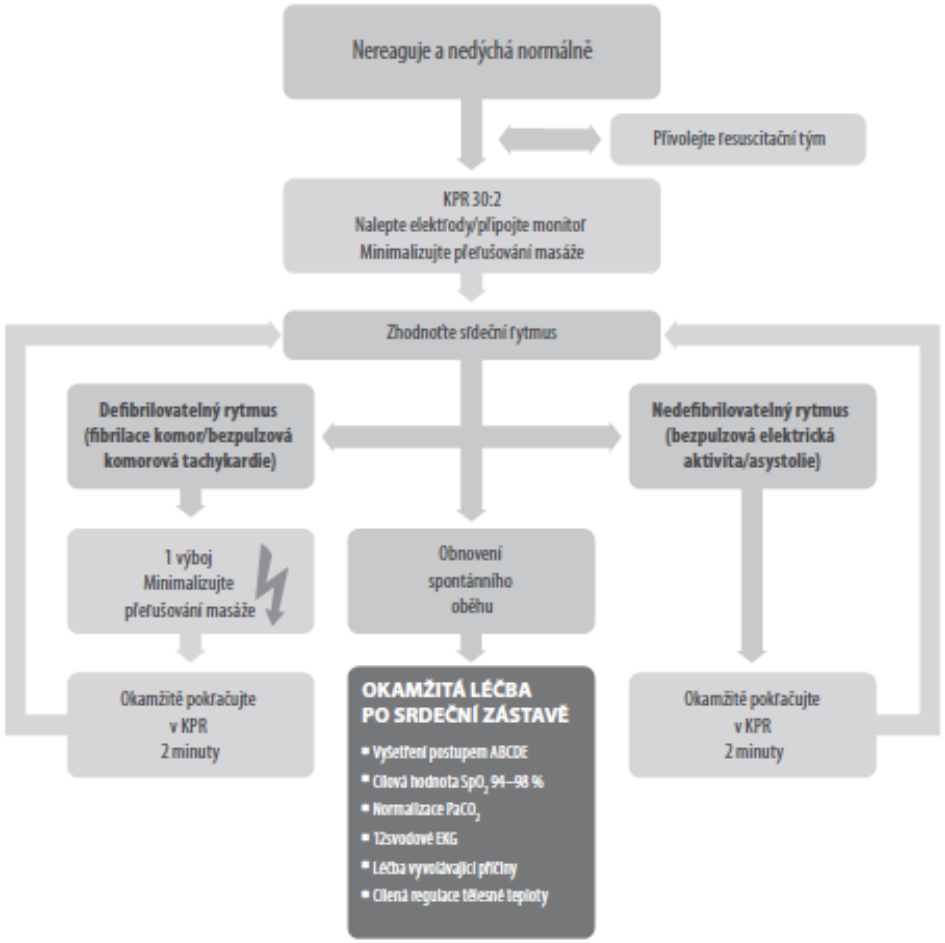
FN MOTOL

PACIENT SE ZASTAVIL PŘEDE DVEŘMI ER….

JIŘÍ KARÁSEK

Rozšířená neodkladná resuscitace



BĚHEM KPR

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

ZAJISTĚTE LÉČBU REVERZIBILNÍCH PŘÍČIN

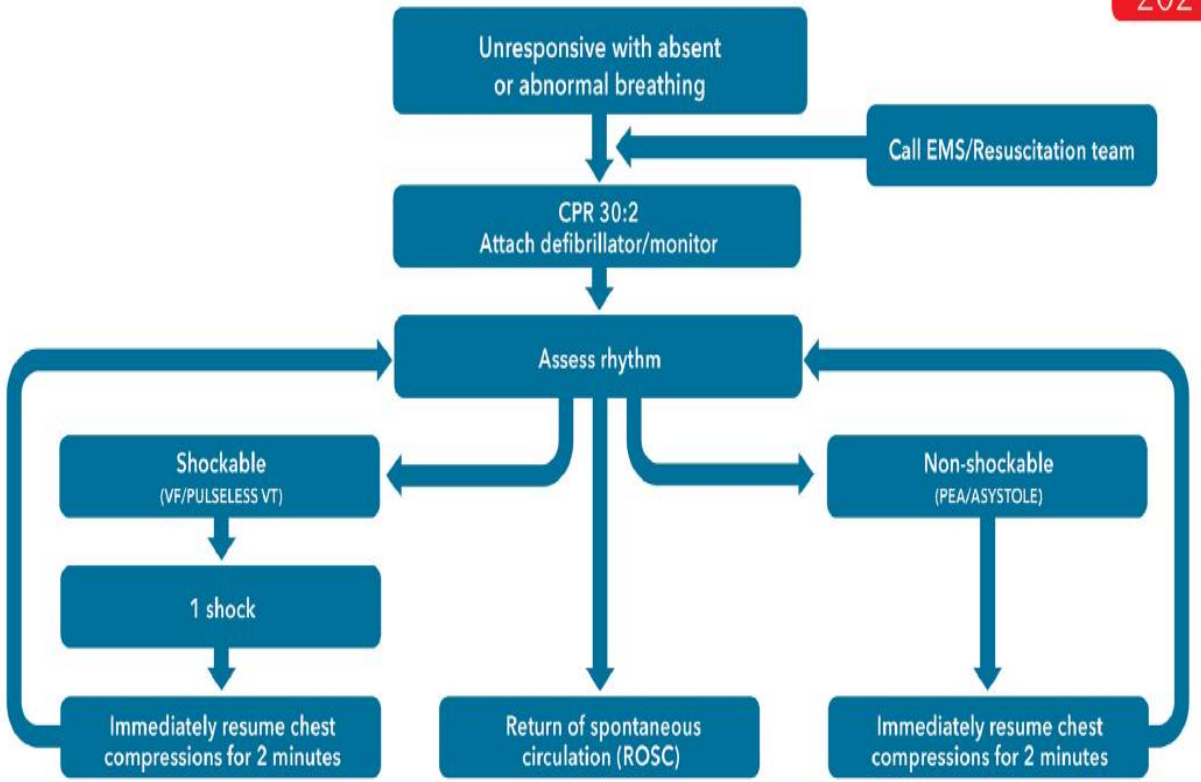
Hypoxie	Trombóza (koronární tepny/plicní embolie)
Hypovolémie	Tenzní pneumotorax
Hypokalémie/hyperkalémie/metabolické příčiny	Tamponáda srdeční
Hypotermie/hypertermie	Toxické látky (intoxikace)

ZVAŽTE

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

ADVANCED LIFE SUPPORT

EUROPEAN RESUSCITATION COUNCIL GUIDELINES 2021



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

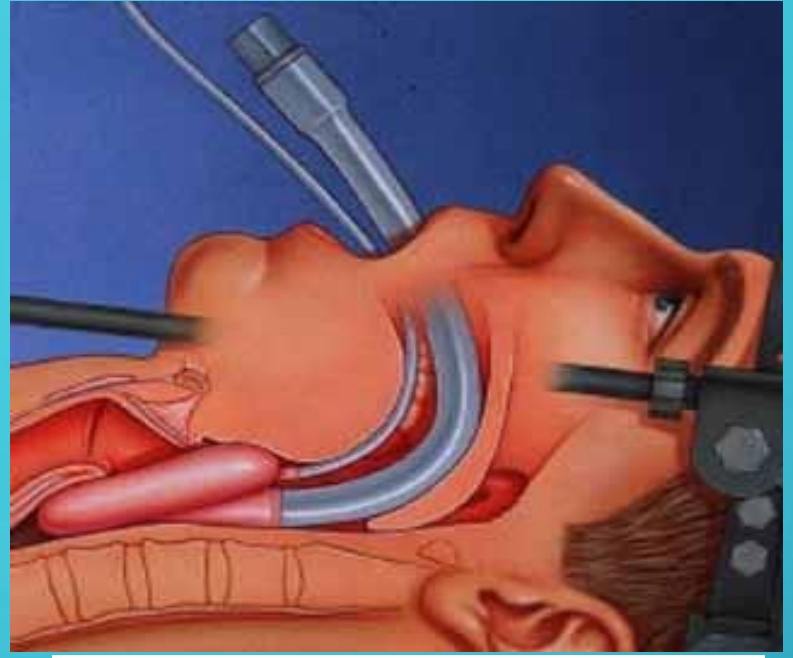
- Coronary angiography/percutaneous coronary intervention
- Mechanical chest compressions to facilitate transfer/treatment
- Extracorporeal CPR

After ROSC

- Use an ABCDE approach
- Aim for SpO_2 of 94-98% and normal $PaCO_2$
- 12 Lead ECG
- Identify and treat cause
- Targeted temperature management

