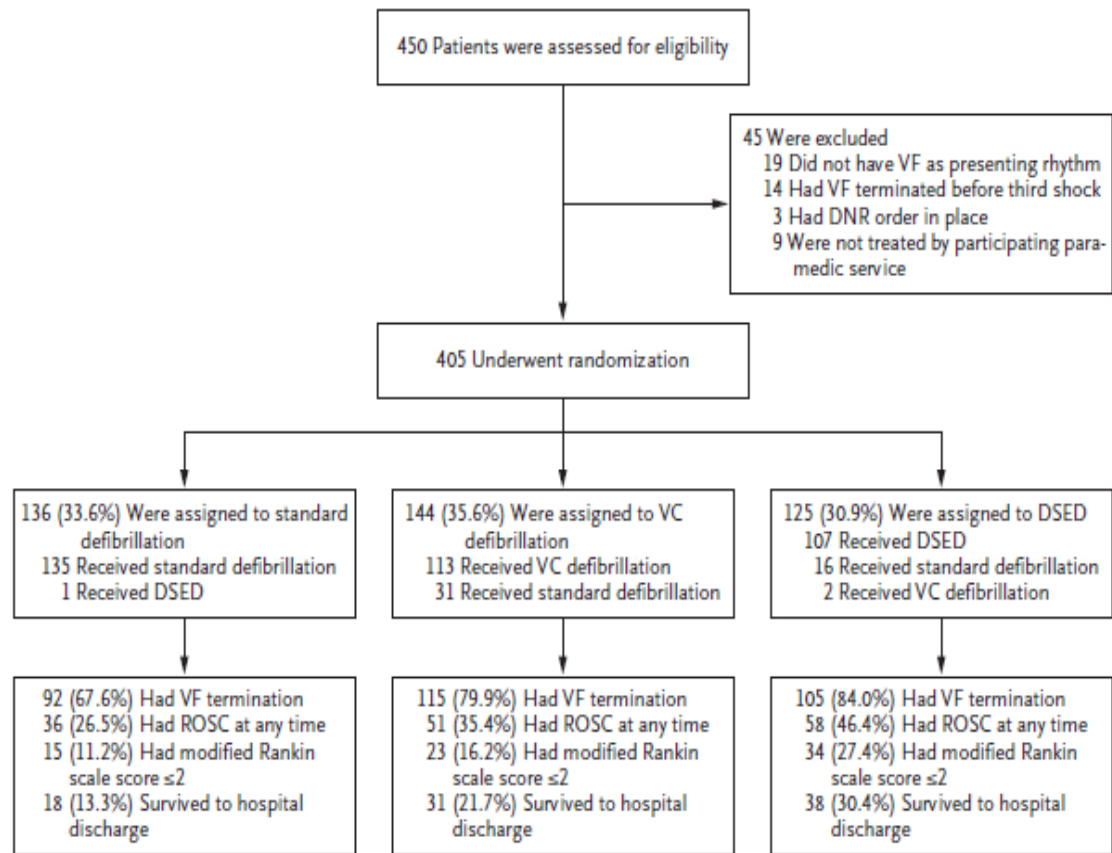
ORIGINAL ARTICLE

Defibrillation Strategies for Refractory Ventricular Fibrillation

Sheldon Cheskes, M.D., P. Richard Verbeek, M.D., Ian R. Drennan, A.C.P., Ph.D.,
 Shelley L. McLeod, Ph.D., Linda Turner, Ph.D., Ruxandra Pinto, Ph.D.,
 Michael Feldman, M.D., Ph.D., Matthew Davis, M.D.,
 Christian Vaillancourt, M.D., Laurie J. Morrison, M.D., Paul Dorian, M.D.,
 and Damon C. Scales, M.D., Ph.D.

- OHCA s refrakterní VF susp. kardiální etiologie (3 výboje)
- CRT s 3 clustery v 6 EMS (rotace po 6 měsících)
- Ukončeno pro COVID
- Konvenční defibrilace vs. VC (vector change) vs. DSED (double sequential extrenal defibrillation)
- 405 pts. (136/244/125 pts.)
- Primární outcome: survival to discharge
- Sekundární: terminace VF, ROSC, dobrý neurolog. outcome mRs 2 a méně





Outcome	Standard Defibrillation (N=136)	VC Defibrillation (N=144)	DSED (N=125)	Adjusted Relative Risk (95% CI)*	
				DSED vs. Standard	VC vs. Standard
<i>number of patients/total number (percent)</i>					
Survival to hospital discharge [†]	18/135 (13.3)	31/143 (21.7)	38/125 (30.4)	2.21 (1.33–3.67)	1.71 (1.01–2.88)
Termination of ventricular fibrillation	92/136 (67.6)	115/144 (79.9)	105/125 (84.0)	1.25 (1.09–1.44)	1.18 (1.03–1.36)
ROSC	36/136 (26.5)	51/144 (35.4)	58/125 (46.4)	1.72 (1.22–2.42)	1.39 (0.97–1.99)
Modified Rankin scale score ≤ 2 [‡]	15/134 (11.2)	23/142 (16.2)	34/124 (27.4)	2.21 (1.26–3.88)	1.48 (0.81–2.71)

Characteristic	Standard Defibrillation (N=136)	VC Defibrillation (N=144)	DSED (N=125)
Age — yr	64.0±14.4	63.8±13.2	63.0±16.8
Male sex — no. (%)	109 (80.1)	127 (88.2)	106 (84.8)
Bystander-witnessed cardiac arrest — no. (%)	82 (60.3)	110 (76.4)	83 (66.4)
Bystander CPR performed — no. (%)	74 (54.4)	90 (62.5)	71 (56.8)
Public location of cardiac arrest — no. (%)	41 (30.1)	51 (35.4)	36 (28.8)
Median response time (IQR) — min [†]	7.4 (5.7–9.9)	7.4 (6.9–9.0)	7.8 (6.0–9.4)
Characteristic	Standard Defibrillation (N=136)	VC Defibrillation (N=144)	DSED (N=125)
Median time from initial call to first shock (IQR) — min [†]	10.2 (8.2–13.2)	10.4 (8.8–12.6)	10.2 (8.8–11.8)
Prehospital intubation — no. (%)	52 (38.2)	72 (50.0)	53 (42.4)
Preshock pause — sec [‡]	6.5±7.0	6.1±6.0	6.4±7.6
Postshock pause — sec [§]	4.8±3.9	5.2±5.8	4.5±2.2
Compression rate per minute [¶]	109.8±8.0	111.1±8.4	111.7±8.7
Compression depth — cm	6.0±1.0	5.9±1.0	5.7±0.9
Chest compression fraction — % ^{**}	83.1±8.1	80.8±8.7	79.1±9.5
No. of standard shocks	7.4±3.0	4.2±2.1	3.9±1.4
No. of shocks to first ROSC ^{††}	5.5±1.6	5.3±1.7	5.7±1.9
Antiarrhythmic drug administered — no. (%)	110 (80.9)	106 (73.6)	92 (73.6)
Amiodarone dose — mg	403.4±75.8	392.9±76.5	378.5±75.4
Lidocaine dose — mg	185.7±73.9	175.7±60.6	162.5±83.3
Median time from arrival of EMS to first antiarrhythmic drug administration (IQR) — min ^{‡‡}	11.0 (8.0–14.0)	11.6 (9.0–16.0)	11.0 (8.0–15.5)
Epinephrine administered — no. (%)	129 (94.9)	133 (92.4)	107 (85.6)
Epinephrine dose — mg	4.2±2.2	4.2±2.0	4.0±2.1
Median time from arrival of EMS to first epinephrine dose (IQR) — min ^{‡‡}	8.7 (6.0–11.5)	9.0 (6.0–14.0)	8.8 (5.4–13.4)
Median time from arrival of EMS to first ROSC (IQR) — min ^{‡‡}	14.8 (10.6–20.0)	15.8 (12.5–19.4)	14.0 (11.0–22.0)
Median time from arrival of EMS to departure from scene (IQR) — min ^{§§}	25.0 (21.3–32.2)	27.5 (23.3–33.6)	26.5 (21.0–33.8)





European Resuscitation Council and European Society of Intensive Care Medicine Guidelines 2021: Post-resuscitation care^{*}

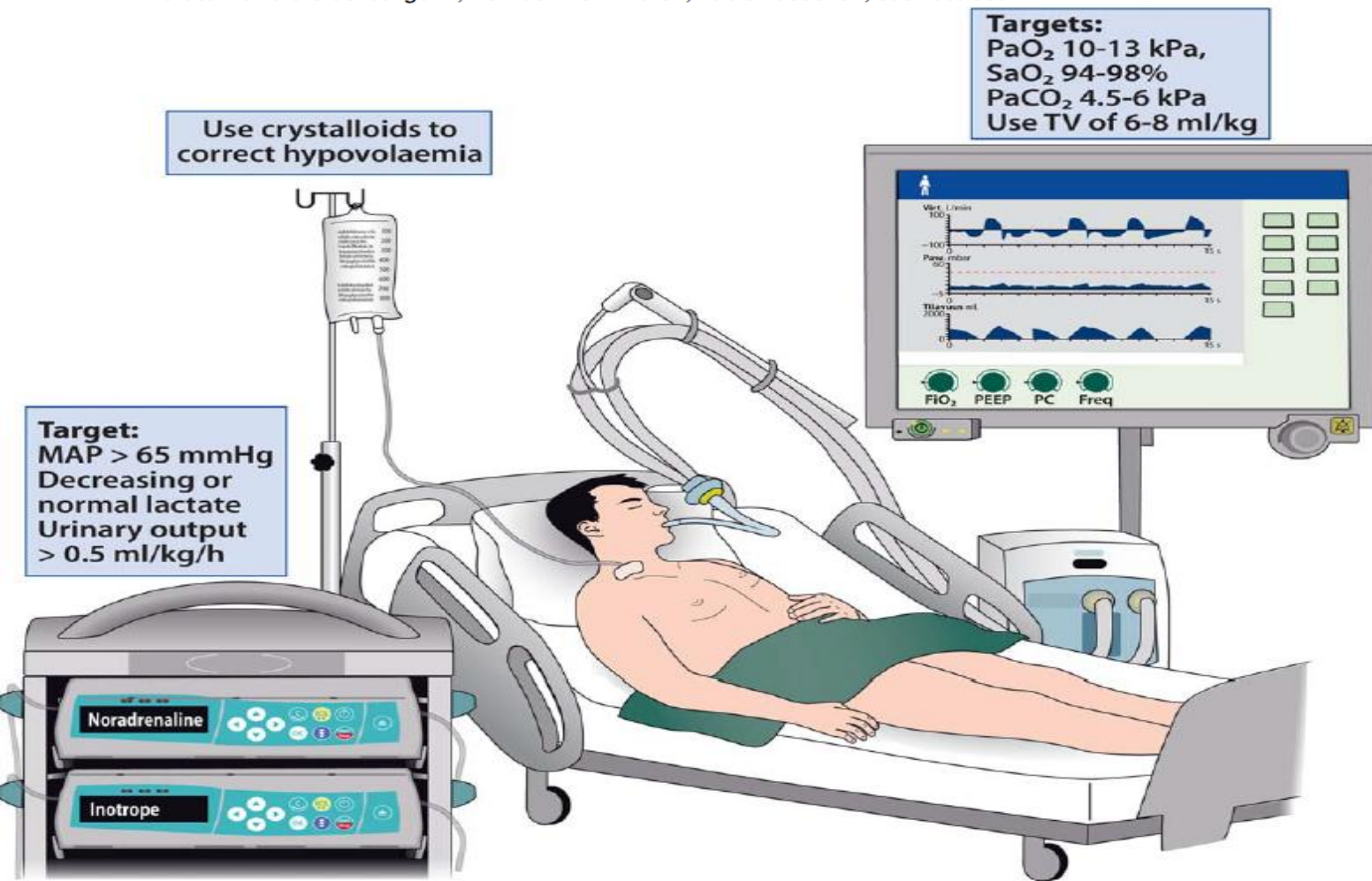


Jerry P. Nolan^{a,b,1,*}, Claudio Sandroni^{c,d,1}, Bernd W. Böttiger^e, Alain Cariou^f, Tobias Cronberg^g, Hans Friberg^h, Cornelia Genbrugge^{i,j}, Kirstie Haywood^k, Gisela Lilja^l, Véronique R.M. Moolaert^m, Nikolaos Nikolaouⁿ, Theresa Mariero Olasveengen^o, Markus B. Skrifvars^p, Fabio Taccone^q, Jasmeet Soar^r

