

· | GUIDELINE AND CONSENSUS ·

%#S)

2016 National consensus on cardiopulmonary resuscitation in China

Cardiopulmonary Resuscitation Specialized Committee of Chinese Research Hospital Association

arrest CA cardiac CA CA CPR CA [12-15]

cardiopulmonary resuscitation CPR CA “ ” CPR

“ ” [1-2] CA CPR

3 [3] CA CPR CA “ ”

544 CPR CPR

CA

1% [4-8] CA

ventricular fibrillation, VF CA CPR CPR

ventricular tachycardia VT CPR

pulseless electrical activity PEA - CPR CPR CPR

CA CA “ ” CA “ ”

[9] CA 10s “ ” CA “ ”

4-6 min CPR CA 2016 CPR

CA

return of spontaneous circulation ROSC CPR [16]

[10] CPR CA 1 CA “ ”

CA CA CA

external defibrillator AED automated CA CA

emergency medical service system EMSS CA CA

[11] CA CA CA

CA CA CA

DOI 10.13919/j.issn.2095-6274.2017.01.001

1.1 CA

CA

“ ” “ ”

CA

CA

coronary artery  
 disease CHD  
 out of hospital cardiac arrest OHCA  
 1.1.1 CA

“ ” “ ” “ ”  
 [24] “ ”  
 [25-27] OHCA  
 CA

“ ” CPR

CA<sup>[17]</sup> /  
 CA [18] CA [28] CA  
 [19] 1 OHCA

CA [20] CHD [21] 60  
 CA<sup>[22]</sup> 2  
 CPR

CA  
 CA CPR

EMSS 120 [23]  
 Heimlich CPR  
 AED CPR CPR CPR  
 [29] CPR

CPR 3  
 CPR 1% 1% CA  
 1% “ ” “ ”  
 “ ” ——525+ 5  
 CPR 2 5  
 CPR CPR

[29,30] 4 AED [31]  
 OHCA AED  
 1.1.2 CA OHCA CA  
 public access defibrillation PAD  
 EMSS CPR EMSS PAD OHCA  
 intensive care unit ICU AED  
 OHCA CPR PAD  
 CPR

CA [32] CA [39-41] CPR EMSS  
 AED AE AED CPR acute coronary syndrome  
 CPR ACS CA  
 AED [33] AED CPR advanced cardiovascular life support ACLS [42]  
 5 [43]

EMSS 2 IHCA IHCA [44]  
 CA 60% IHCA ICU [45,46]

EMSS 6 CA CPR CA CPR  
 OHCA ACLS  
 IHCA  
 7 ICU CPR IHCA  
 EMSS “ ” [24] CPR ACLS IHCA  
 AED OHCA IHCA  
 IHCA  
 CA early warning scoring system EWSS  
 rapid respond team RRT  
 medical emergency team MET RRT

1.1.3 CA CA MET  
 OHCA IHCA [47,48] RRT MET ICU  
 inside hospital cardiac arrest IHCA [34]

CA RRT MET RRT MET [49-51]  
 1 OHCA 3 CPR  
 EMSS EMSS CA CPR CA  
 120  
 [ICU emergency intensive care  
 unit EICU ] CPR

CPR [52]  
 CPR CPR [53]  
 CA CPR CPR [54]  
 OHCA CA [35,36] CPR [37,38] ACLS [55]

CPR [24]

[52] CPR IHCA

IHCA CA [56] IHCA 1.2.3 CA CA

IHCA ACLS

1.2 CA CPR [29] CA CA [62]

CA CA CPR 3 CA CA

1.2.1 CA OHCA 1 h CA [63] CA

CA OHCA [25] CA [57] CHD [59]

CHD acute myocardial infarction AMI

angiotensin converting enzyme inhibitor ACEI 1.3 CA CA

CA

implantable cardioverter defibrillator ICD CA [58,59] CHD CA “ ”