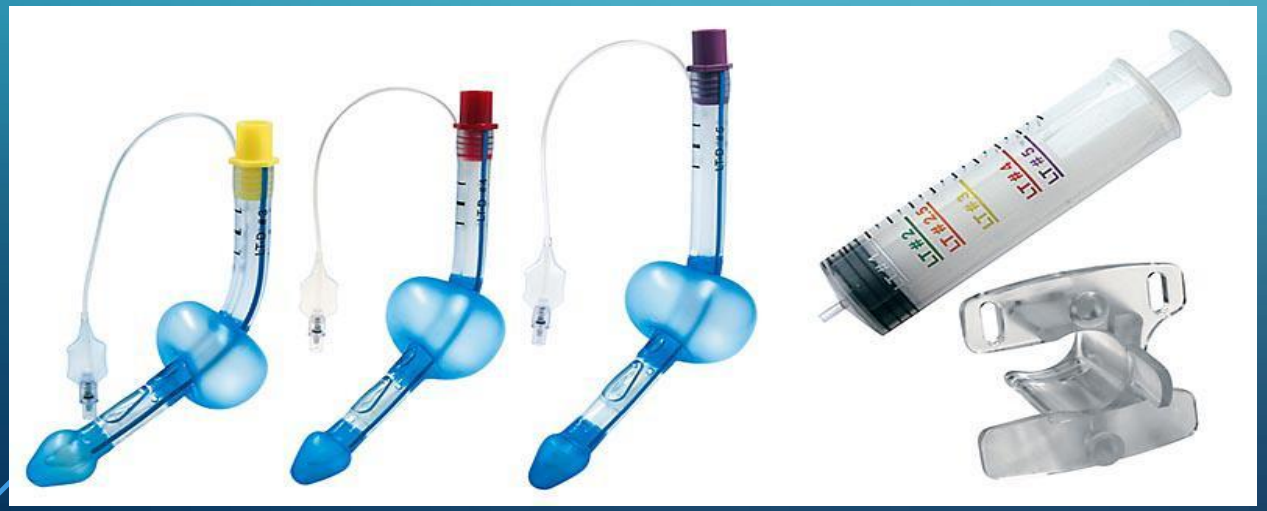
LAMA

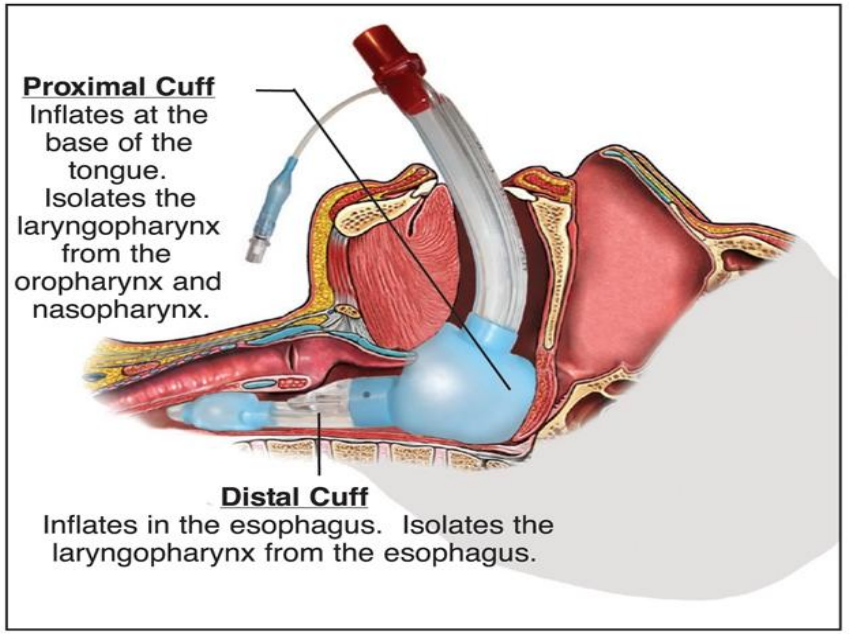
Těsní do PS 30 mm H2O
Nebrání zcela aspiraci
Zavádí se naslepo
Nemusí mít dostatečný efekt
Dospělí velikost 3-5
Fastrach

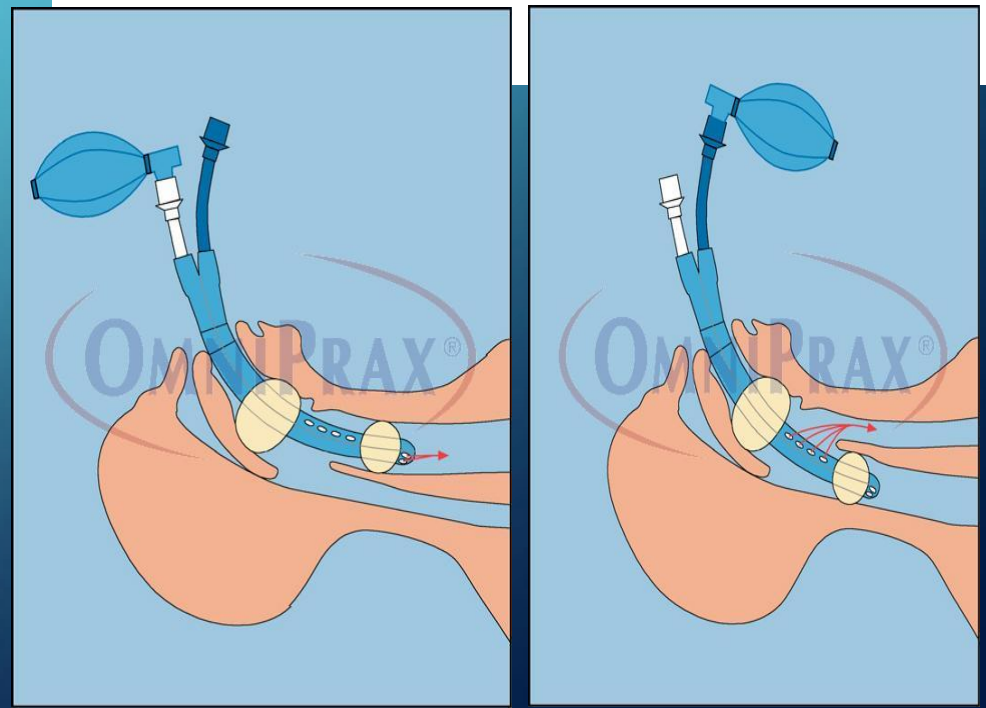


COMBITUBUS

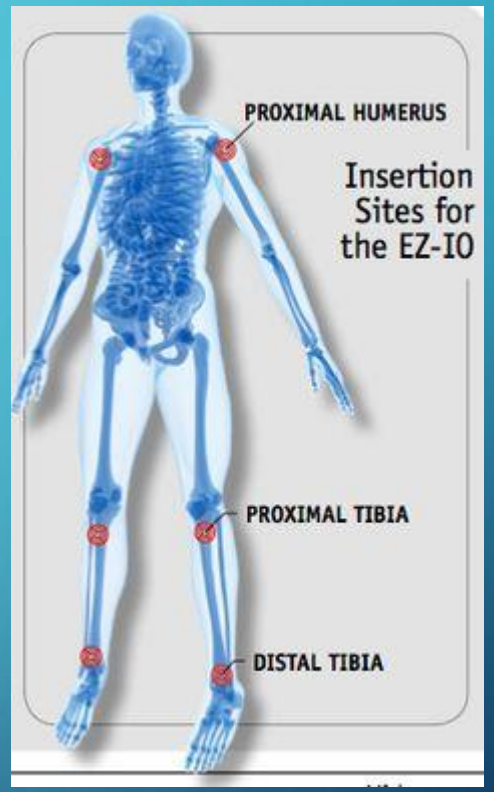
- Alternativa zejména v PNP
- Lze použít jen dočasně (do 8 hod)
- Jícnová a tracheální rourka, dva balónky

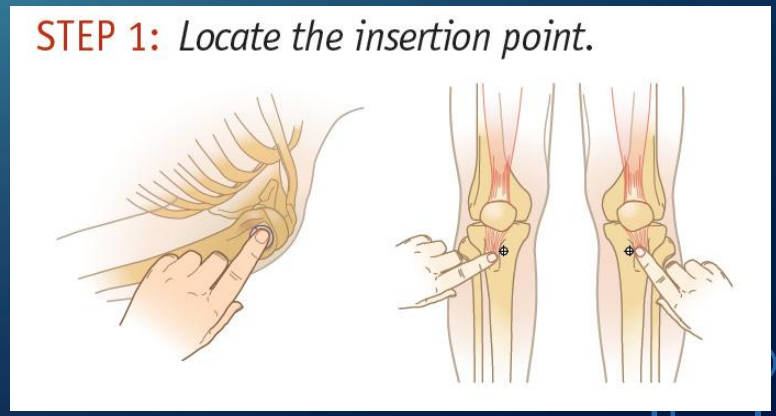






INTRAOSEÁLNÍ PŘÍSTUP






69
99
38
187
70


ALPHA
COLUMBIA

The NEW ENGLAND JOURNAL of MEDICINE

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)