Targets:
PaO₂ 10-13 kPa,
SaO₂ 94-98%
PaCO₂ 4.5-6 kPa
Use TV of 6-8 ml/kg

Use crystalloids to correct hypovolaemia

Target:
MAP > 65 mmHg
Decreasing or normal lactate
Urinary output > 0.5 ml/kg/h



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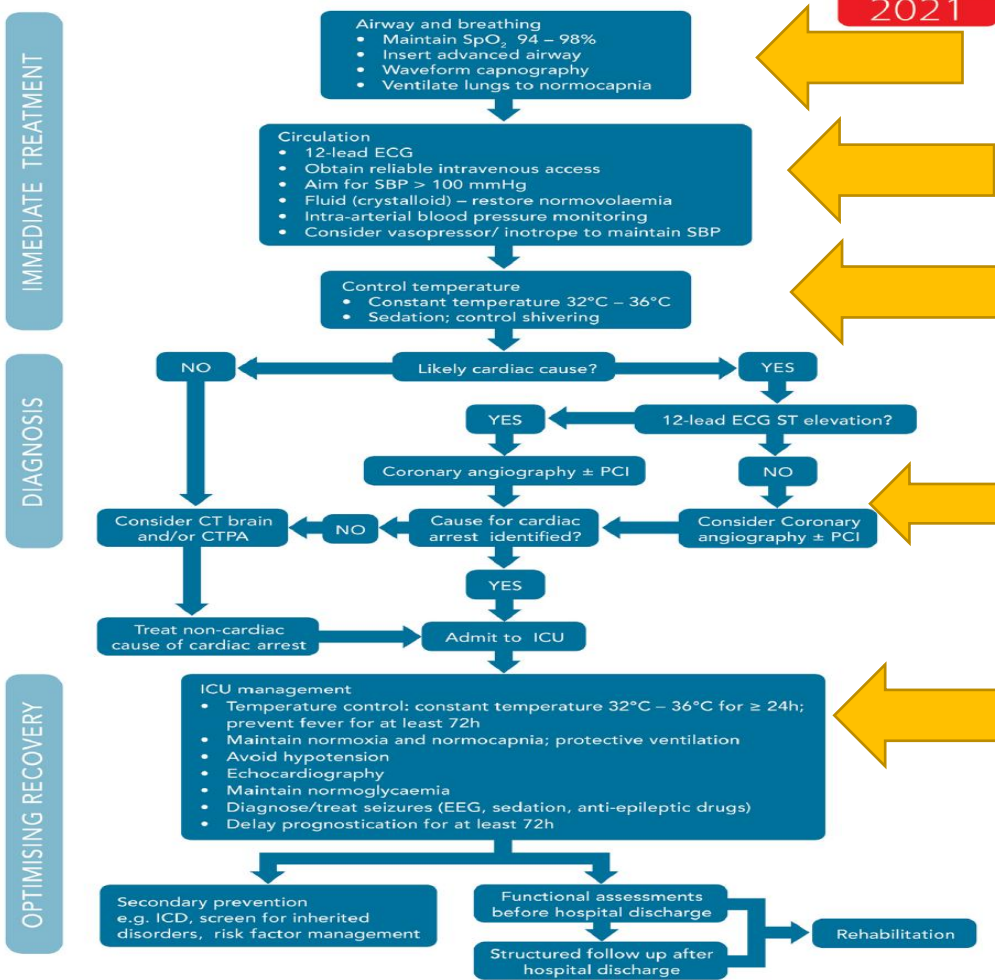


European Resuscitation Council and European Society of Intensive Care Medicine Guidelines 2021: Post-resuscitation care*



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POST-RESUSCITATION CARE



- oxygenace/ventilace
- oběhová podpora
- kontrola tělesné teploty
- diagnostický algoritmus
- neuroprognostifikace/konvulze



Oxygenace a ventilace

Control of oxygenation

- After ROSC, use 100% (or maximum available) inspired oxygen until the arterial oxygen saturation or the partial pressure of arterial oxygen can be measured reliably.
- After ROSC, once SpO₂ can be measured reliably or arterial blood gas values are obtained, titrate the inspired oxygen to achieve an arterial oxygen saturation of 94–98% or arterial partial pressure of oxygen (PaO₂) of 10–13 kPa or 75–100 mmHg (Fig. 3).
- Avoid hypoxaemia (PaO₂ < 8 kPa or 60 mmHg) following ROSC.
- Avoid hyperoxaemia following ROSC.

Control of ventilation

- Obtain an arterial blood gas and use end tidal CO₂ in mechanically ventilated patients.
- In patients requiring mechanical ventilation after ROSC, adjust ventilation to target a normal arterial partial pressure of carbon dioxide (PaCO₂) i.e. 4.5–6.0 kPa or 35–45 mmHg.
- In patients treated with targeted temperature management (TTM) monitor PaCO₂ frequently as hypocapnia may occur.
- During TTM and lower temperatures use consistently either a temperature or non-temperature corrected approach for measuring blood gas values.
- Use a lung protective ventilation strategy aiming for a tidal volume of 6–8 mL kg⁻¹ ideal body weight.



European Resuscitation Council and European Society of Intensive Care Medicine Guidelines 2021: Post-resuscitation care*

Jerry P. Nolan^{a,b,1,*}, Claudio Sandroni^{c,d,1}, Bernd W. Böttiger^e, Alain Cariou^f, Tobias Cronberg^g, Hans Friberg^h, Cornelia Genbrugge^{i,j}, Kirstie Haywood^k, Gisela Lilja^l, Veronique R.M. Moolaert^m, Nikolaos Nikolaouⁿ, Theresa Mariero Olasveengen^o, Markus B. Skrifvars^p, Fabio Taccone^q, Jasmeet Soar^r





BOX

- CRT 2x2 factorial design
- Comatose OHCA patients 1:1, TTM 36, MV 24 h at least
- Restrictive oxygen target (PaO₂ 9-10kPa)-FiO₂ 0,3 vs. liberal oxygen target (PaO₂ 13-14kPa)-FiO₂ 0,6.
- 789 patients (394 vs. 395)
- Primary outcome: composite of death from any cause or hospital discharge CPC 3,4 to D90
- Secondary outcomes: NSE at H48, death from any cause, cognitive ability scores and CPC at day 90

Table 2. Primary and Secondary Outcomes and Adverse Events.*

Variable	Restrictive Oxygen Target (N=394)	Liberal Oxygen Target (N=395)	Treatment Effect (95% CI)†	P Value
Primary outcome				
Death from any cause or CPC 3 or 4 at discharge — no. (%)‡	126 (32.0)	134 (33.9)	0.95 (0.75–1.21)	0.69
Secondary outcomes				
Death from any cause at 90 days — no. (%)	113 (28.7)	123 (31.1)	0.93 (0.72–1.20)	
Acute kidney injury with renal-replacement therapy — no. (%)	34 (8.6)	47 (11.9)	0.85 (0.69–1.03)	
Median CPC at 90 days (IQR)‡	1 (1–5)	1 (1–5)		
Median score on modified Rankin scale at 90 days (IQR)§	2 (0–6)	1 (0–6)		
Median score on Montreal Cognitive Assessment at 90 days (IQR)¶	27 (24–29)	27 (24–28)		
Median neuron-specific enolase at 48 hr (IQR) — µg/liter	17 (11–36)	18 (11–34)		
Adverse events — no. (%)				
Infection**	103 (26.1)	109 (27.6)	0.96 (0.82–1.13)	0.65
Arrhythmia††	57 (14.5)	52 (13.2)	1.06 (0.86–1.30)	0.60
Bleeding				
Any	82 (20.8)	92 (23.3)	0.93 (0.79–1.10)	0.40
Uncontrolled bleeding‡‡	17 (4.3)	21 (5.3)	0.90 (0.67–1.21)	0.62
Acute kidney injury with renal-replacement therapy	34 (8.6)	47 (11.9)	0.85 (0.69–1.03)	0.13
Electrolyte disorder§§	32 (8.1)	25 (6.3)	1.15 (0.85–1.56)	0.33
Metabolic disorder¶¶	34 (8.6)	28 (7.1)	1.12 (0.84–1.48)	0.42
Seizure	81 (20.6)	83 (21.0)	0.99 (0.83–1.17)	0.14



Podpora oběhu

Haemodynamic monitoring and management

- All patients should be monitored with an arterial line for continuous blood pressure measurements, and it is reasonable to monitor cardiac output in haemodynamically unstable patients.
- Perform early (as soon as possible) echocardiography in all patients to detect any underlying cardiac pathology and quantify the degree of myocardial dysfunction.
- Avoid hypotension (<65 mmHg). Target mean arterial pressure (MAP) to achieve adequate urine output ($>0.5 \text{ mL kg}^{-1} \text{ h}^{-1}$) and normal or decreasing lactate (Fig. 3).
- During TTM at 33 °C, bradycardia may be left untreated if blood pressure, lactate, ScvO₂ or SvO₂ is adequate. If not, consider increasing the target temperature, but to no higher than 36 °C.
- Maintain perfusion with fluids, noradrenaline and/or dobutamine, depending on individual patient need for intravascular volume, vasoconstriction or inotropy.
- Do not give steroids routinely after cardiac arrest.
- Avoid hypokalaemia, which is associated with ventricular arrhythmias.



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Resuscitation

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European Resuscitation Council and European Society of Intensive Care Medicine Guidelines 2021: Post-resuscitation care*

Jerry P. Nolan^{a,b,1,}, Claudio Sandroni^{c,d,1}, Bernd W. Böttiger^e, Alain Cariou^f, Tobias Cronberg^g, Hans Friberg^h, Cornelia Genbrugge^{i,j}, Kirstie Haywood^k, Gisela Lilja^l, Veronique R.M. Moolaert^m, Nikolaos Nikolaouⁿ, Theresa Mariero Olasveengen^o, Markus B. Skrifvars^p, Fabio Taccone^q, Jasmeet Soar^r*

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BOX

- CRT 2x2 factorial design
- Comatose OHCA patients 1:1, TTM 36
- key exclusions: unwitnessed asystole or IC bleeding or stroke
- MAP: 63 mm Hg vs. MAP 77 mm Hg
- 789 patients (393 vs. 396)
- Blinded calibration of MAP devices (70 mm Hg for all, but real +/- 10%)
- MAP maintained with fluidws to CVP 10 mm Hg, norepinephrine and the addition dopamine if needed
- Primary outcome: composite of death from any cause or hospital discharge CPC 3,4 to D90
- Secondary outcomes: NSE at H48, death from any cause, cognitive ability scores and CPC at day 90

Table 2. Outcomes and Adverse Events.*

Outcome or Event	High Blood-Pressure Target (N=393)	Low Blood-Pressure Target (N= 396)	Hazard Ratio (95% CI)	P Value
Primary outcome				
Death from any cause or CPC of 3 or 4 at discharge within 90 days — no. (%)†	133 (34)	127 (32)	1.08 (0.84–1.37)	0.56
Secondary outcomes				
Death from any cause within 90 days — no. (%)	122 (31)	114 (29)	1.13 (0.88–1.46)	
Acute kidney injury with renal-replacement therapy — no. (%)	41 (10)	40 (10)	1.03 (0.66–1.59)	
Median CPC at 3 months (IQR)†	1 (1–5)	1 (1–5)		
Median modified Rankin scale score at 3 months (IQR)‡	1 (0–6)	1 (0–6)		
Median Montreal Cognitive Assessment score, per protocol (IQR)§	20 (15–27)	21 (15–27)		
Median Montreal Cognitive Assessment score at 3 months, post hoc (IQR)§	27 (24–29)	26 (24–29)		
Median neuron-specific enolase level at 48 hours (IQR) — µg/liter¶	18 (11–37)	18 (11–34)		
			Relative Risk (95% CI)	
Serious adverse events — no. (%)				
Infection	102 (26)	110 (28)	0.96 (0.82–1.11)	0.56
Arrhythmia**	59 (15)	50 (13)	1.10 (0.79–1.38)	0.33
Any bleeding††	82 (21)	92 (23)	0.93 (0.79–1.10)	0.43
Uncontrolled bleeding†††	22 (6)	16 (4)	0.85 (0.64–1.13)	0.31
Electrolyte disorder‡‡	23 (6)	34 (9)	0.82 (0.66–1.04)	0.13
Metabolic disorder§§	31 (8)	31 (8)	1.00 (0.77–1.30)	0.98
Seizure¶¶	76 (19)	88 (22)	0.92 (0.78–1.08)	0.32



Temperature control

- Maintain a constant, target temperature between 32 °C and 36 °C for those patients in whom temperature control is used (strong recommendation, moderate-quality evidence).
- Whether certain subpopulations of cardiac arrest patients may benefit from lower (32–34 °C) or higher (36 °C) temperatures remains unknown, and further research may help elucidate this.
- TTM is recommended for adults after OHCA with an initial shockable rhythm who remain unresponsive after ROSC (strong recommendation, low-quality evidence).
- TTM is suggested for adults after OHCA with an initial non-shockable rhythm who remain unresponsive after ROSC (weak recommendation, very low-quality evidence).
- TTM is suggested for adults after IHCA with any initial rhythm who remain unresponsive after ROSC (weak recommendation, very low-quality evidence).
- If targeted temperature management is used, it is suggested that the duration is at least 24 h (weak recommendation, very low-quality evidence).