CA 1.3.1 OHCA CA

Q-T Brugada CHD CA

ICD [58-60] CA CA

1.2.2 CA [61] CA QT T

EWSS 50% IHCA IHCA European Society of Cardiology ESC left ventricular ejection fraction CA

IHCA IHCA [64]

ICU IHCA

IHCA IHCA

CA 12 VA  
 12  
 QT ST  
 IHCA  
 1.3.2 CA VA VA ARVC  
 CA VA CHD  
 VA VA  
 CPVT VA  
 [65] CA VA SCD  
 VA VA  
 CA AMI SCD  
 [66] + [ single-photon emission computed  
 CA tomography SPECT ] [ ST 1 mm  
 catecholaminergic polymorphic ventricular tachycardia CPVT QT left bundle-branch block LBBB ]  
 CHD VA  
 [67] + CHD VA  
 VA CHD VA  
 [68] 1/3 cardiac magnetic resonance CMR X  
 computed tomography CT  
 VF QT 2 CA " "  
 long QT syndrome LQTS CA  
 [69] ICD " " CPR  
 1960 CPR  
 [70] CHD CPR CPR  
 " "  
 2.1 CA CPR  
 CPR  
 1.3.3 CPR standard cardiopulmonary resuscitation STD-  
 CA CPR  
 CA [71] 2.1.1 CPR [ CPR [72]  
 ventricular arrhythmias VA 1 basic life support BLS ]  
 [60] " "  
 anhrhythmogenic right ventricular cardiomyopathy [35]  
 ARVC 2  
 VA CA  
 CHD CA

[35-73,74] CA CPR [99-101] CPR

CA CPR CA CPR

5 CPR

[75,76] 0.5-1.0 cm [77] 30

3 5-10s<sup>[72]</sup> EMSS 1 EMSS

120 EMSS [102] CPR

CPR EMSS OHCA<sup>[35]</sup> AED OHCA CPR

EMSS CA CPR<sup>[78,79]</sup> IHCA

CPR CPR [103-107]

4 CA CPR<sup>[80,81]</sup> CPR 6 s/ 10 /min<sup>[72]</sup>

5 cm 100-120 /min 6 cm

[82-87] CPR CPR

60%<sup>[88-91]</sup> CPR / 30 2 1 s

[93-98] 10 /min<sup>[92]</sup>

500-600 ml<sup>[108]</sup>

[109] CPR CPR

CPR CPR 1 L [110] 1/2-2/3 2 L 1/3

AED CPR CA

[97,98] 30 2

6 CA  
 VF VF [31] 75 mg CA VF/ VT  
 VF 1 min 7%~10% 300 mg 20-30 ml 3-5  
 CA [111,112] min 150mg 1 mg/min  
 VF/ VT 5 CPR 6 h CA 150 mg 3-5 mg/kg 10  
 [113,114] min 1.0-1.5 mg/min 6 h  
 360 J VF/VT 150 mg  
 120 J 150 J [115] 2 g  
 pulmonary endarterectomy  
 PEA CPR [116]  
 AED OHCA AED [122,123]  
 AED CPR CA AED 1.0-1.5 mg/kg  
 CPR AED/ [117,118] min 1 VF/VT 0.50-0.75 mg/kg 5-10  
 CA AED CPR VT b 3 mg/kg [124] VF/VT  
 AED OHCA CPR 1-2 g 5-20 min VT  
 AED 1-2 g 50-100 ml CA [122] CA  
 2 min CPR 2 CA [122] CA  
 3 CPR CA CA  
 IHCA CPR  
 3 min VF CPR [119] CA CA CPR  
 VF CA CO<sub>2</sub>  
 2 min ROSC CA  
 7 CPR pH  
 CA CPR ROSC [125,126]  
 BLS  
 BLS  
 intravenous injection IV intraosseous IO CA  
 CPR 40 100  
 VF 15 min 1/2 1 mmol/kg CPR  
 PEA 1 mg VF/ VT 3-5 min 1 8 CPR CPR  
 20 ml CPR CPR  
 [120,121] CPR CPR  
 0.40 CPR  
 [54] CPR  
 CPR 2 CPR  
 VF/ VT CPR CPR