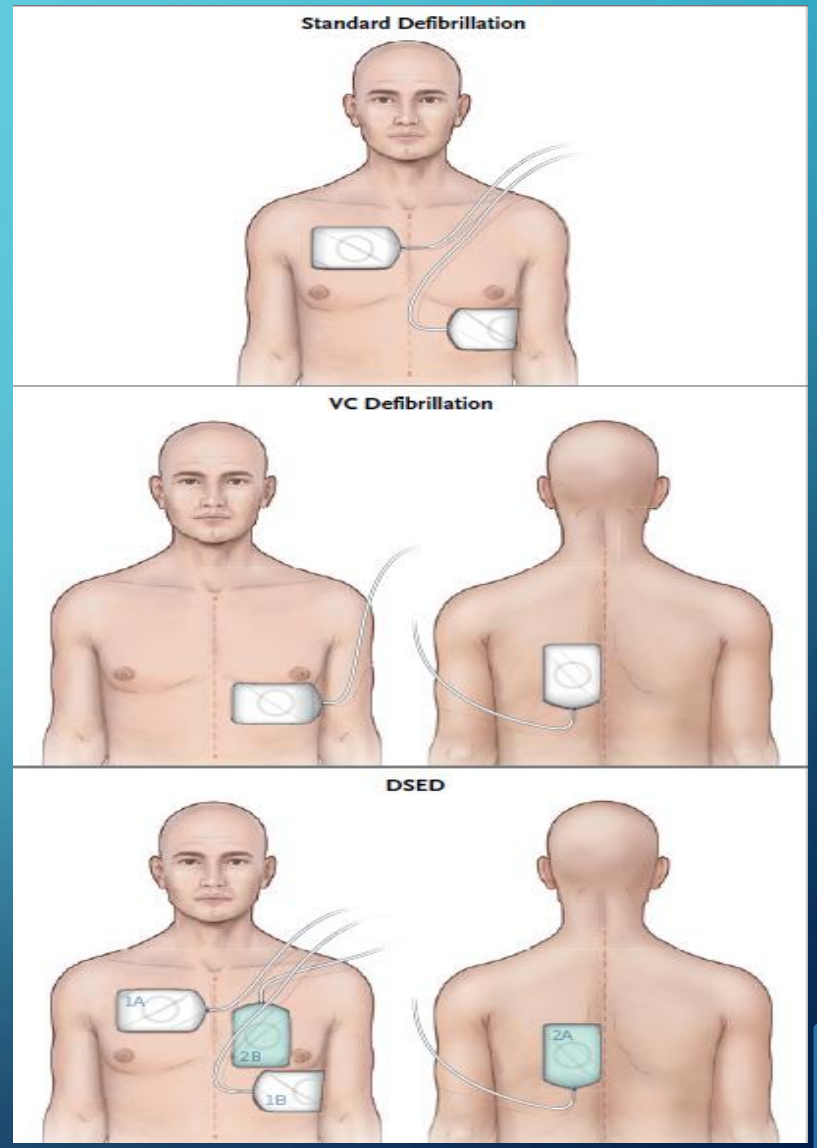
Ukončeno pro COVID

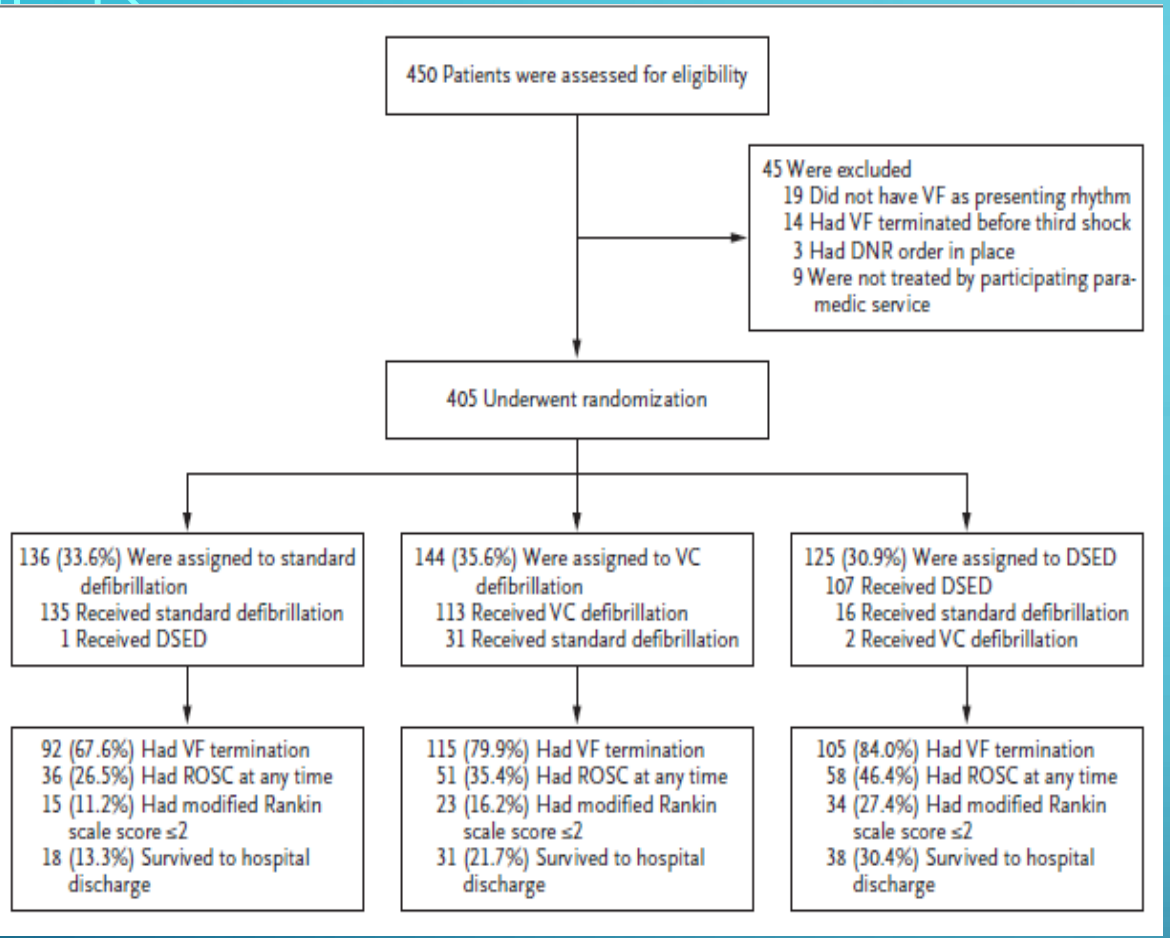
Konvenční defibrilace vs. VC (vector change) vs. DSED (double sequentional extrenal defibrilation

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
	number of patients/total number (percent)				
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)

Mechanical versus manual chest compression for out-of-hospital cardiac arrest (PARAMEDIC): a pragmatic, cluster randomised controlled trial

*Gavin D Perkins, Ranjit Lall, Tom Quinn, Charles D Deakin, Matthew W Cooke, Jessica Horton, Sarah E Lamb, Anne-Marie Slowther, Malcolm Woollard, Andy Carson, Mike Smyth, Richard Whitfield, Amanda Williams, Helen Pocock, John J M Black, John Wright, Kyee Han, Simon Gates, PARAMEDIC trial collaborators**

Summary

Background Mechanical chest compression devices have the potential to help maintain high-quality cardiopulmonary resuscitation (CPR), but despite their increasing use, little evidence exists for their effectiveness. We aimed to study whether the introduction of LUCAS-2 mechanical CPR into front-line emergency response vehicles would improve survival from out-of-hospital cardiac arrest.

Methods The pre-hospital randomised assessment of a mechanical compression device in cardiac arrest (PARAMEDIC) trial was a pragmatic, cluster-randomised open-label trial including adults with non-traumatic, out-of-hospital cardiac arrest from four UK Ambulance Services (West Midlands, North East England, Wales, South Central). 91 urban and semi-urban ambulance stations were selected for participation. Clusters were ambulance service vehicles, which were randomly assigned (1:2) to LUCAS-2 or manual CPR. Patients received LUCAS-2 mechanical chest compression or manual chest compressions according to the first trial vehicle to arrive on scene. The primary outcome was survival at 30 days following cardiac arrest and was analysed by intention to treat. Ambulance dispatch staff and those collecting the primary outcome were masked to treatment allocation. Masking of the ambulance staff who delivered the interventions and reported initial response to treatment was not possible. The study is registered with Current Controlled Trials, number ISRCTN08233942.

Findings We enrolled 4471 eligible patients (1652 assigned to the LUCAS-2 group, 2819 assigned to the control group) between April 15, 2010 and June 10, 2013. 985 (60%) patients in the LUCAS-2 group received mechanical chest compression, and 11 (<1%) patients in the control group received LUCAS-2. In the intention-to-treat analysis, 30 day survival was similar in the LUCAS-2 group (104 [6%] of 1652 patients) and in the manual CPR group (193 [7%] of 2819 patients; adjusted odds ratio [OR] 0·86, 95% CI 0·64–1·15). No serious adverse events were noted. Seven clinical adverse events were reported in the LUCAS-2 group (three patients with chest bruising, two with chest lacerations, and two with blood in mouth). 15 device incidents occurred during operational use. No adverse or serious adverse events were reported in the manual group.

Interpretation We noted no evidence of improvement in 30 day survival with LUCAS-2 compared with manual compressions. On the basis of ours and other recent randomised trials, widespread adoption of mechanical CPR devices for routine use does not improve survival.