- We recommend TTM for adults after either OHCA or IHCA (with any initial rhythm) who remain unresponsive after ROSC.
- Maintain a target temperature at a constant value between 32 °C and 36 °C for at least 24 h.
- Avoid fever (>37.7 °C) for at least 72 h after ROSC in patients who remain in coma.

A recent randomised controlled trial of both IHCA and OHCA patients with initial non-shockable rhythms showed a higher percentage of patients survived with a favourable neurological outcome when treated with TTM at 33 °C versus 37 °C.¹³ This has enabled the recommendation to be extended to all rhythms and locations.

The definition of fever (>37.7 °C) is consistent with that used in the TTM2 trial.¹⁴

Kontrola tělesné teploty



Kontrola tělesné teploty

Temperature control

- We recommend targeted temperature management (TTM) for adults after either OHCA or in-hospital cardiac arrest (IHCA) (with any initial rhythm) who remain unresponsive after ROSC.
- Maintain a target temperature at a constant value between 32 °C and 36 °C for at least 24 h.
- Avoid fever (>37.7 °C) for at least 72 h after ROSC in patients who remain in coma.
- Do not use pre-hospital intravenous cold fluids to initiate hypothermia.



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SPOLEČNOSTI



ORIGINAL ARTICLE

Targeted Temperature Management for Cardiac Arrest with Nonshockable Rhythm

J.-B. Lascarrou, H. Merdji, A. Le Gouge, G. Colin, G. Grillet, P. Girardie, E. Coupez, P.-F. Dequin, A. Cariou, T. Boulain, N. Brule, J.-P. Frat, P. Asfar, N. Pichon, M. Landais, G. Plantefeve, J.-P. Quenot, J.-C. Chakarian, M. Sirodot, S. Legriel, J. Letheulle, D. Thevenin, A. Desachy, A. Delahaye, V. Botoc, S. Vimeux, F. Martino, B. Giraudeau, and J. Reignier, for the CRICS-TRIGGERSEP Group*

Hyperion

- 33°C vs. 37°C u nedefibr. rytmu
- prim. outcome: 90. den CPC 1,2
- sekund. outcome: 90. denní mortalita
- IHCA i OHCA

Table 2. Neurologic Outcomes and Hospitalization Characteristics.*

Outcome	Hypothermia (N=284)	Normothermia (N=297)	Difference or Hazard Ratio (95% CI)
CPC score of 1 or 2 on day 90 — no. (%)	29 (10.2)	17 (5.7)	4.5 (0.1 to 8.9)†
CPC score distribution on day 90 — no. (%)			
CPC score of 1	16 (5.6)	11 (3.7)	
CPC score of 2	13 (4.6)	6 (2.0)	
CPC score of 3	22 (7.7)	31 (10.4)	
CPC score of 4	1 (0.4)	0	
CPC score of 5	231 (81.3)	247 (83.2)	
Loss to follow-up	1 (0.4)	2 (0.7)	
Death by day 90 — no. (%)	231 (81.3)	247 (83.2)	-1.9 (-8.0 to 4.4)†
Death in the ICU — no. (%)	222 (78.2)	236 (79.5)	0.93 (0.78 to 1.10)‡
Duration of mechanical ventilation — days			
Median	4.5	4.0	
Interquartile range	2.0 to 7.0	2.0 to 7.0	
Length of stay in ICU — days			
Median	4.0	4.0	
Interquartile range	2.0 to 7.0	2.0 to 6.0	
Survival to ICU discharge — no. (%)	62 (21.8)	61 (20.5)	1.07 (0.75 to 1.52)‡
Duration of mechanical ventilation — days			
Median	11.0	10.0	
Interquartile range	6.0 to 24.0	4.0 to 27.0	
Length of stay in ICU — days			
Median	6.0	6.0	
Interquartile range	4.0 to 18.0	2.0 to 21.0	
Survival to hospital discharge — no. (%)	56 (19.7)	50 (16.8)	1.19 (0.81 to 1.74)‡

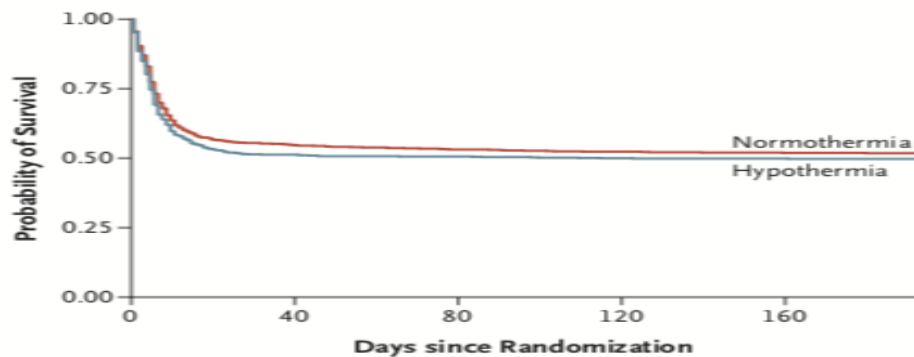


Hypothermia versus Normothermia after Out-of-Hospital Cardiac Arrest

J. Dankiewicz, T. Cronberg, G. Lilja, J.C. Jakobsen, H. Levin, S. Ullén, C. Rylander, M.P. Wise, M. Oddo, A. Cariou, J. Bělohávek, J. Hovdenes, M. Saxena, H. Kirkegaard, P.J. Young, P. Pelosi, C. Storm, F.S. Taccone, M. Joannidis, C. Callaway, G.M. Eastwood, M.P.G. Morgan, P. Nordberg, D. Erlinge, A.D. Nichol, M.S. Chew, J. Hollenberg, M. Thomas, J. Bewley, K. Sweet, A.M. Grejs, S. Christensen, M. Haenggi, A. Levis, A. Lundin, J. Düring, S. Schmidbauer, T.R. Keeble, C.V. Karamasis, C. Schrag, E. Faessler, O. Smid, M. Otáhal, M. Maggiorini, P.D. Wendel Garcia, P. Jaubert, J.M. Cole, M. Solar, O. Borgquist, C. Leithner, S. Abed-Maillard, L. Navarra, M. Annborn, J. Undén, I. Brunetti, A. Awad, P. McGuigan, R. Bjørkholm Olsen, T. Cassina, P. Vignon, H. Langland, T. Lange, H. Friberg, and N. Nielsen, for the TTM2 Trial Investigators*

Table 2. Outcomes and Adverse Events.

Outcome or Event	Hypothermia (N=930)	Normothermia (N=931)	Relative Risk (95% CI)*	P Value
Primary outcome: death from any cause at 6 mo — no./total no. (%)	465/925 (50)	446/925 (48)	1.04 (0.94–1.14)	0.37
Main secondary outcome — no./total no. (%)				
Score of 4–6 on modified Rankin scale at 6-mo follow-up†	488/881 (55)	479/866 (55)	1.00 (0.92–1.09)	
Poor functional outcome at 6 mo‡	495/918 (54)	493/911 (54)	1.00 (0.91–1.08)	
Score on modified Rankin scale at 6-mo follow-up — no./total no. (%)†				
0	140/881 (16)	148/866 (17)		
1	87/881 (10)	80/866 (9)		
2	132/881 (15)	127/866 (15)		
3	34/881 (4)	32/866 (4)		
4	16/881 (2)	20/866 (2)		
5	7/881 (1)	13/866 (2)		
6	465/881 (53)	446/866 (52)		
Serious adverse events — no./total no. (%)				
Arrhythmia resulting in hemodynamic compromise	222/927 (24)	152/921 (16)	1.45 (1.21–1.75)	<0.001
Bleeding	44/927 (5)	46/922 (5)	0.95 (0.63–1.42)	0.81
Skin complication related to device used for targeted temperature management	10/927 (1)	5/922 (<1)	1.99 (0.71–6.37)	0.21
Pneumonia	330/927 (36)	322/921 (35)	1.02 (0.90–1.15)	0.75
Sepsis	99/926 (11)	83/922 (9)	1.19 (0.90–1.57)	0.23



No. at Risk	0	40	80	120	160
Normothermia	925	506	491	484	480
Hypothermia	925	474	468	462	461