CPR coronary artery perfusion pressure CPP [127] CPR CPR CPR

cardiac output CO ROSC CA 2.2.1 CPR CPR

CPR CPR OHCA CPP / CPR [129] [24] STD-CPR

CPR CPR 2.2.2 CPR CPR [130] "

CPR 100 /min 40-50 kg 20-30 kg ROSC ROSC

ROSC<sup>[11]</sup> CPR CA 1 CA 2 CA 3 CA 4 CA 5 CA 6

CPR 100-120 /min CPR 5-6 cm 60% CA 7 CA 8

2.1.2 [72] CPR BLS 1 1 CA 9 CA 10 CA 11 STD- [131] STD-

CPR CPR CA 1 CPR CPR CPR [132,133] STD-CPR

CPR CPR 2.2.3 CPR [134]

CPR CPR 5 cm 15 2 [135,136] CA CPR

30 2 CPR / CPR 4 [137]

cm / [128] CA CPR CA STD-CPR

2.2 CA " " CA STD-CPR

" " CPR CA CPR CA



CPR CA  
 2.2.4 CPR CPR CPR CPR  
 CA  
 CPR [138] CA 3  
 CPR CPR  
 “ ” “ ” CPR CPR  
 CPR CPR  
 CPR  
 2-5 CT CPR [146]  
 1/3 percutaneous coronary  
 2-5 intervention PCI CA  
 4-5 cm PCI CPR 4  
 100-120 /min Weil MCC 3D CPR  
 2.2.5 CPR extracorporeal cardiopulmonary resuscitation ECPR extracorporeal membrane oxygenation ECMO [147]  
 CA  
 CA ECPR [139-141]  
 ECPR CPR CPR [142]  
 2.3 CA “ ” CA CPR  
 VF [142] CA  
 2.2.6 CPR CPR CPR CPR  
 [143] CPR CPR  
 [144,145] CPR Peter Safar  
 STD-CPR 2010 2015 CPR A-airway  
 B-breath C-circulation  
 C C-A-B CPR BLS A-B-  
 CPR CPR CPR A-B-C C-A-B  
 STD-CPR [142] “ ” [148,149]  
 1 CA  
 / CA  
 VF CA  
 CA  
 2 - C-  
 CPR - CPR CPR A-B CA  
 STD-CPR A-B-C

2 CPR CPR CA

CPR CA

C—A—B CPR CA

CA CA

3 VF 5 min AED VF CA

2.3.2 / / [150] CA

1 CA CA CA CA 1 1000 1/3 0.3-0.5 ml 500-1000 ml

PEA CPR [97,98,151] 20 ml/kg g h i

2 / CA [160-162] trauma cardiac arrest TCA TCA ROSC CA

CPR CA [152,153] CPR [163] TCA CPR

CPR CA [154] [164] TCA CPR

3 / CA CPR 35 CPR

CA CPR 1 1 1 tranexamic acid TXA [165-167] massive transfusion

1 min CPR VF protocols MIP CPR 80-90 mmHg 1 mmHg=0.133 kPa 60 min [168] TXA 10 min 1 g 8 h 1 g

30 35

[155-157] CA TCA

CA [158] TCA CPR

CPR [159] 10 min CPR 15 min

[170] TCA 2.3.3 [150 173] 1 CA CA

15 min CA [180] 2

TCA 5 CA CA CA

[171 172] CA

TCA CPR 6 CPR CPR CPR CA

[173,174] CPR [150] AMI 20% CA

7 CA 4 VF

CPR PEA VF

PETCO<sub>2</sub> end-tidal carbon dioxide pressure, CA CPR 3 CPR

CPR 60-90 min [119] PEA CA

[176,177] CA

ECPR

[150] OHCA CHD VF [34 181] CA

CA PCI CPR CA

A-CPR [182 183] CPR CA

ECPR [133] CPR CA CPR

[119] CA AED [184,185]