Funding National Institute for Health Research HTA – 07/37/69.

Original Investigation

Mechanical Chest Compressions and Simultaneous Defibrillation vs Conventional Cardiopulmonary Resuscitation in Out-of-Hospital Cardiac Arrest

The LINC Randomized Trial

Sten Rubertsson, MD, PhD; Erik Lindgren, MD; David Smekal, MD, PhD; Ollie Östlund, PhD; Johan Silfverstolpe, MD; Robert A. Lichtveld, MD, PhD; Rene Boomars, MPA; Björn Ahlstedt, MD; Gunnar Skoog, MD; Robert Kastberg, MD; David Halliwell, RN; Martyn Box, RN; Johan Herlitz, MD, PhD; Rolf Karlsten, MD, PhD

IMPORTANCE A strategy using mechanical chest compressions might improve the poor outcome in out-of-hospital cardiac arrest, but such a strategy has not been tested in large clinical trials.

OBJECTIVE To determine whether administering mechanical chest compressions with defibrillation during ongoing compressions (mechanical CPR), compared with manual cardiopulmonary resuscitation (manual CPR), according to guidelines, would improve 4-hour survival.

DESIGN, SETTING, AND PARTICIPANTS Multicenter randomized clinical trial of 2589 patients with out-of-hospital cardiac arrest conducted between January 2008 and February 2013 in 4 Swedish, 1 British, and 1 Dutch ambulance services and their referring hospitals. Duration of follow-up was 6 months.

INTERVENTIONS Patients were randomized to receive either mechanical chest compressions (LUCAS Chest Compression System, Physio-Control/Jolife AB) combined with defibrillation during ongoing compressions (n = 1300) or to manual CPR according to guidelines (n = 1289).

MAIN OUTCOMES AND MEASURES Four-hour survival, with secondary end points of survival up to 6 months with good neurological outcome using the Cerebral Performance Category (CPC) score. A CPC score of 1 or 2 was classified as a good outcome.

RESULTS Four-hour survival was achieved in 307 patients (23.6%) with mechanical CPR and 305 (23.7%) with manual CPR (risk difference, −0.05%; 95% CI, −3.3% to 3.2%; $P > .99$). Survival with a CPC score of 1 or 2 occurred in 98 (7.5%) vs 82 (6.4%) (risk difference, 1.18%; 95% CI, −0.78% to 3.1%) at intensive care unit discharge, in 108 (8.3%) vs 100 (7.8%) (risk difference, 0.55%; 95% CI, −1.5% to 2.6%) at hospital discharge, in 105 (8.1%) vs 94 (7.3%) (risk difference, 0.78%; 95% CI, −1.3% to 2.8%) at 1 month, and in 110 (8.5%) vs 98 (7.6%) (risk difference, 0.86%; 95% CI, −1.2% to 3.0%) at 6 months with mechanical CPR and manual CPR, respectively. Among patients surviving at 6 months, 99% in the mechanical CPR group and 94% in the manual CPR group had CPC scores of 1 or 2.

CONCLUSIONS AND RELEVANCE Among adults with out-of-hospital cardiac arrest, there was no significant difference in 4-hour survival between patients treated with the mechanical CPR algorithm or those treated with guideline-adherent manual CPR. The vast majority of survivors in both groups had good neurological outcomes by 6 months. In clinical practice, mechanical CPR using the presented algorithm did not result in improved effectiveness compared with manual CPR.

TRIAL REGISTRATION clinicaltrials.gov Identifier: NCT00609778

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ELSEVIER

Selected Topics: Prehospital Care

LUCAS II DEVICE FOR CARDIOPULMONARY RESUSCITATION IN A NONSELECTIVE OUT-OF-HOSPITAL CARDIAC ARREST POPULATION LEADS TO WORSE 30-DAY SURVIVAL RATE THAN MANUAL CHEST COMPRESSIONS

Jiri Karasek, MD,*†‡ Petr Ostadal, MD, PHD,§ Frantisek Klein, MGR,‡ Alena Rechova, MD,‡ Jiri Seiner, MD,* Matej Strycek, MD,* Rostislav Polasek, MD,* and Petr Widimsky, MD, PHD†

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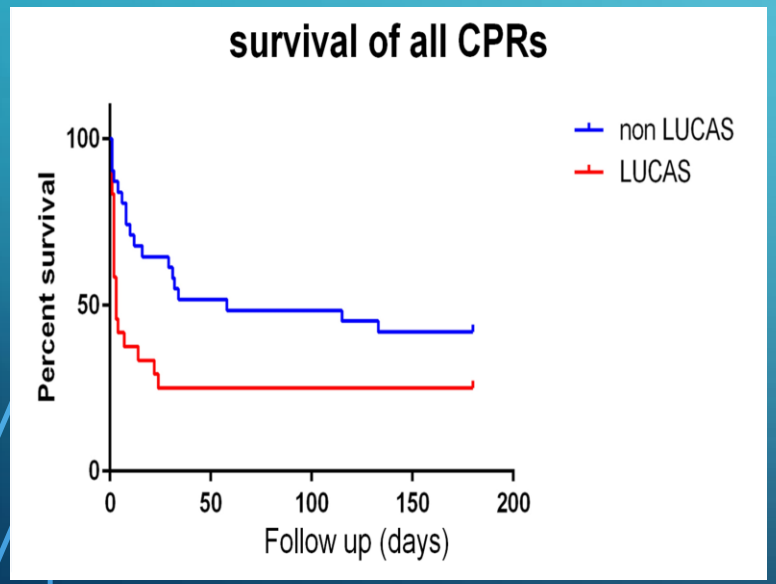

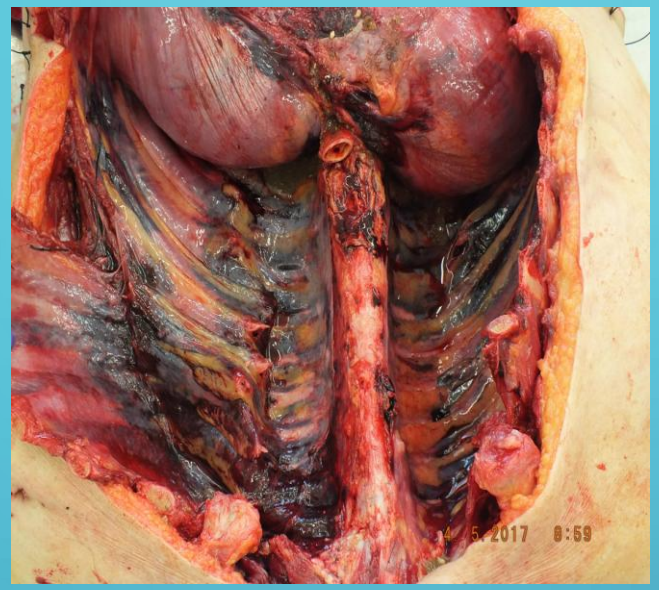

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Forensic Science International

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

ELSEVIER

The comparison of cardiopulmonary resuscitation-related trauma: Mechanical versus manual chest compressions

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ABSTRACT

Introduction: Aim:: To compare injuries after cardiopulmonary resuscitation (CPR) caused by manual or mechanical chest compressions in resuscitated patients with non-traumatic cardiac arrest.
Methods: This retrospective, multicenter study was based on autopsy reports of patients who died after CPR; individuals with a traumatic cause(s) of cardiac arrest were excluded. Patients were divided into two CPR groups: mechanical and manual. The Abbreviated Injury Scale was used to objectively evaluate the most serious injuries and the New Injury Scale Score was used to summarize all injuries.
Results: Of 704 patients, data from 630 individuals were analyzed after exclusion of those with trauma-related cardiac arrest. Manual CPR was performed in 559 patients and mechanical in 64 subjects. There were no differences in sex, bystander CPR, or etiology of cardiac arrest between the two groups, however, mechanical CPR was significantly longer (X vs. Y, $p = 0.0005$) and patients in this group were younger (X vs. Y, $p = 0.0067$). No differences were found in the incidence of CPR-related injuries between the groups. The median number of the most serious injury (according to Abbreviated Injury Scale) was 3, which was not statistically different; the median number of injuries according to the New Injury Severity Score was 13 in both groups (low probability of fatal injury). Type of injuries were also similar with the exception of pericardial damage that was more prevalent in mechanical CPR group. Only age and bystander CPR were found to be independently associated with the autopsy-documented trauma.
Conclusion: Our results suggest that mechanical chest compressions do not increase the incidence and severity of CPR-related injury in comparison with manual methods despite significantly longer CPR duration.