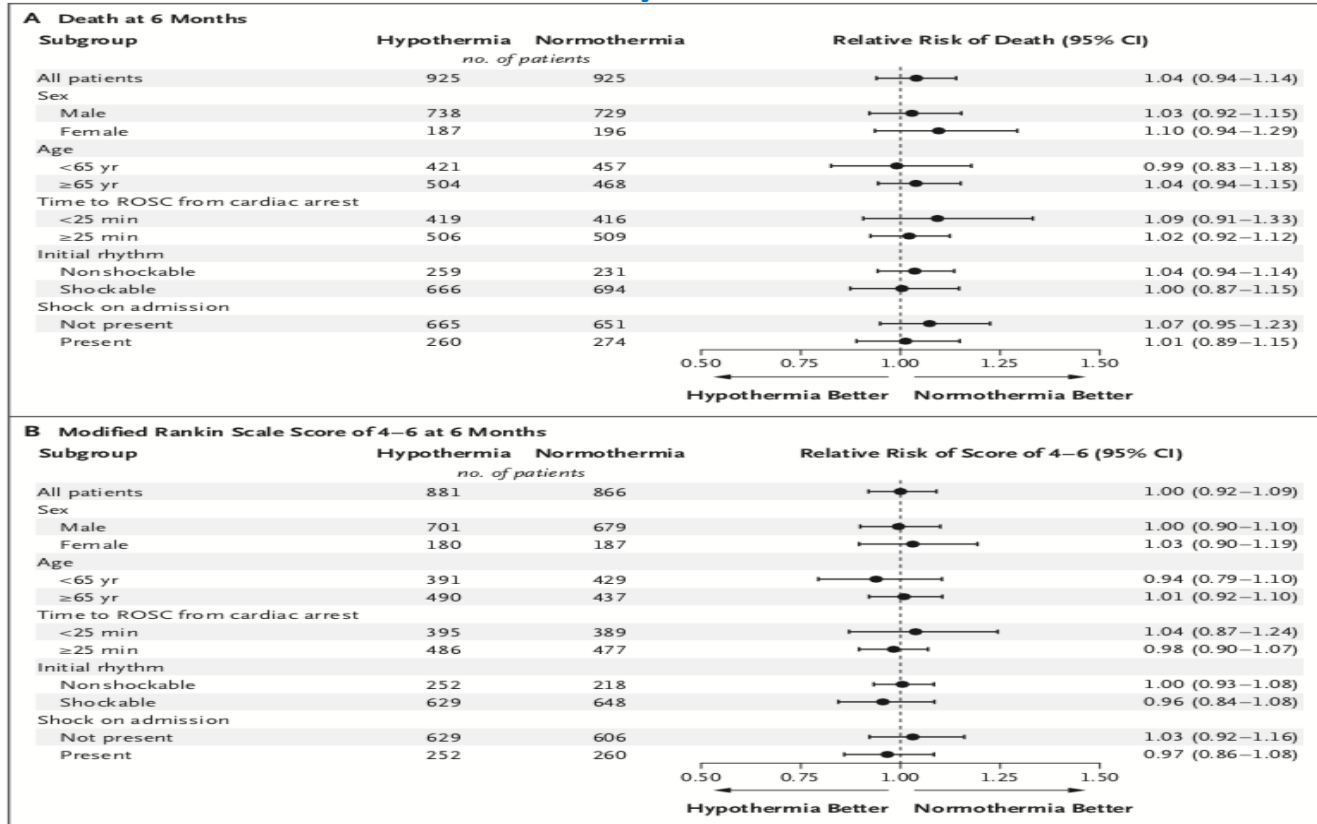
TTM 2

33°C vs. normothermie do 37.8 °C

primární outcome: 6-měs. mortalita

sekundární outcome: 6-měs. mRS ≥4

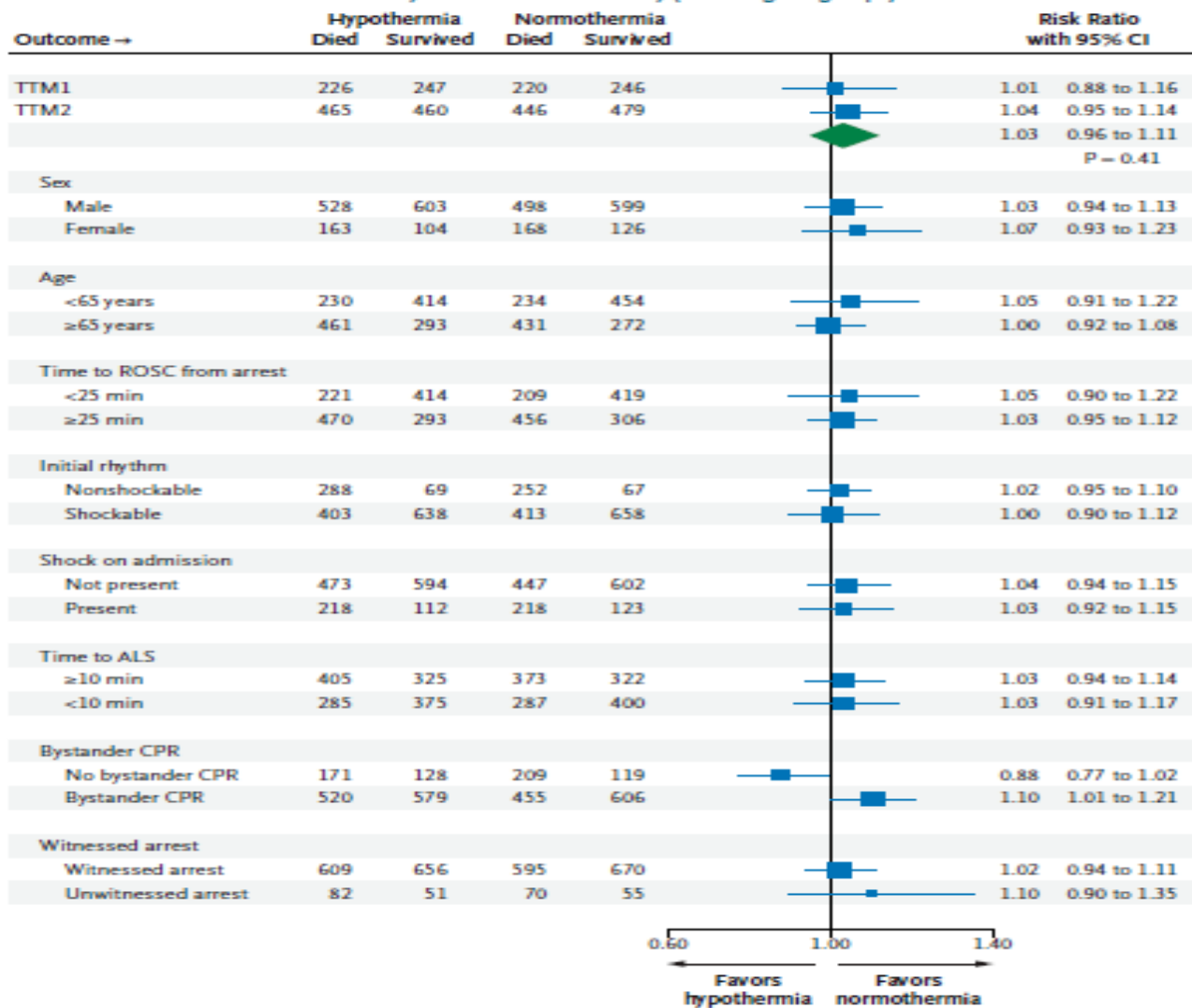
OHCA bez ohledu na inic. rytmus



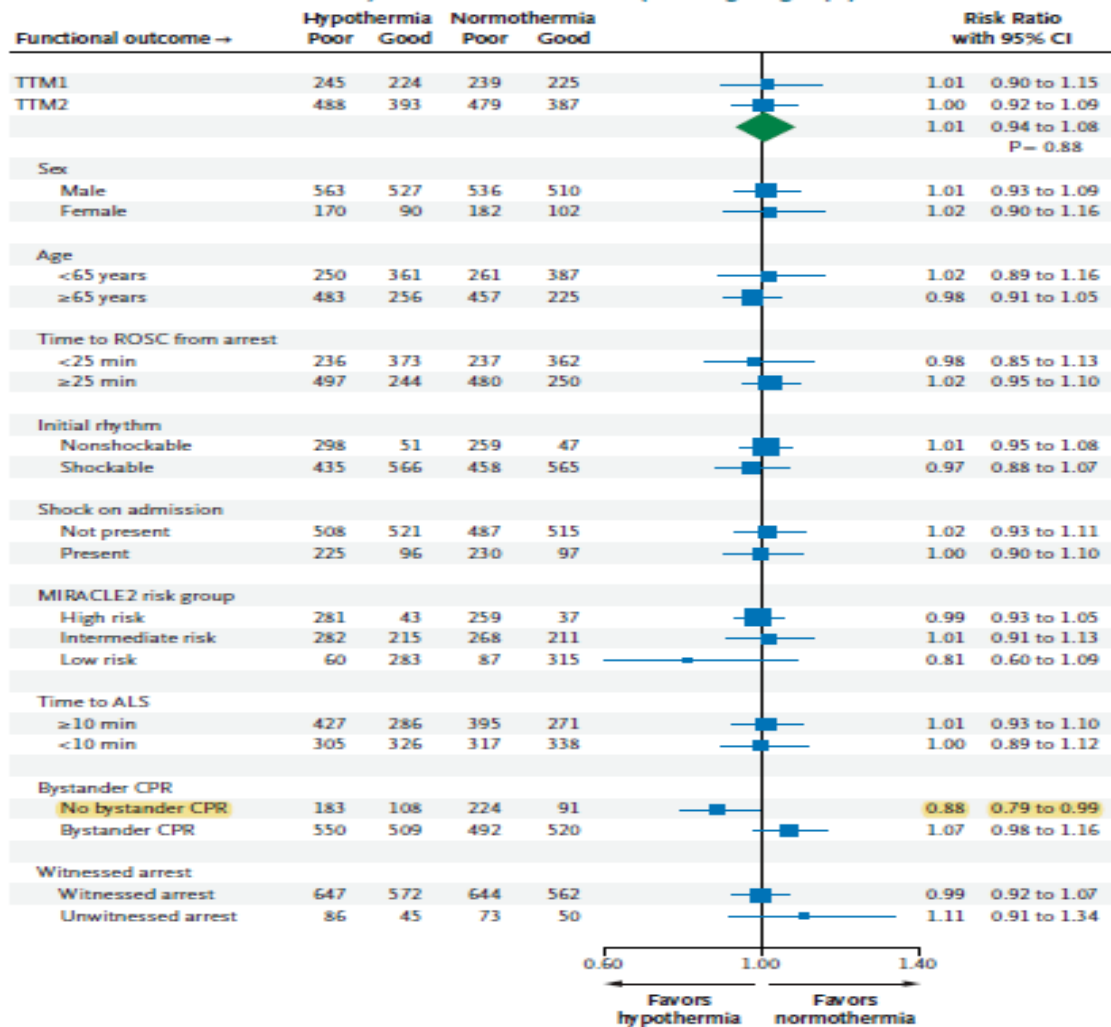
ORIGINAL ARTICLE

Hypothermic versus Normothermic Temperature Control after Cardiac Arrest

Meta-analysis of all-cause mortality (including subgroups)



Meta-analyses of functional outcome (including subgroups)



Diagnosis of cause of cardiac arrest

- Early identification of a respiratory or neurological cause can be achieved by performing a brain and chest CT-scan at hospital admission, before or after coronary angiography (see coronary reperfusion).
- In the absence of signs or symptoms suggesting a neurological or respiratory cause (e.g. headache, seizures or neurological deficits, shortness of breath or documented hypoxaemia in patients with known respiratory disease) or if there is clinical or ECG evidence of myocardial ischaemia, undertake coronary angiography first. This is followed by CT scan if coronary angiography fails to identify causative lesions.

Coronary reperfusion

- Emergent cardiac catheterisation laboratory evaluation (and immediate PCI if required) should be performed in adult patients with ROSC after cardiac arrest of suspected cardiac origin with ST-elevation on the ECG.
- In patients with ROSC after out-of-hospital cardiac arrest (OHCA) without ST-elevation on the ECG, emergent cardiac catheterisation laboratory evaluation should be considered if there is an estimated high probability of acute coronary occlusion (e.g. patients with haemodynamic and/or electrical instability).

2015 Guidelines

2021 Guidelines

Rationale for change

Coronary angiography

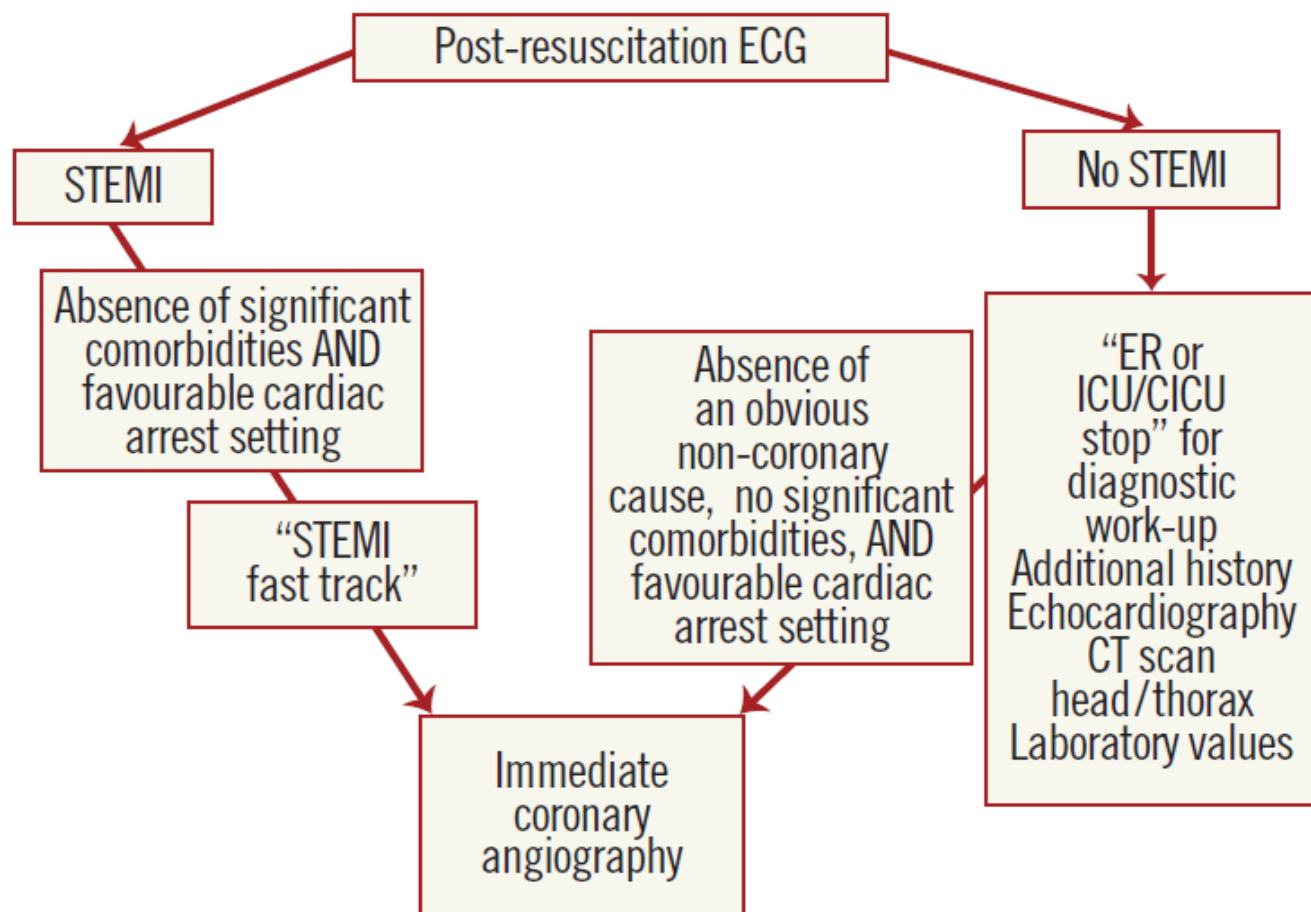
It is reasonable to discuss and consider emergent cardiac catheterisation laboratory evaluation after ROSC in patients with the highest risk of a coronary cause for their cardiac arrest

In patients with ROSC after OHCA without ST-elevation on the ECG, emergent cardiac catheterisation laboratory evaluation should be considered if there is an estimated high probability of acute coronary occlusion (e.g. patients with haemodynamic and/or electrical instability).

A randomised controlled trial showed no difference in 90-day survival following out of hospital VF cardiac arrest among patients without ST-elevation on the ECG allocated to immediate coronary angiography versus delayed angiography.¹⁰ Recent ESC guidelines state that 'Delayed as opposed to immediate angiography should be considered in haemodynamically stable patients without ST-segment elevation successfully resuscitated after an out-of-hospital cardiac arrest'.¹¹



Diagnostika



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Invasive coronary treatment strategies for out-of-hospital cardiac arrest: a consensus statement from the European Association for Percutaneous Cardiovascular Interventions (EAPCI)/Stent for Life (SFL) groups

Marko Noc¹, MD; Jean Fajadet², MD; Jens F. Lassen³, MD; Petr Kala⁴, MD; Philip MacCarthy⁵, MD; Goran K. Olivecrona⁶, MD; Stephan Windecker⁷, MD; Christian Spaulding^{8*}, MD

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(Summary of the 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. Prepared by the Czech Society of Cardiology)

Tabulka 13 – Riziková kritéria vyžadující invazivní strategii u non-STE AKS

Kritéria velmi vysokého rizika

- Hemodynamická nestabilita nebo kardiogenní šok
- Recidivující nebo pokračující bolest na hrudi refrakterní k medikamentózní léčbě
- Život ohrožující arytmie nebo srdeční zástava
- Mechanické komplikace infarktu myokardu
- Akutní srdeční selhání
- Recidivující dynamické změny ST nebo vlny T zejména s intermitentními elevacemi úseku ST

5.6.3 Načasování invazivní strategie

■ Okamžitá invazivní strategie (< 2 h)

Pacienti s non-STE AKS a velmi vysokým rizikem (tabulka 13) mají bez léčby špatnou prognózu. Doporučuje se okamžitá (tj. < 2 h od přijetí k hospitalizaci, analogická léčbě STEMI) invazivní strategie bez ohledu na EKG nebo výsledky biomarkerů. Centra bez STEMI programu by měla tyto pacienty okamžitě přeložit (obr. 6). Léčba pacientů se srdeční zástavou mimo nemocnici a bez STE na EKG musí být individualizována a vyžaduje multidisciplinární konzultaci. Ti, kteří jsou při vědomí, by měli okamžitě podstoupit SKG.

Doporučené postupy ESC pro léčbu akutního infarktu myokardu u pacientů s elevacemi úseku ST, 2017: souhrn dokumentu vypracovaný Českou kardiologickou společností

(2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: Summary of the document prepared by the Czech Society of Cardiology)



Petr Kala^a, Martin Mates^b, Michael Želízko^c, Richard Rokyta^d, Petr Ošťádal^b

Srdeční zástava		
Doporučení	Třída ^a	Úroveň ^b
U pacientů po resuscitaci pro srdeční zástavu s EKG záznamem odpovídajícím STEMI je doporučena strategie primární PCI.	I	B
U pacientů, kteří v časném období po resuscitaci pro srdeční zástavu dále nereagují, je indikována cílená regulace tělesné teploty. ^c	I	B
Je indikováno, aby zdravotní systémy uplatňovaly strategie pro usnadnění převozu (jednou specializovanou záchrannou službou) všech pacientů s podezřením na IM přímo do nemocnic s nonstop (24/7) možností reperfuze formou PCI.	I	C
Je doporučeno, aby všichni lékaři a zdravotničtí pracovníci pečující o osoby s podezřením na IM měli přístup k defibrilátorům a byli vyškoleni v poskytování základní podpory srdeční a životních funkcí.	I	C
U pacientů po resuscitaci pro srdeční zástavu bez diagnostických elevací úseku ST, ale s vysokým podezřením na probíhající ischemii myokardu by měla být zvážena urgentní koronarografie (a PCI, pokud je indikována).	IIa	C
Přednemocniční chlazení rychlou i.v. aplikací velkých objemů chladné tekutiny okamžitě po obnovení spontánního oběhu není doporučeno	III	B

3.3 Srdeční zástava (tabulka 7)

K mnoha úmrtím dochází během prvních několika hodin od začátku STEMI z důvodu fibrilace komor. U resuscitovaných pacientů s elevacemi úseku ST na EKG je indikována okamžitá koronarografie. Detaily viz doporučené postupy European Resuscitation Council (ERC).

- We recommend emergency cardiac catheterisation lab evaluation (and immediate PCI if required), in a manner similar to patients with STEMI without cardiac arrest, in selected adult patients with ROSC after out-of-hospital cardiac arrest (OHCA) of suspected cardiac origin with ST-elevation on ECG.
- In patients who are comatose and with ROSC after OHCA of suspected cardiac origin without ST-elevation on ECG It is reasonable to consider an emergency cardiac catheterisation lab evaluation in patients with the highest risk of coronary cause cardiac arrest.

The invasive management (i.e. early coronary angiography (CAG) followed by immediate PCI if deemed necessary) of this patient group, particularly patients after prolonged resuscitation and having nonspecific ECG changes, has been controversial due to the lack of specific evidence and significant implications on resource utilization (including transfer of patients to PCI centres).



COACT

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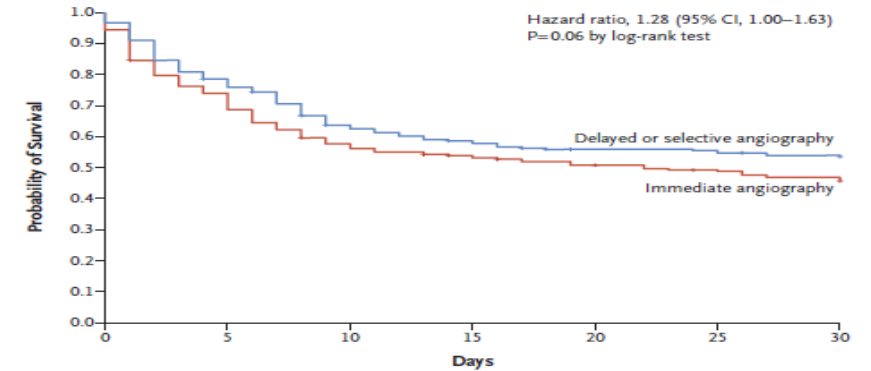
Coronary Angiography after Cardiac Arrest without ST-Segment Elevation

J.S. Lemkes, G.N. Janssens, N.W. van der Hoeven, L.S.D. Jewballi, E.A. Dubois, M. Meuwissen, T.A. Rijpstra, H.A. Bosker, M.J. Blans, G.B. Bleeker, R. Baak, G.J. Vlachojannis, B.J.W. Eikemans, P. van der Harst, I.C.C. van der Horst, M. Voskuil, J.J. van der Heijden, A. Beishuizen, M. Stoel, C. Carnaro, H. van der Hoeven, J.P. Henriques, A.P.J. Vlaar, M.A. Vink, B. van den Bogaard, T.A.C.M. Heestermans, W. de Ruijter, T.S.R. Delnoij, H.J.G.M. Crijns, G.A.J. Jessurun, P.V. Oemrawsingh, M.T.M. Gosselink, K. Plomp, M. Magro, P.W.G. Elbers, P.M. van de Ven, H.M. Oudemans-van Straaten, and N. van Royen

Table 3. Clinical Outcomes.*

Outcome	Immediate Angiography Group (N=273)	Delayed Angiography Group (N=265)	Effect Size (95% CI)†
Primary end point			
Survival at 90 days — no. of patients (%)‡	176 (64.5)	178 (67.2)	OR, 0.89 (0.62 to 1.27)
Secondary end points			
Survival with good cerebral performance or mild or moderate disability — no. of patients/total no. (%)	171/272 (62.9)	170/264 (64.4)	OR, 0.94 (0.66 to 1.31)
CPC score at 90 days — no./total no. (%)§			
1	157/272 (57.7)	159/264 (60.2)	Reference
2	14/272 (5.1)	11/264 (4.2)	OR, 1.29 (0.56 to 2.92)
3	4/272 (1.5)	5/264 (1.9)	OR, 0.81 (0.21 to 3.07)
4	0/272	2/264 (0.8)	NA
5	97/272 (35.7)	87/264 (33.0)	OR, 1.13 (0.78 to 1.63)
Survival until hospital discharge — no. of patients (%)	178 (65.2)	182 (68.7)	OR, 0.85 (0.60 to 1.22)
Neurologic status at ICU discharge			
GCS score			
Median (IQR)	15 (14 to 15)	15 (14 to 15)	
Geometric mean (95% CI)	13.7 (13.2 to 14.2)	13.5 (12.9 to 13.7)	1.02 (0.96 to 1.04)
CPC score — no./total no. (%)§			
1	74/258 (28.7)	86/249 (34.5)	Reference
2	59/258 (22.9)	56/249 (22.5)	OR, 1.22 (0.76 to 1.98)
3	36/258 (14.0)	30/249 (12.0)	OR, 1.39 (0.78 to 2.48)
4	4/258 (1.6)	9/249 (3.6)	OR, 0.52 (0.15 to 1.75)
5	85/258 (32.9)	68/249 (27.3)	OR, 1.45 (0.93 to 2.27)
TIMI major bleeding, any grade — no. (%)	7 (2.6)	13 (4.9)	OR, 0.51 (0.20 to 1.30)
Recurrence of ventricular tachycardia resulting in defibrillation or electrical cardioversion — no. (%)	21 (7.7)	16 (6.0)	OR, 1.30 (0.66 to 2.54)
Creatinine kinase			
Median AUC (IQR)	30,099 (9983 to 67,096)	28,006 (11,044 to 74,043)	
Geometric mean (95% CI)	25,694 (21,764 to 30,333)	25,306 (21,140 to 30,291)	1.02 (0.80 to 1.30)
Creatinine kinase MB			
Median AUC (IQR)	930 (402 to 2456)	851 (302 to 2868)	
Geometric mean (95% CI)	975 (793 to 1198)	949 (739 to 1219)	1.03 (0.74 to 1.42)
Troponin T			
Median AUC (IQR)	11.3 (4.4 to 33.5)	10.6 (4.5 to 36.2)	
Geometric mean (95% CI)	11.2 (9.2 to 13.6)	12.8 (10.3 to 16.0)	0.87 (0.64 to 1.16)
Troponin I			
Median AUC (IQR)	154.7 (33.1 to 1762)	183.2 (21.4 to 7278)	
Geometric mean (95% CI)	226.7 (100.1 to 513.2)	315.9 (116.7 to 837.5)	0.72 (0.21 to 2.54)
AKIN classification stage — no./total no. (%)¶			
0	218/244 (89.3)	214/243 (88.1)	Reference
1	12/244 (4.9)	8/243 (3.3)	OR, 1.47 (0.59 to 3.67)
2	4/244 (1.6)	5/243 (2.1)	OR, 0.79 (0.21 to 2.96)
3	10/244 (4.1)	16/243 (6.6)	OR, 0.61 (0.27 to 1.38)

TOMAHAWK



No. at Risk							
Days	0	5	10	15	20	25	30
Delayed or selective angiography	265	207	163	149	139	138	133
Immediate angiography	265	195	151	138	129	123	117

End Point	Immediate Angiography (N=265)	Delayed or Selective Angiography (N=265)	Effect Size (95% CI)†
Primary end point			
Death from any cause — no. (%)	143 (54.0)	122 (46.0)	Hazard ratio, 1.28 (1.00 to 1.63)
Secondary efficacy end points‡			
Myocardial infarction — no./total no. (%)	0/248	2/250 (0.8)	Relative risk, 0 (0 to 1.93)
Severe neurologic deficit — no./total no. (%)§	21/112 (18.8)	16/126 (12.7)	Relative risk, 1.48 (0.82 to 2.67)
Death from any cause or severe neurologic deficit — no./total no. (%)	164/255 (64.3)	138/248 (55.6)	Relative risk, 1.16 (1.00 to 1.34)
Median length of ICU stay (IQR) — days	7 (3–11)	8 (4–13)	HLE, -1 (-2 to 0)