European Heart Journal (2015) **36**, 2793–2867
doi:10.1093/eurheartj/ehv316

ESC GUIDELINES

2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death

The Task Force for the Management of Patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death of the European Society of Cardiology (ESC)

Resuscitation

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

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. Moulaert[m], Nikolaos Nikolaou[n], Theresa Mariero Olasveengen[o], Markus B. Skrifvars[p], Fabio Taccone[q], Jasmeet Soar[r]*

It is recommended that post-resuscitation care is performed in high-volume expert centres capable of offering multidisciplinary intensive care treatment, including primary coronary interventions, electrophysiology, cardiac assist devices, cardiac and vascular surgery and therapeutic hypothermia.	I	B	245, 246
The creation of regional networks for the treatment of cardiac arrest should be considered to improve outcomes.	IIa	B	245

Cardiac arrest centres

No specific recommendation

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]

European Heart Journal (2017) 38, 1645–1652
doi:10.1093/eurheartj/ehx104

CLINICAL RESEARCH
Acute coronary syndromes

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

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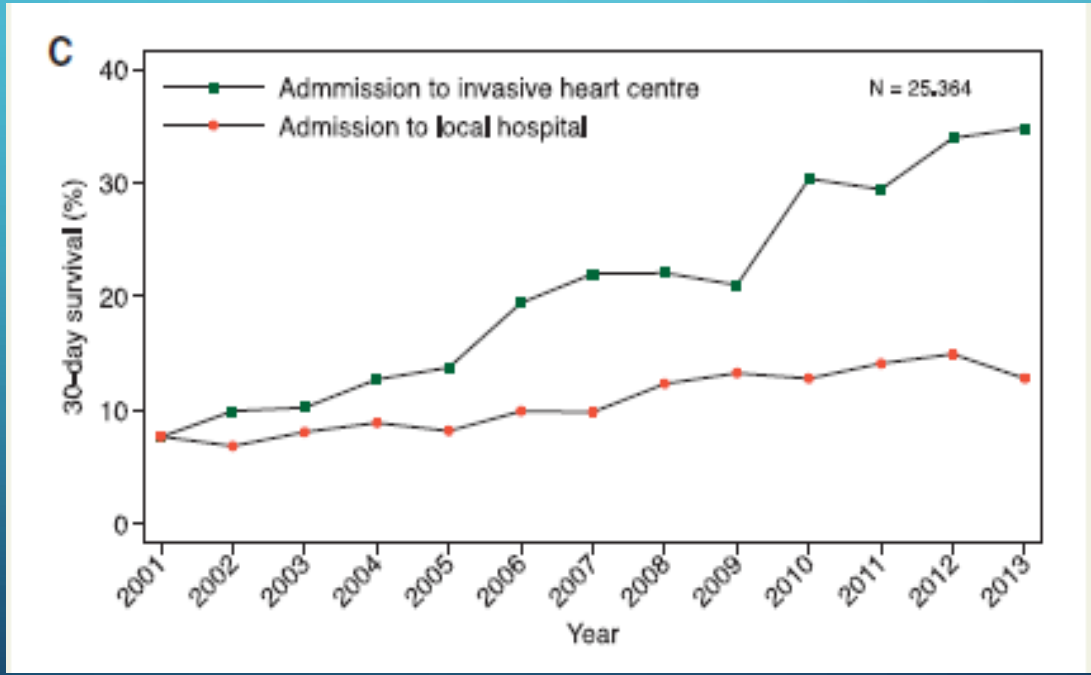

American Journal of Emergency Medicine 44 (2021) 95–99

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American Journal of Emergency Medicine

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

Bypassing out-of-hospital cardiac arrest patients to a regional cardiac center: Impact on hemodynamic parameters and outcomes

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ABSTRACT

Introduction: Current guidelines recommend systematic care for patients who experience out-of-hospital cardiac arrest (OHCA) and the development of cardiac arrest centers (CACs). However, data regarding prolonged transport time of these often hemodynamically unstable patients are limited.

Methods: Data from a prospective OHCA registry of a regional CAC collected between 2013 and 2017, when all OHCA patients from the district were required to be transferred directly to the CAC, were analyzed. Patients were divided into two subgroups: CAC, when the CAC was the nearest hospital; and bypass, when OHCA occurred in a region of another local hospital but the subject was transferred directly to the CAC (7 hospitals in the district). Data included transport time, baseline characteristics, hemodynamic and laboratory parameters on admission (systolic blood pressure, lactate, pH, oxygen saturation, body temperature, and initial doses of vasopressors and inotropes), and final outcomes (30-day in-hospital mortality, intensive care unit stay, days on artificial ventilation, and cerebral performance capacity at 1 year).

Results: A total of 258 subjects experienced OHCA in the study period; however, 27 were excluded due to insufficient data and 17 for secondary transfer to CAC. As such, 214 patients were analyzed, 111 in the CAC group and 103 in the bypass group. The median transport time was significantly longer for the bypass group than the CAC group (40.5 min [IQR 28.3–55.0 min] versus 20.0 min [IQR 13.0–34.0], respectively; $p < 0.0001$). There were no differences in 30-day in-hospital mortality, 1-year neurological outcome, or median length of mechanical ventilation. There were no differences in baseline characteristics, initial hemodynamic parameters on admission, catecholamine dosage(s).

Conclusion: Individuals who experienced OHCA and taken to a CAC incurred significantly prolonged transport times; however, hemodynamic parameters and/or outcomes were not affected. These findings shows the safety of bypassing local hospitals for a CAC.

Table 1
Demographic and event characteristics

Group (n)	CAC (111)	Bypassing (103)	*P*-value
Man, n(%)	82 (73.9)	82 (79.6)	0.34
Age, mean ± SD	64, 13 ± 12.9	61.52 ± 14.3	0.16
Shockable rythm n(%)	73 (65.8)	75 (72.8)	0.3
Bystander- CPR n(%)	75 (67.6)	71 (68.9)	0.88
ROSC median(IQR)	16 (10–27)	20 (15–27)	0.39
ACS n(%)	49 (44)	50 (48.5)	0.58
Vasopressors n(%)	89 (80.2)	72 (69.9)	0.73
Lenght of transport (min) Median (IQR)	20 (13–34)	40.5 (28.3–55)	p < 0.0001
ROSC-Admission (min), mean ± SD	52.6 ± 19.8	76.0 ± 24.9	p < 0.0001

Table 2
Length of stay and follow up

	LOCAL (111)	Bypassing (103)	p value
ICU stay median (IQR)	9 (4–18) days	8 (4–15)days	0.3
AV days median (IQR)	4 (1–9) days	4 (1–8) days	0.41
30 days mortality n (%)	60 (57.1)	53 (56.4)	0.9999
1 year follow up CPC 1,2 n (%)	52 (50.9)	52 (54.9)	0.717
Revascularisation, n (%)	42 (37.8)	41(39.8)	0.78

Table 4
Admission characteristics

roup (n)	CAC (111)	Bypassing (103)	P-value
sBP (mm Hg) mean,SD	104 ± 28	108 ± 31	0.33
Lactate mmol/l Median (IQR)	4.5 (2.3–8.8)	4 (2–6)	0.07
pH median (IQR)	7.12 (7–7.27)	7 (7–7.27)	0.62
TT median (IQR)	36 (35–36.5)	36 (35.6–36.7)	0.15
SpO2 median(IQR)	95.5 (91–100)	98 (94–100)	0.14
Norepinephrine mcg/min median (IQR)	10 (4–20)	8 (7–17)	0.94
Dobutamin mcg/min mean, SD	464 ± 244	518 ± 279	0.69

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

Study or subgroup	log[Odds ratio]	SE	OR (95% CI)	Weight, %
Survival to discharge				
Balian et al,[17] 2019	0.36	0.14	1.43 (1.08-1.89)	10.5
Callaway et al,[18] 2010	0.09	0.16	1.10 (0.80-1.50)	10.2
Cha et al,[19] 2012	1.01	0.13	2.74 (2.12-3.54)	10.8
Chocron et al,[20] 2017	0.24	0.35	1.27 (0.64-2.51)	6.3
Couper et al,[21] 2018	0.03	0.18	1.03 (0.72-1.47)	9.7
Cudnik et al,[22] 2012	-0.03	0.15	0.97 (0.73-1.29)	10.5
Shin et al,[29] 2011	0.59	0.12	1.81 (1.43-2.30)	11.0
Stub et al,[30] 2011	0.02	0.19	1.02 (0.70-1.48)	9.5
von Vopelius-Feldt et al,[31] 2021	0.34	0.11	1.41 (1.14-1.75)	11.2
Subtotal (95% CI)			1.36 (1.08-1.73)	89.7
Heterogeneity: $\tau^2 = 0.10$; $\chi^2 = 44.62$, $df = 8$ ($P < .001$); $I^2 = 82\%$				
Test for overall effect: $z = 2.57$ ($P = .01$)				
Survival to 30 d				
Kashiura et al,[23] 2020	-0.27	0.15	0.76 (0.56-1.03)	10.3
Subtotal (95% CI)			0.76 (0.56-1.03)	10.3
Heterogeneity: Not applicable				
Test for overall effect: $z = 1.79$ ($P = .07$)				
Total (95% CI)			1.28 (1.00-1.64)	100.0
Heterogeneity: $\tau^2 = 0.13$; $\chi^2 = 60.62$, $df = 9$ ($P < .001$); $I^2 = 85\%$				
Test for overall effect: $z = 1.97$ ($P = .05$)				
Test for subgroup differences: $\chi^2 = 9.00$, $df = 1$ ($P = .003$); $I^2 = 88.9\%$				