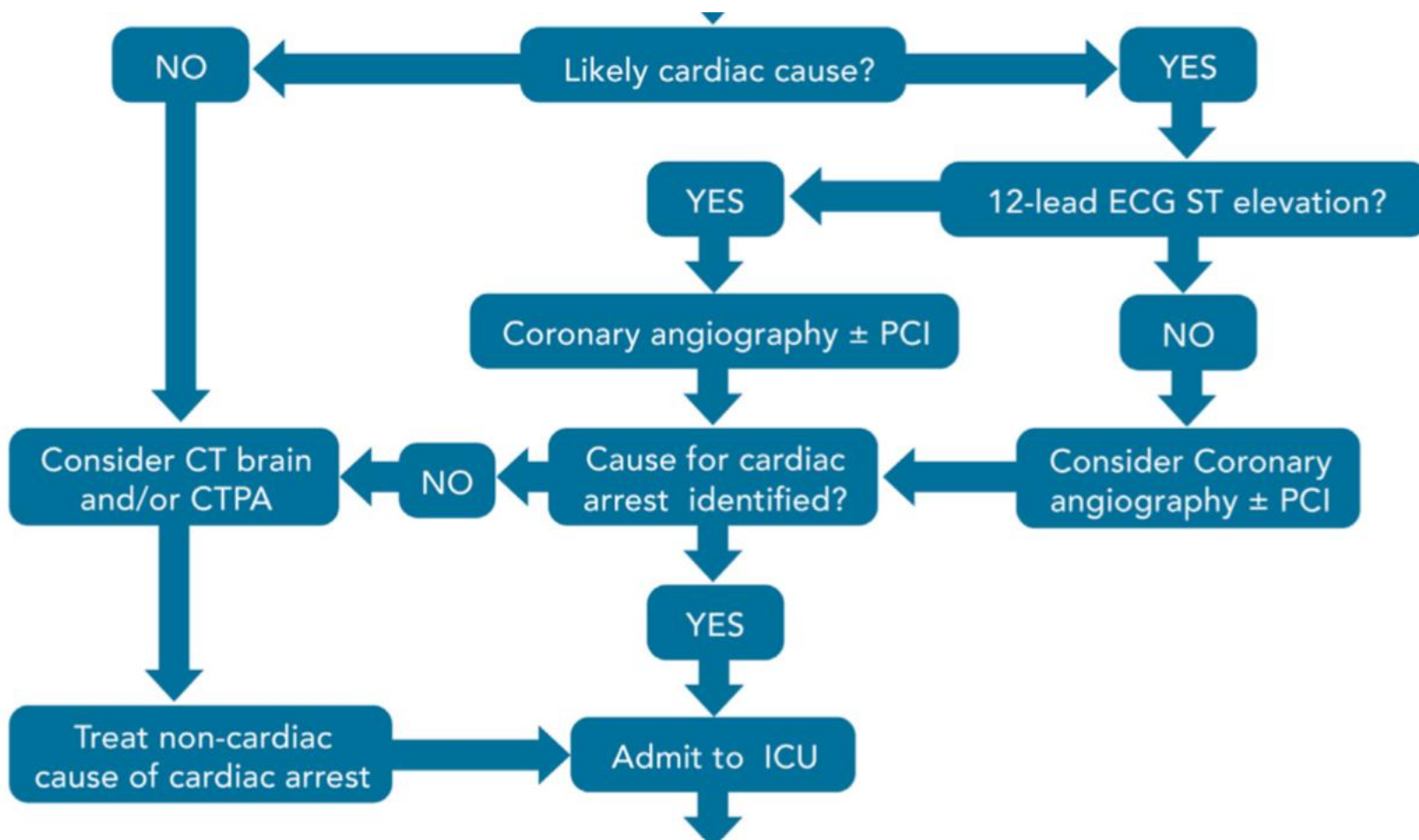
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Diagnostický algoritmus



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ČESKÉ KARDIOLOGICKÉ
SPOLEČNOSTI



Randomized Trial of Three Anticonvulsant Medications for Status Epilepticus

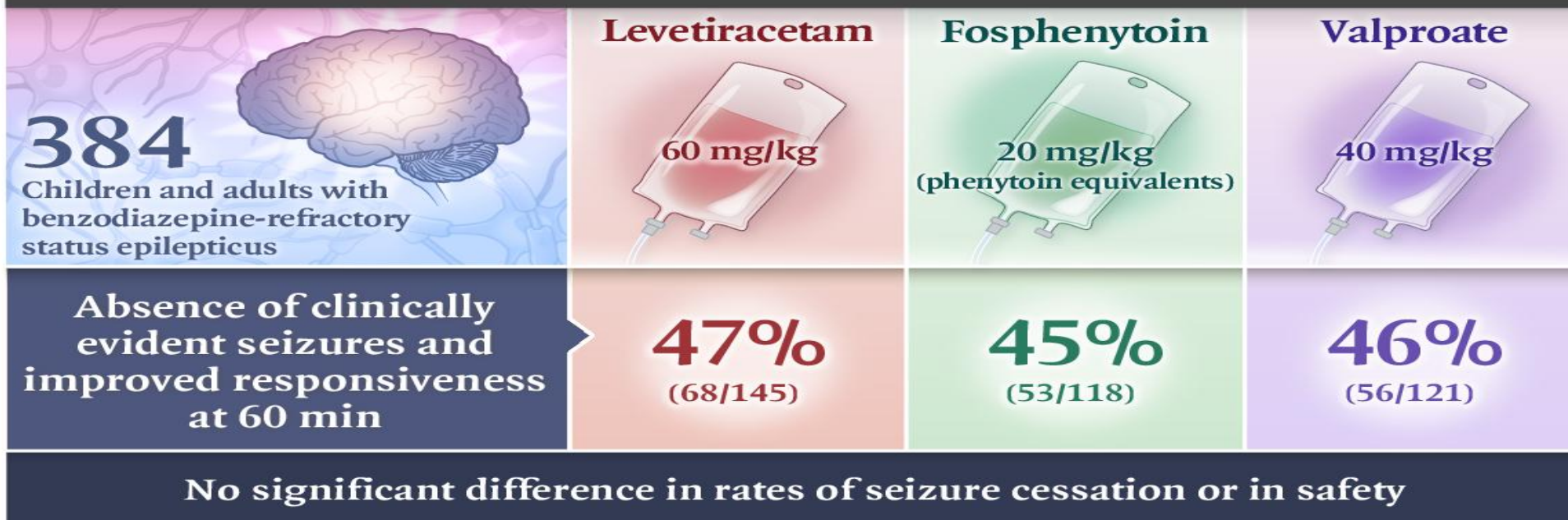


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Trial of Three Anticonvulsant Medications for Status Epilepticus

MULTICENTER, RANDOMIZED, DOUBLE-BLIND TRIAL



J. Kapur et al. 10.1056/NEJMoa1905795

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Outcome	Levetiracetam (N=150)	Fosphenytoin (N=125)	Valproate (N=125)
Life-threatening hypotension within 60 min after start of trial-drug infusion	1 (0.7)	4 (3.2)	2 (1.6)

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TELSTAR

- 172 pt. comatose after OHCA/IHCA
- rhythmic and periodic EEG patterns on continuous EEG (start at least H24)
- CRT 1:1, 88 pts. antiseizure med. vs. 84 pts. standard care
- Therapy et least 48 hours
- Primary outcome : CPC at 3 months
- Secondary endpoints: mortality, ICU stay, MV days
- Interventions:
 - STEP 1- first antiseizure drug (phenytoin/valproate/levetiracetam)+ sedative (propofol or midazolame)
 - STEP 2 – second antiseizure drug+second sedative
 - STEP 3 – high dose barbiturate

Treating Rhythmic and Periodic EEG Patterns in Comatose Survivors of Cardiac Arrest

B.J. Ruijter, H.M. Keijzer, M.C. Tjepkema-Cloostermans, M.J. Blans, A. Beishuizen, S.C. Tromp, E. Scholten, J. Horn, A.-F. van Rootselaar, M.M. Admiraal, W.M. van den Bergh, J.-W.J. Elting, N.A. Foudraïne, F.H.M. Kornips, V.H.J.M. van Kranen-Mastenbroek, R.P.W. Rouhl, E.C. Thomeer, W. Moudrous, F.A.P. Nijhuis, S.J. Booij, C.W.E. Hoedemaekers, J. Doorduïn, F.S. Taccone, J. van der Palen, M.J.A.M. van Putten, and J. Hofmeijer, for the TELSTAR Investigators*

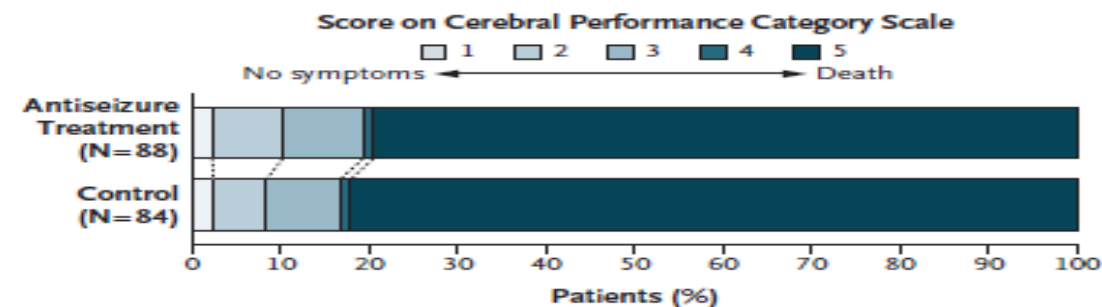


Table 2. Antiseizure Treatment and EEG Response.*

Variable	Antiseizure Treatment (N=88) no./total no. (%)	Control (N=84)†
Treatment details		
Intensive antiseizure treatment started	88/88 (100)	0/83
Intensive antiseizure treatment continued after 24 hr‡	54/88 (61)	0/83
No. of antiseizure drugs used		
0	0/88	75/83 (90)
1	24/88 (27)	5/83 (6)
2	57/88 (65)	3/83 (4)
≥3	7/88 (8)	0/83
No. of sedative drugs used		
0	1/88 (1)	20/83 (24)
1	27/88 (31)	47/83 (57)
2	54/88 (61)	15/83 (18)
≥3	6/88 (7)	1/83 (1)
≥1 Antiseizure drug continued during entire period of ICU admission	85/88 (97)	8/83 (10)
Effect on EEG recordings		
Complete suppression of EEG index activity for ≥48 consecutive hr§	49/88 (56)	2/83 (2)
Complete suppression of EEG index activity for ≥24 consecutive hr	75/88 (85)	10/83 (12)
Suppression of RPPs 0–24 hr after randomization		
Complete	64/88 (73)	3/83 (4)
Partial	20/88 (23)	11/83 (13)
None	4/88 (5)	69/83 (83)
Suppression of RPPs 24–48 hr after randomization‡		
Complete	60/88 (68)	39/83 (47)
Partial	12/88 (14)	14/83 (17)
None	6/88 (7)	9/83 (11)
No EEG recordings available	2/88 (2)	1/83 (1)
Treatment restrictions during ICU admission		
Do not resuscitate	32/88 (36)	36/83 (43)
Withdrawal of life-sustaining treatment	68/88 (77)	65/83 (78)

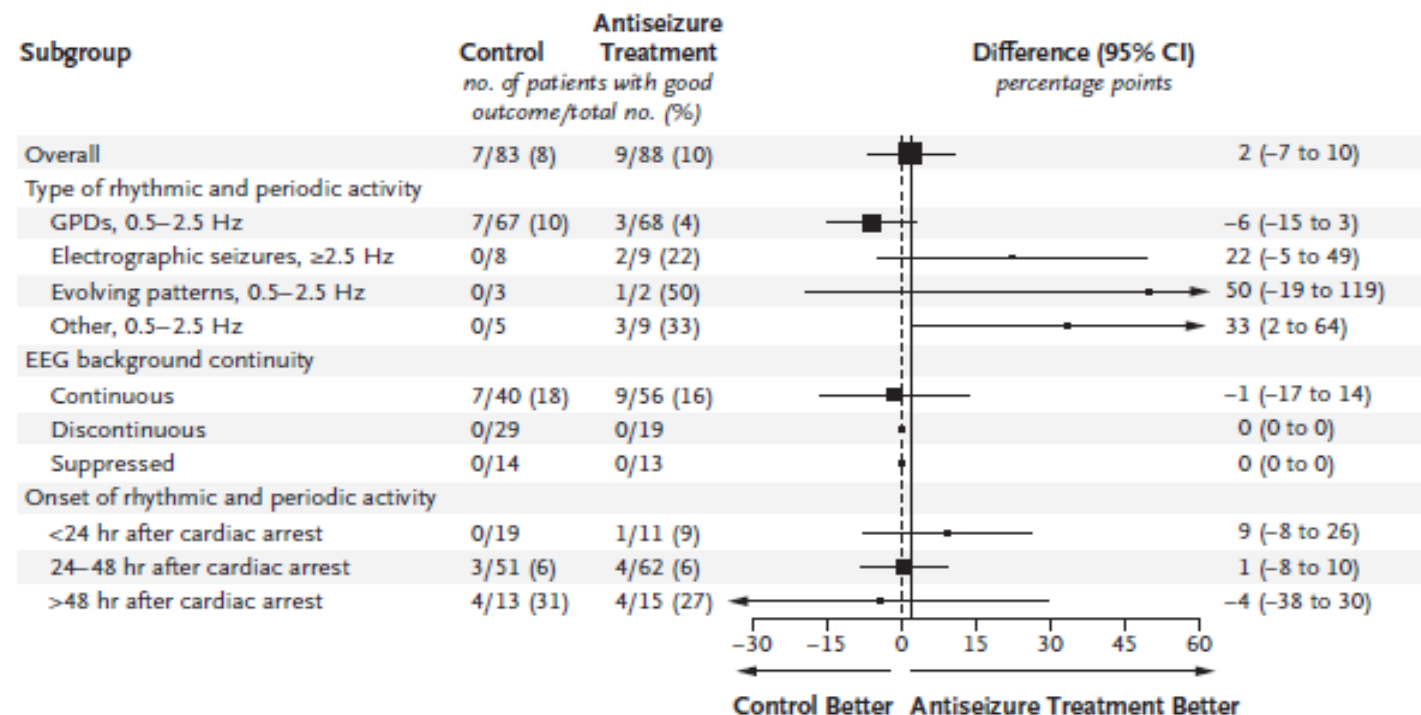
Table 3. Primary, Secondary, and Safety Outcomes (Intention-to-Treat Population).*