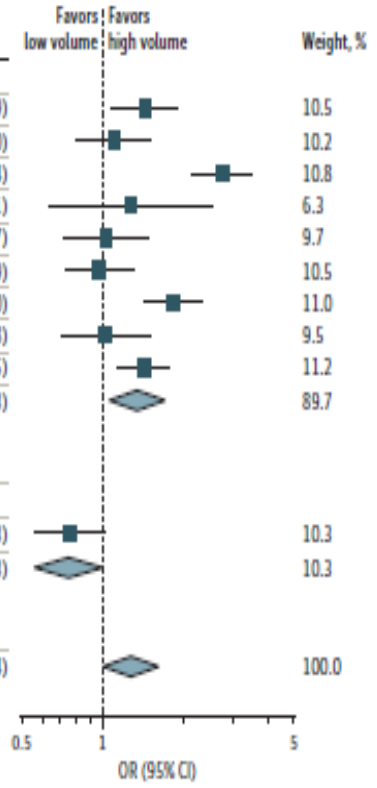
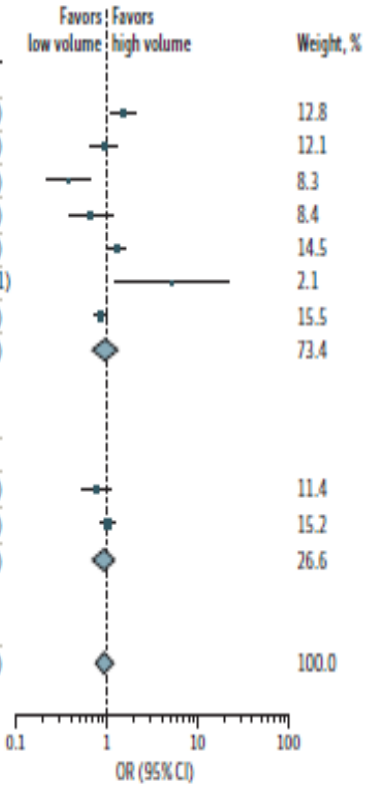


Figure 3. Adjusted Odds of Good Neurological Outcomes at Discharge and 30 Days

Study or subgroup	log[Odds ratio]	SE	OR (95% CI)	Weight, %
Good neurological outcomes at discharge				
Balian et al,[17] 2019	0.41	0.15	1.51 (1.11-2.05)	12.8
Couper et al,[21] 2018	-0.06	0.17	0.94 (0.67-1.32)	12.1
Cudnik et al,[22] 2012	-0.97	0.28	0.38 (0.22-0.66)	8.3
Lee et al,[25] 2015	-0.41	0.28	0.66 (0.39-1.14)	8.4
Mumma et al,[26] 2015	0.28	0.11	1.32 (1.06-1.64)	14.5
Schober et al,[28] 2016	1.65	0.74	5.20 (1.22-22.11)	2.1
Worthington et al,[32] 2017	-0.14	0.08	0.87 (0.74-1.02)	15.5
Subtotal (95% CI)			0.98 (0.71-1.33)	73.4
Heterogeneity: $\tau^2 = 0.12$; $\chi^2 = 35.35$, $df = 6$ ($P < .001$); $I^2 = 83\%$				
Test for overall effect: $z = 0.16$ ($P = .88$)				
Good neurological outcomes at 30 d				
Kashiura et al,[23] 2020	-0.26	0.19	0.77 (0.53-1.12)	11.4
Matsuyama et al,[25] 2017	0.03	0.09	1.03 (0.87-1.22)	15.2
Subtotal (95% CI)			0.94 (0.72-1.22)	26.6
Heterogeneity: $\tau^2 = 0.02$; $\chi^2 = 1.91$, $df = 1$ ($P = .17$); $I^2 = 48\%$				
Test for overall effect: $z = 0.49$ ($P = .63$)				
Total (95% CI)			0.96 (0.77-1.20)	100.0
Heterogeneity: $\tau^2 = 0.08$; $\chi^2 = 37.35$, $df = 8$ ($P < .001$); $I^2 = 79\%$				
Test for overall effect: $z = 0.37$ ($P = .71$)				
Test for subgroup differences: $\chi^2 = 0.04$, $df = 1$ ($P = .84$); $I^2 = 0\%$				



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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

Amelia 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

Expedited transfer to a cardiac arrest centre for non-ST-elevation out-of-hospital cardiac arrest (ARREST): a UK prospective, multicentre, parallel, randomised clinical trial

*Tiffany Patterson, Gavin D Perkins, Alexander Perkins, Tim Clayton, Richard Evans, Matthew Dodd, Steven Robertson, Karen Wilson, Adam Mellett-Smith, Rachael T Fothergill, Paul McCrone, Miles Dalby, Philip MacCarthy, Sam Firoozi, Iqbal Malik, Roby Rakhit, Ajay Jain, Jerry P Nolan, Simon R Redwood, for the ARREST trial collaborators**

Summary

Background The International Liaison Committee on Resuscitation has called for a randomised trial of delivery to a cardiac arrest centre. We aimed to assess whether expedited delivery to a cardiac arrest centre compared with current standard of care following resuscitated cardiac arrest reduces deaths.

Methods ARREST is a prospective, parallel, multicentre, open-label, randomised superiority trial. Patients (aged ≥18 years) with return of spontaneous circulation following out-of-hospital cardiac arrest without ST elevation were randomly assigned (1:1) at the scene of their cardiac arrest by London Ambulance Service staff using a secure online randomisation system to expedited delivery to the cardiac catheter laboratory at one of seven cardiac arrest centres or standard of care with delivery to the geographically closest emergency department at one of 32 hospitals in London, UK. Masking of the ambulance staff who delivered the interventions and those reporting treatment outcomes in hospital was not possible. The primary outcome was all-cause mortality at 30 days, analysed in the intention-to-treat (ITT) population excluding those with unknown mortality status. Safety outcomes were analysed in the ITT population. The trial was prospectively registered with the International Standard Randomised Controlled Trials Registry, 96585404.

Findings Between Jan 15, 2018, and Dec 1, 2022, 862 patients were enrolled, of whom 431 (50%) were randomly assigned to a cardiac arrest centre and 431 (50%) to standard care. 20 participants withdrew from the cardiac arrest centre group and 19 from the standard care group, due to lack of consent or unknown mortality status, leaving 411 participants in the cardiac arrest centre group and 412 in the standard care group for the primary analysis. Of 822 participants for whom data were available, 560 (68%) were male and 262 (32%) were female. The primary endpoint of 30-day mortality occurred in 258 (63%) of 411 participants in the cardiac arrest centre group and in 258 (63%) of 412 in the standard care group (unadjusted risk ratio for survival 1·00, 95% CI 0·90–1·11; p=0·96). Eight (2%) of 414 patients in the cardiac arrest centre group and three (1%) of 413 in the standard care group had serious adverse events, none of which were deemed related to the trial intervention.

Interpretation In adult patients without ST elevation, transfer to a cardiac arrest centre following resuscitated cardiac arrest in the community did not reduce deaths.

Funding British Heart Foundation.

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See Comment page 1300

* Collaborators are listed in the appendix: pp 3–7

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Introduction

There are marked regional variations in survival following resuscitated out-of-hospital cardiac arrest (OHCA), which are attributable to resources, personnel, and infrastructure in addition to patient characteristics.[1–3] Regionalisation of care improves outcomes in patients with time-critical illness by concentrating services within centres, increasing the number of patients treated and therefore the skills and experience of health-care providers within those centres.[4] Implementing prehospital systems of care for OHCA management would work in a similar manner to networks for ST-elevation myocardial infarction, with ambulance staff providing prompt identification and delivery of patients to a designated cardiac arrest centre.[5,6] Post-arrest care with early interventions for ischaemia-reperfusion injury and treatment of the underlying cause has preferential outcomes.[7] This care might be better delivered in a cardiac arrest centre; however, observational studies yield conflicting results due to confounding variables, including selection bias and heterogeneity of care.[8] As a result, the International Liaison Committee on Resuscitation highlighted the need for a randomised trial.

	Cardiac arrest centre group (n=414)	Standard care group (n=413)	RR, OR, or mean difference (95% CI)	Adjusted OR* (95% CI) or p value	Risk difference (95% CI)
Primary endpoint					
30-day mortality	258/411 (63%)	258/412 (63%)	RR 1·00 (0·90 to 1·11)	1·09 (0·73 to 1·63)	0·2% (–6·5 to 6·8)
Secondary endpoints					
3-month mortality	267/411 (65%)	263/411 (64%)	RR 1·02 (0·92 to 1·12)	--	1·0% (–5·6 to 7·5%)
mRS score at discharge			OR 1·00 (0·76 to 1·32)	0·99	--
0	70/413 (17%)	78/402 (19%)	--	--	--
1	23/413 (6%)	31/402 (8%)	--	--	--
2	22/413 (5%)	12/402 (3%)	--	--	--
3	15/413 (4%)	9/402 (2%)	--	--	--
4	10/413 (2%)	2/402 (1%)	--	--	--
5	16/413 (4%)	12/402 (3%)	--	--	--
6	257/413 (62%)	258/402 (64%)	--	--	--
mRS score at 3 months			OR 0·98 (0·73 to 1·31)	0·87	--
0	75/399 (19)	69/390 (18%)	--	--	--
1	22/399 (6%)	32/390 (8%)	--	--	--
2	17/399 (4%)	9/390 (2%)	--	--	--
3	5/399 (1%)	9/390 (2%)	--	--	--
4	9/399 (2%)	3/390 (1%)	--	--	--
5	4/399 (1%)	5/390 (1%)	--	--	--
6	267/399 (67%)	263/390 (67%)	--	--	--
mRS score at discharge					
Favourable	130/413 (32%)	130/402 (32%)	RR 1·01 (0·92 to 1·11)	0·79	0·9% (–5·5 to 7·3)
Unfavourable	283/413 (69%)	272/402 (68%)	--	--	--
mRS score at 3 months					
Favourable	119/399 (30%)	119/390 (31%)	RR 1·01 (0·92 to 1·11)	0·83	0·7% (–5·7 to 7·1)
Unfavourable	280/399 (70%)	271/390 (70%)	--	--	--
Mean EQ-5D-5L score	0·68 (0·32); n=97†	0·72 (0·25); n=92†	Mean difference –0·04 (–0·12 to 0·05)	--	--

Data are n/N (%) and mean (SD), unless otherwise specified. Mortality refers to all-cause mortality. mRS=modified Rankin Scale. OR=odds ratio. RR=risk ratio. *Adjusted OR calculated due to convergence issues. †The number of participants for whom data were obtained.

Table 3: **Primary and secondary outcomes**

ALS 2021

5 TOP MESSAGES

EUROPEAN RESUSCITATION COUNCIL

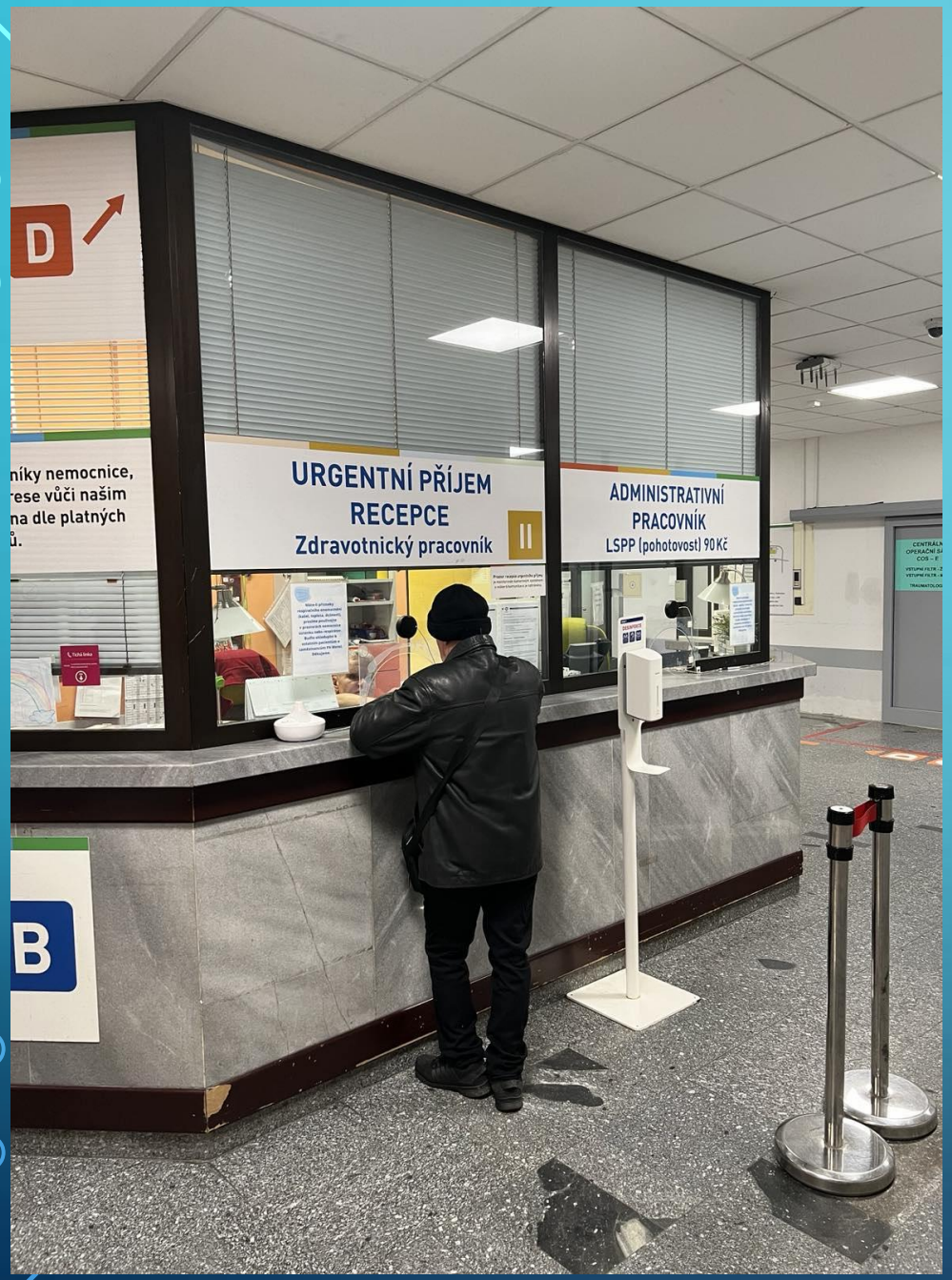
1. High-quality chest compression with minimal interruption, early defibrillation, and treatment of reversible causes remain the priority

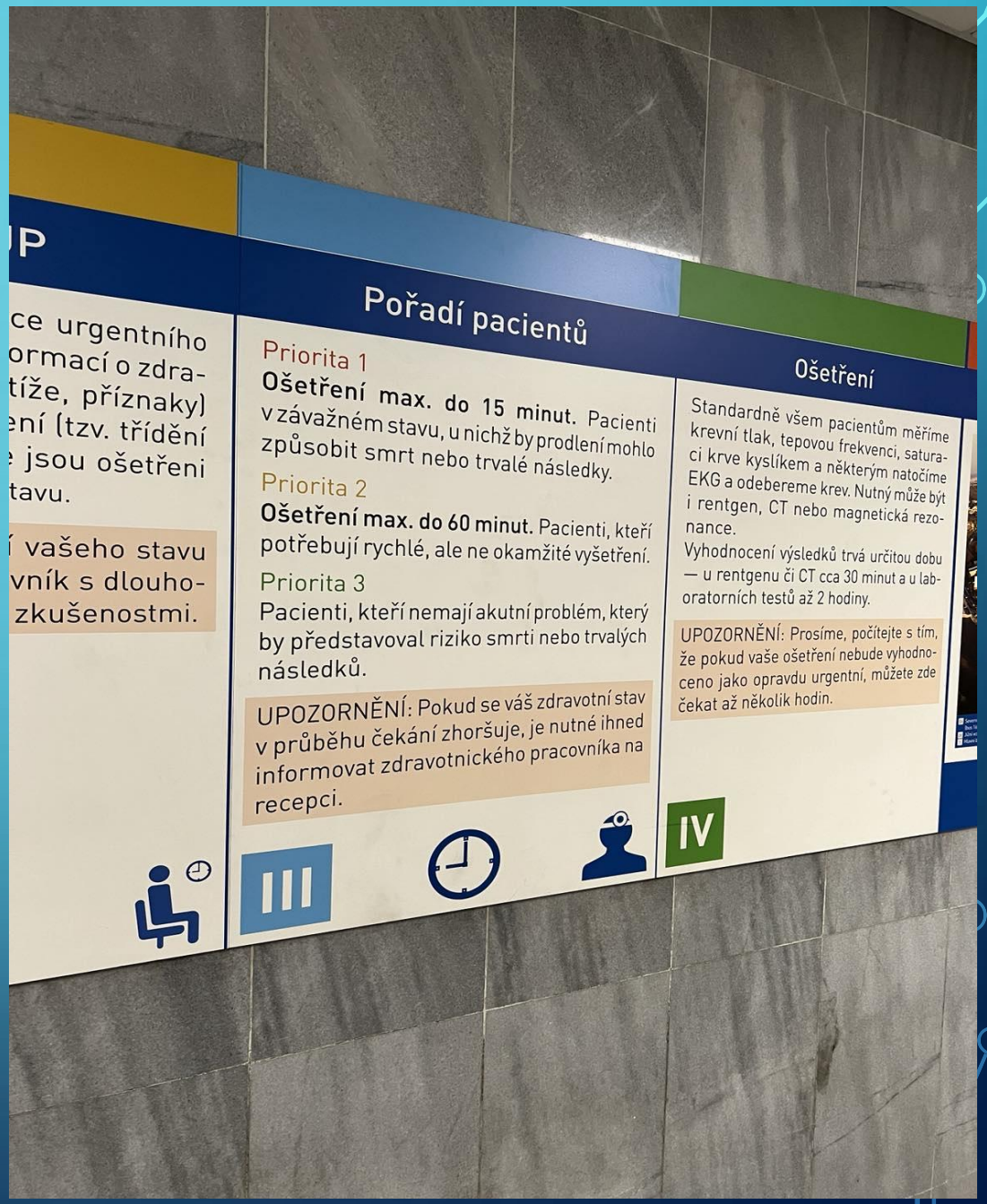
2. Premonitory signs and symptoms often occur before cardiac arrest in- or out-of-hospital – cardiac arrest is preventable in many patients