Outcome	Antiseizure Treatment (N=88)	Control (N=84)	Measure of Effect†		P Value
			Calculation	Value (95% CI)	
Primary outcome					
CPC score of 3, 4, or 5 at 3 mo — no. (%)	79 (90)	77 (92)	Risk difference	2 (–7 to 11)	0.68
Secondary outcomes‡					
CPC score at 3 mo§			Common odds ratio	1.19 (0.56 to 2.53)	
CPC score of 2 to 5 at 3 mo — no. (%)	86 (98)	82 (98)	Risk difference	0 (–5 to 4)	
CPC score of 4 or 5 at 3 mo — no. (%)	71 (81)	70 (83)	Risk difference	3 (–9 to 14)	
Death at 3 months — no. (%)	70 (80)	69 (82)	Risk difference	3 (–9 to 14)	
Mean length of stay in the ICU (95% CI) — days	8.7 (6.7 to 10.7)	7.5 (5.5 to 9.4)			
Mean duration of mechanical ventilation (95% CI) — days	7.8 (6.1 to 9.5)	6.6 (4.9 to 8.4)			
Serious adverse events until 3 mo					
Any serious adverse event — no. (%)	73 (83)	72 (86)	Chi-square test		0.62
Death after withdrawal of life-sustaining treatment — no./total no. (%)	68/88 (77)	65/83 (78)	Chi-square test		0.87
Death, other cause — no. (%)	2 (2)¶	4 (5)‖	Fisher's exact test		0.44
Patients with other serious adverse events — no. (%)	8 (9)	9 (11)	Chi-square test		0.72
No. of other serious adverse events	10	11			

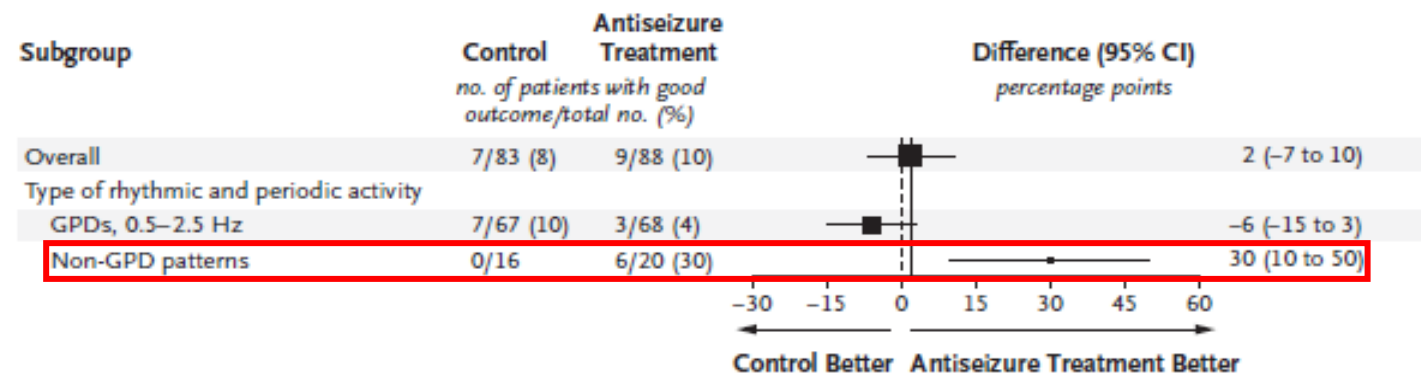


- GDP:
- Generalized periodic discharges

A Prespecified Analyses



B Post Hoc Analysis: GPDs vs. Non-GPD Patterns



CAC

Adult patients with non-traumatic OHCA should be considered for transport to a cardiac arrest centre according to local protocol.

An expert consensus paper published by several European organisations including the Association of Acute Cardiovascular Care (ACVA) of the European Society of Cardiology (ESC), the ERC and the ESICM, states that the minimum requirements for a cardiac arrest centre are 24/7 availability of an on-site coronary angiography laboratory, an emergency department, an ICU, imaging facilities, such as echocardiography, CT, and MRI.¹⁶ Based on evidence from a systematic review, ILCOR suggests that wherever possible, adult patients with non-traumatic OHCA cardiac arrest should be cared for in cardiac arrest centres.¹⁷

eCPR

Extracorporeal CPR (eCPR) is defined by the ELSO (Extracorporeal Life Support Organization) as the application of rapid-deployment veno-arterial extracorporeal membrane oxygenation (VA-ECMO) to provide circulatory support in patients in whom conventional CPR is unsuccessful in achieving sustained ROSC.³⁶¹ The use of eCPR has increased for both IHCA and OHCA in recent years.^{362–365}

The 2019 ILCOR CoSTR informed by a systematic review made the following recommendation:^{242,244,366}

- We suggest that eCPR may be considered as a rescue therapy for selected patients with cardiac arrest when conventional CPR is failing in settings in which it can be implemented (weak recommendation, very low certainty of evidence).



Advanced reperfusion strategies for patients with out-of-hospital cardiac arrest and refractory ventricular fibrillation (ARREST): a phase 2, single centre, open-label, randomised controlled trial

Demetris Yannopoulos, Jason Bartos, Ganesh Raveendran, Emily Walser, John Connett, Thomas A Murray, Gary Collins, Lin Zhang, Rajat Kalra, Marinos Kosmopoulos, Ranjit John, Andrew Shaffer, R J Frascone, Keith Wesley, Marc Conterato, Michelle Biros, Jakub Tolar, Tom P Auferheide



Effect of Intra-arrest Transport, Extracorporeal Cardiopulmonary Resuscitation, and Immediate Invasive Assessment and Treatment on Functional Neurologic Outcome in Refractory Out-of-Hospital Cardiac Arrest: A Randomized Clinical Trial

Jan Belohlavek, MD, PhD; Jana Smalцова, MD; Daniel Rob, MD; Ondrej Franek, MD; Ondrej Smid, MD; Milana Pokorna, MD, PhD; Jan Horak, MD; Vratislav Mrazek, MD; Tomas Kovarik, MD, PhD; David Zemanek, MD, PhD; Ales Kral, MD, PhD; Stepan Havranek, MD, PhD; Petra Kavalkova, PhD; Lucie Kompelentova, MD; Helena Tomkova, MD; Alan Mejstrik, MSc; Jaroslav Valasek, MD; David Peran, MSc; Jaroslav Pekara, MSc; Jan Rullsek, MD, PhD; Martin Balik, MD, PhD; Michal Huptych, PhD; Jiri Jarkovsky, PhD; Jan Malik, MD, PhD; Anna Valerianova, MD, PhD; Frantisek Milejnsky, MSc, PhD; Petr Kolouch, MD; Petra Havrankova, MD, PhD; Dan Romportl, MD; Arnost Komarek, PhD; Ales Linhart, MD, PhD; for the Prague OHCA Study Group

Research Original Investigation

Functional Neurologic Outcomes After Early Invasive Management of Out-of-Hospital Cardiac Arrest

Table 2. Primary and Secondary Outcomes in a Study of Intra-arrest Transport, Extracorporeal Cardiopulmonary Resuscitation, and Immediate Invasive Assessment and Treatment in Refractory Out-of-Hospital Cardiac Arrest

	No. (%)		Absolute difference, % (95% CI)	P value
	Invasive strategy (n = 124)	Standard strategy (n = 132)		
Primary outcome				
Survival with minimal or no neurologic impairment at 180 d ^a	39 (31.5)	29 (22.0)	9.5 (-1.3 to 20.1)	.09
Secondary outcomes				
Survival with minimal or no neurologic impairment at 30 d ^a	38 (30.6)	24 (18.2)	12.4 (1.9 to 22.7)	.02
Cardiac recovery at 30 d ^b	54 (43.5)	45 (34.1)	9.4 (-2.5 to 21)	.12



	ECMO-facilitated resuscitation (n=15)		Standard ACLS treatment (n=15)		Risk difference or p value
	Number of patients with data	Patients	Number of patients with data	Patients	
Primary outcome (95% CrI)					
Survival to hospital discharge	14	6 (43%. 21.3-67.7)	15	1 (7%. 1.6-30.2)	36% (3.7-59.2; posterior probability= 0.9861)
Secondary outcomes (95% CI)					
Survival to 3 months	14	6 (43%. 21.3-67.7)	15	0 (0.0-20.4)	0.0063
Survival to 6 months	14	6 (43%. 21.3-67.7)	15	0 (0.0-20.4)	0.0063
CPC score at discharge	6	2.5 (0.5)	1	4	NA
CPC score at 3 months	6	1.16 (0.4)	0	NA	NA
CPC score at 6 months	6	1.16 (0.4)	0	NA	NA
mRS score at discharge	6	3.8 (0.7)	1	5	NA
mRS score at 3 months	6	2 (1.2)	0	NA	NA
mRS score at 6 months	6	1.3 (0.8)	0	NA	NA

The cardiac arrest centre for the treatment of sudden cardiac arrest due to presumed cardiac cause: aims, function, and structure: position paper of the ACVC association of the ESC, EAPCI, EHRA, ERC, EUSEM, and ESICM

CAC (Cardiac Arrest Centre)

Emergency department for assessment of patient without STEMI criteria for non-cardiac causes

Coronary angiography 24/7

ICU with the option of TTM

Imaging facilities (TTE, TEE, CT and MRI)