3. Use a basic or advanced airway technique – only rescuers with a high success rate should use tracheal intubation

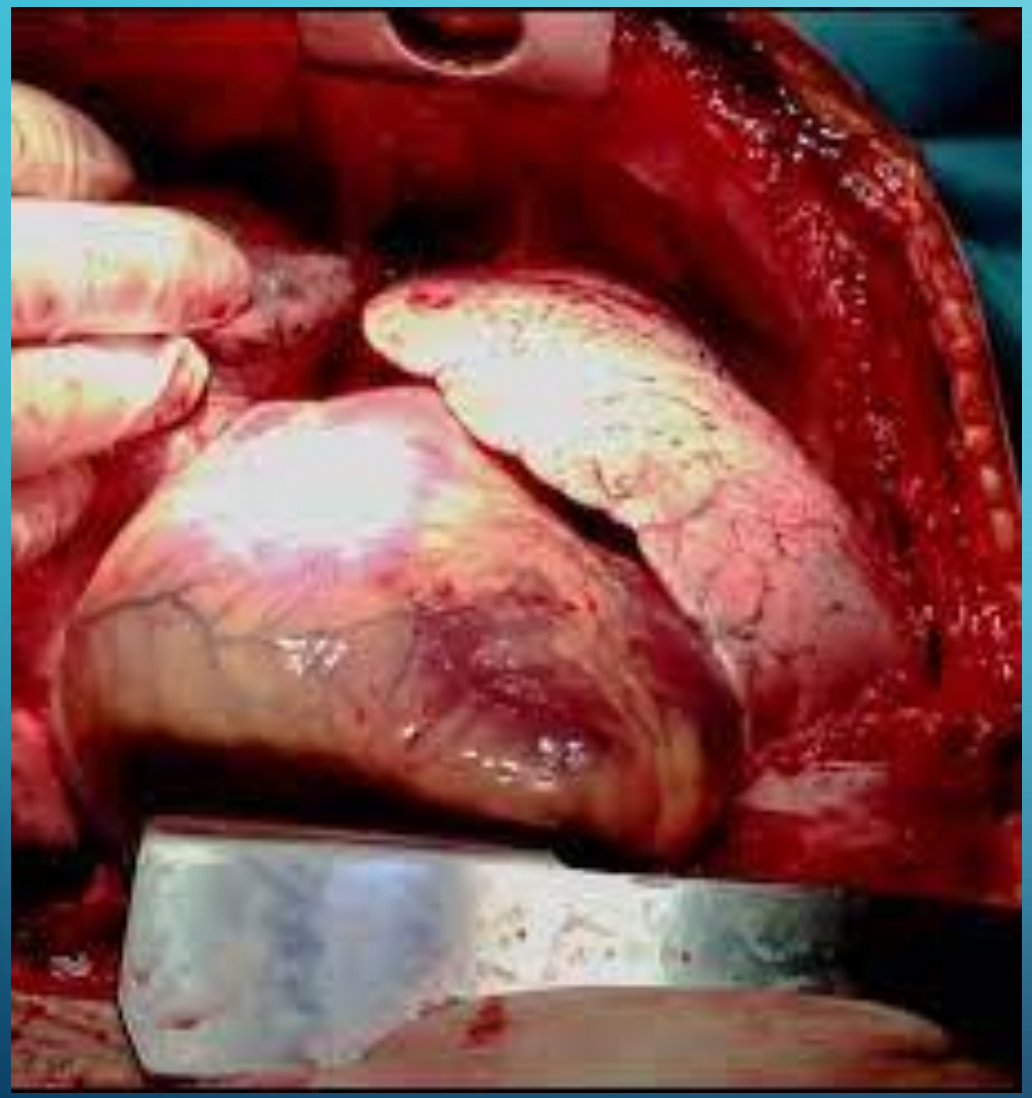
4. Use adrenaline early for non-shockable cardiac arrest

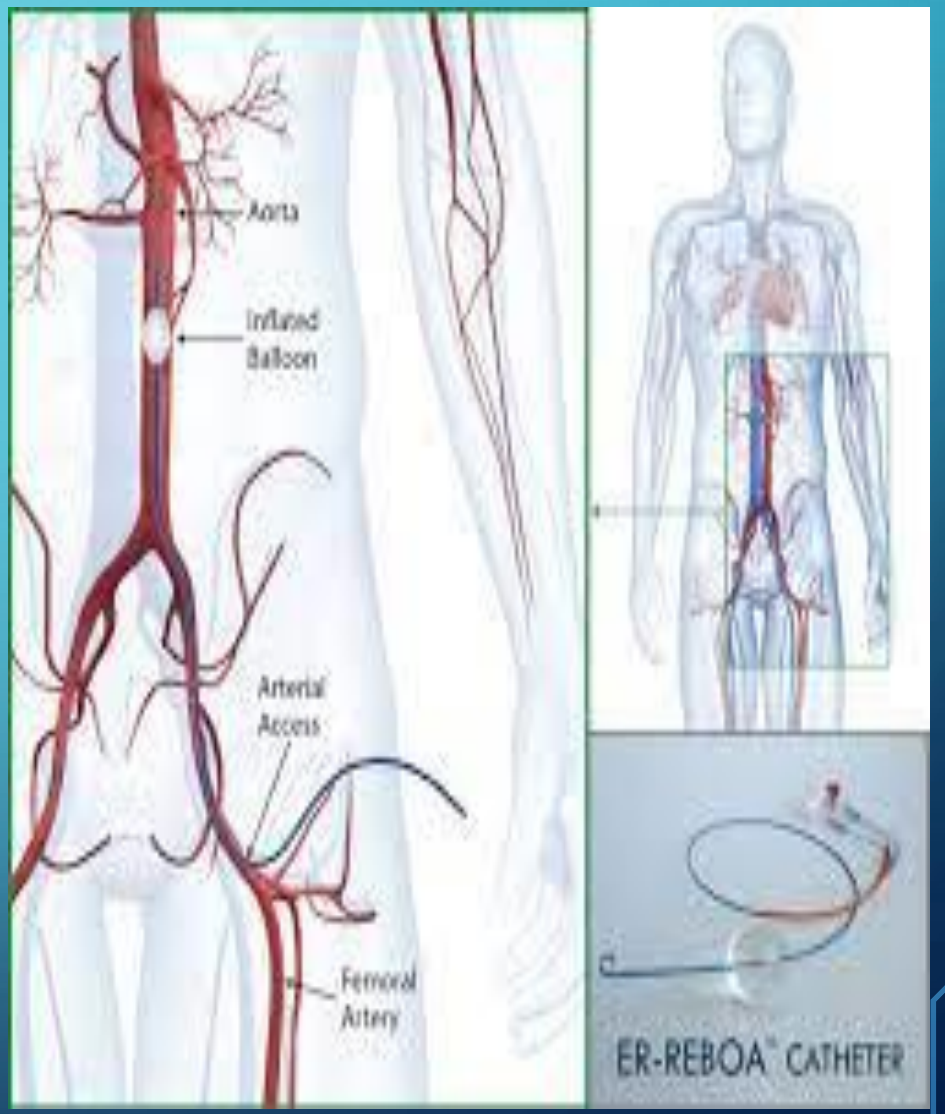
5. In select patients, if feasible, consider extracorporeal CPR (eCPR) as a rescue therapy when conventional ALS is failing


URGENTNÍ PŘÍJEM
RECEPCE
Zdravotnický pracovník
II
ADMINISTRATIVNÍ
PRACOVNÍK
LSPP (pohotovost) 90 Kč
D
B


Pořadí pacientů
Ošetření
Priorita 1
Ošetření max. do 15 minut. Pacienti v závažném stavu, u nichž by prodlení mohlo způsobit smrt nebo trvalé následky.
Priorita 2
Ošetření max. do 60 minut. Pacienti, kteří potřebují rychlé, ale ne okamžité vyšetření.
Priorita 3
Pacienti, kteří nemají akutní problém, který by představoval riziko smrti nebo trvalých následků.
UPOZORNĚNÍ: Pokud se váš zdravotní stav v průběhu čekání zhoršuje, je nutné ihned informovat zdravotnického pracovníka na recepci.
Standardně všem pacientům měříme krevní tlak, tepovou frekvenci, saturaci krve kyslíkem a některým natočíme EKG a odebereme krev. Nutný může být i rentgen, CT nebo magnetická rezonance.
Vyhodnocení výsledků trvá určitou dobu — u rentgenu či CT cca 30 minut a u laboratorních testů až 2 hodiny.
UPOZORNĚNÍ: Prosíme, počítejte s tím, že pokud vaše ošetření nebude vyhodnoceno jako opravdu urgentní, můžete zde čekat až několik hodin.
III
IV


TRIÁŽNÍ BOX

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