Rehabilitation service

Education and teaching

Data acquisition and quality control

OHCA hub hospital

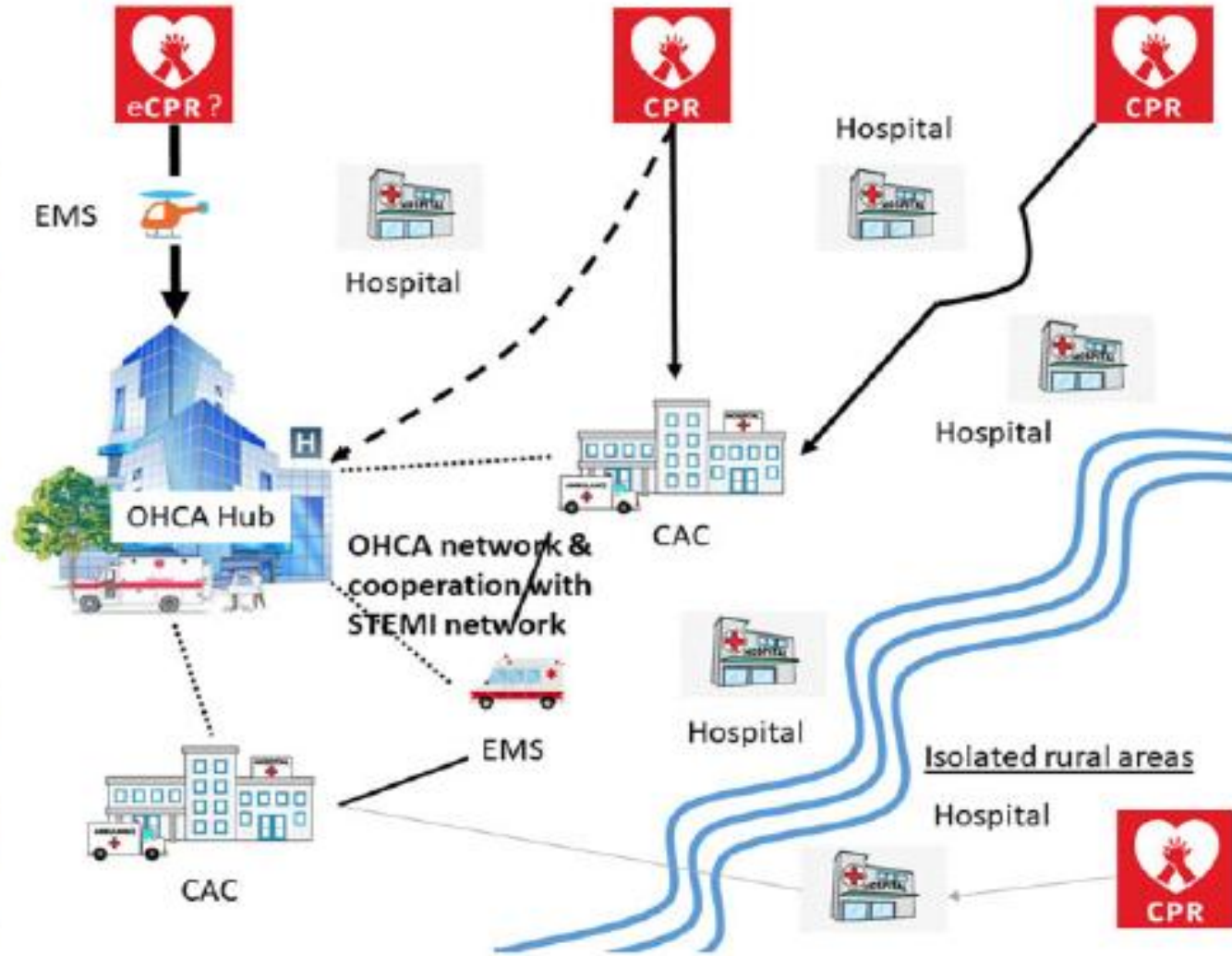
All features of the CAC AND

Mechanical assist device program – eCPR

Arrhythmia management with EPS

Device management

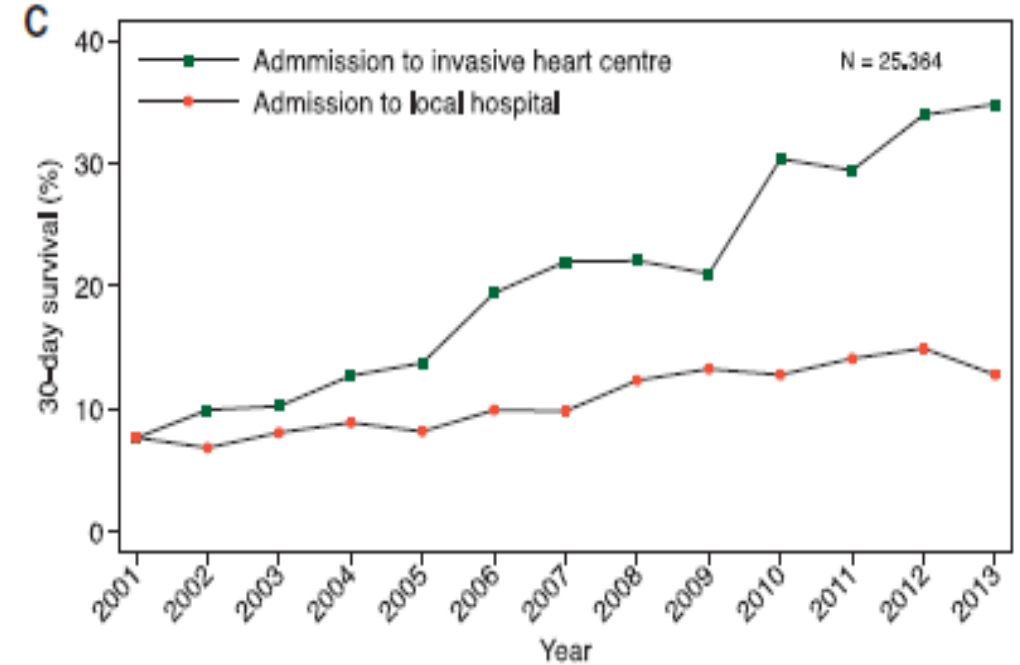
Research facilities and fund raising



Distance to invasive heart centre, performance of acute coronary angiography, and angioplasty and associated outcome in out-of-hospital cardiac arrest: a nationwide study

Tinne Tranberg^{1*}, Freddy K. Lippert², Erika F. Christensen^{3,4}, Carsten Stengaard¹, Jakob Hjørt¹, Jens Flensted Lassen¹, Frants Petersen⁵, Jan Skov Jensen⁶, Caroline Bäck⁷, Lisette Okkels Jensen⁸, Jan Ravkilde⁹, Hans Erik Botker¹, and Christian Juhl Terkelsen¹

- 1. přijetí do PCI centra zlepšuje 30-denní přežívání
- 2. vzdálenost do centra nemá na přežívání vliv
- 3. přežívání je závislé na hustotě populace, laické KPR, zástavě přede svědky a defibrilovatelném rytmu





Original Investigation | Emergency Medicine

Association of High-Volume Centers With Survival Outcomes Among Patients With Nontraumatic Out-of-Hospital Cardiac Arrest A Systematic Review and Meta-Analysis

Amella Xin Chun Goh; Jie Cong Seow; Melvin Yong Hao Lai; Nan Liu, PhD; Yi Man Goh; Marcus Eng Hock Ong, MBBS, MPH; Shir Lynn Lim, MBBS, MMed (Int Med); Jamie Sin Ying Ho, MBBChir (Cantab); Jun Wei Yeo; Andrew Fu Wah Ho, MBBS, MMed, MPH

Figure 2. Adjusted Odds of Survival to Charge and to 30 Days

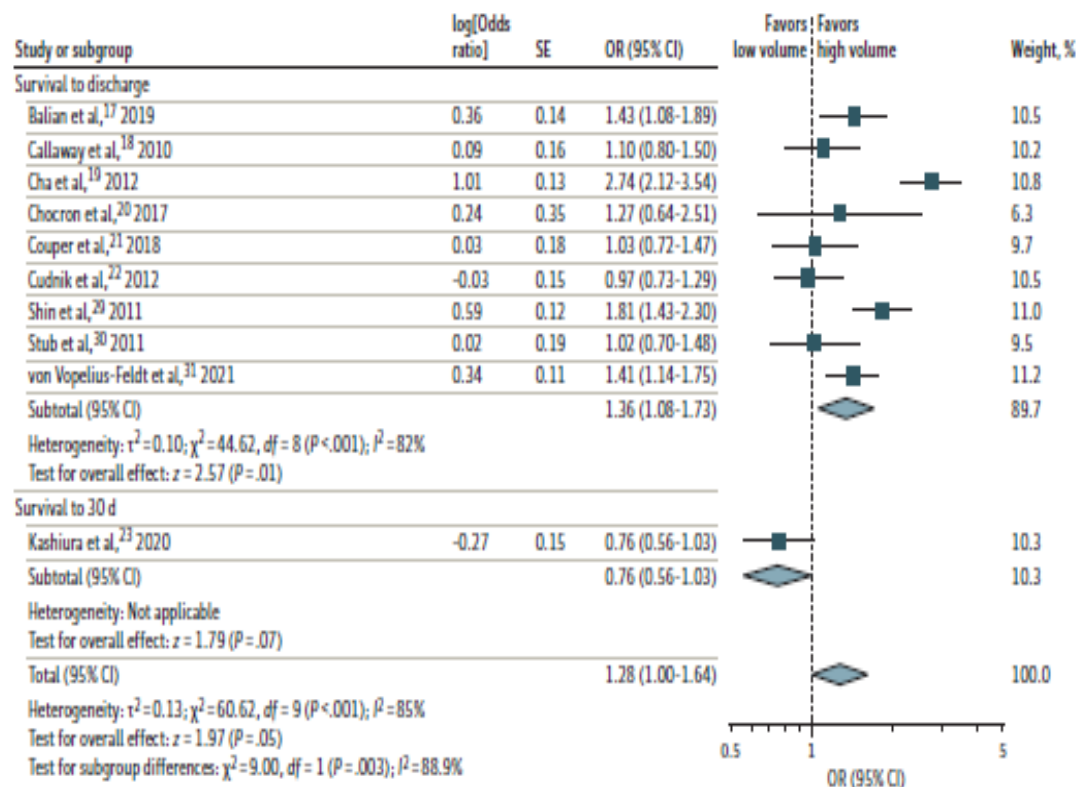
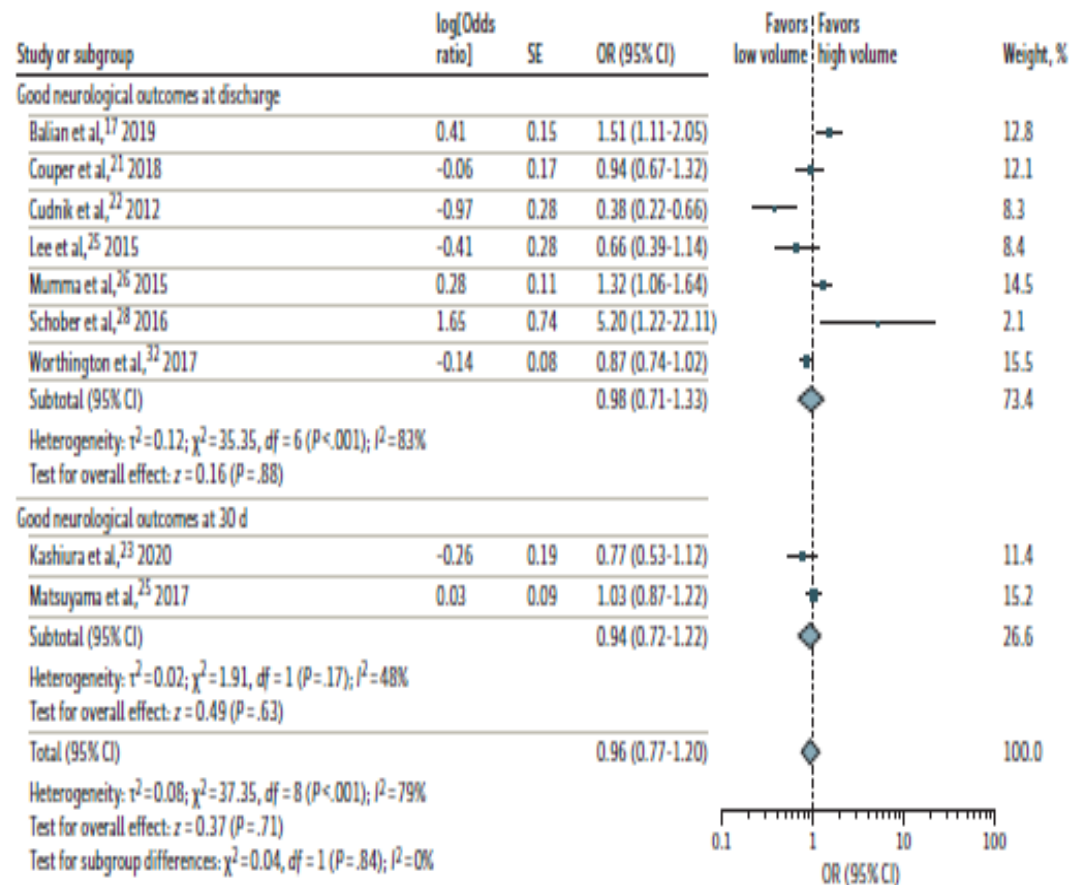


Figure 3. Adjusted Odds of Good Neurological Outcomes at Discharge and 30 Days



Závěr

- Adrenalin u asystolie ASAP
- Zvážit alternativní defibrilační techniky u refrakterní VF
- Udržovat normoxémii a normokapnii
- Udržovat MAP na ne méně než 65 mmHg a diurézu nad 0.5 ml/kg/h
- TTM mezi 32-36°C po 24 h bez ohledu na IHCA/OHCA a inic. rytmus
- Paušálně akutně SKG u OHCA bez ST elevací neprovádět
- multimodální neuroprognostifikace/stanovení špatné neurol. prognózy
- Anitkonvulzivní terapie u epileptogenních projevů
- Zvážit možnost eCPR
- Směrování pacienta do CAC





After delivering this speech Chatham suddenly pressed his hand to his heart and fell back in a swoon.

- My Lords, any state is better than despair. Let us at least make one effort; and if we must fall, let us fall like men!

XXXI. VÝROČNÍ SJEZD
ČESKÉ KARDIOLOGICKÉ
SPOLEČNOSTI