[178] CA 3 CA [186]

CPR 0.4 mg 2 mg 4 min [174] CA [187]

CA CA 1 AED

[188] ROSC

CPR ECPR 4 CA CPR

5  
 CPR AED “ CPR”  
 CPR 3 CA “ ”  
 CA CA ROSC  
 “ ”  
 CA [199]  
 [189-191] 3.1 CA ROSC  
 2.3.4 1 CA  
 CO “ ” CA  
 post-resuscitation syndrome  
 CA  
 CO CA [192] PRS OHCA  
 1% [6] CA  
 CA ICU  
 CPR CA ROSC  
 ABCDE  
 3.1.1 airway A CA ROSC  
 [193]  
 4 min  
 CA [200-201]  
 [174] 2 CA  
 end-tidal carbon dioxide ETCO<sub>2</sub>  
 CHD CA  
 PEA CA  
 CA 3.1.2 breathing B  
 CPR [194-197] CPR [ alveolar  
 partial pressure of carbon dioxide PaCO<sub>2</sub> 35-45 mmHg]  
 ETCO<sub>2</sub> 30-40 mmHg [202]  
 ETCO<sub>2</sub>  
 CPR 3 CPR CA  
 CPR 30min ROSC CA 100%  
 CPR [198] CPR CA pulse oxygen  
 CPR SpO<sub>2</sub> [203] SpO<sub>2</sub> 0.94  
 SpO<sub>2</sub>  
 3.1.3 circulation C ROSC  
 CA  
 CPR 1  
 CPR CA 90mmHg  
 5 CPR meanarterial pressure MAP 65mmHg [204] 2  
 CA  
 CPR CA  
 CPR ECPR 3  
 CPR 3.1.4 differential diagnosis D  
 CPR CPR CA  
 CPR AMI ECPR CA  
 CA  
 5H hypoxemia 5H 5T  
 hypoxia hypoxia

hydrogen / hypkalemia/hypokalemia TIM  
hypohemia 5T tension pneumothorax 72h [223]  
cardiac tamponade toxins thrombosis TIM CA 72h  
pulmonary coronary thrombosis CA [224]

3.2 CA CA 3.2.4 ECMO refractory cardiac  
“ ” “ ” “ arrest RCA CPR ECMO  
” CA / ECPR CA - V-A ECMO  
CA ECMO ECPR  
CA ACS VF

3.2.1 ACS CA  
OHCA [206] CA ROSC 12 [140 225] ECPR  
18 ST  
ST OHCA ECPR CA  
[207]  
OHCA RCA CA  
ST [225]  
[208,209] CA [210]

3.2.2 targeted temperature management  
TTM TTM CA “ ”

32-36 24h 3.3.1 CA “ ”  
0.25-0.5 h [211-213] , death CDCD CDCD China donation after citizen's  
“ C- ”  
donation after citizen's death DCD  
non-heart beating donation NHBD DCD  
TIM DCD DCD DCD  
TIM DCD

72h TIM  
3.2.3 CA [214] TIM  
CA TIM  
CA TIM  
2 min [226]  
3.3.3 CDCD  
CT  
MRI [ SB100  
neuron-specific enolase, NSE ] [215-222]  
CA

CA  
CA  
CA

CA [227-229]  
CA

2016  
“ ”  
CA  
CPR  
“ ”  
2016  
CPR  
CPR

[ 1 ] Ad Hoc Committee on Cardiopulmonary Resuscitation of the Division of Medical Sciences, National Academy of Sciences National Research Council. Cardiopulmonary resuscitation [J]. JAMA, 1966, 198 4 : 372- 379. DOI: 10.1001/jama.1966.03110170084023

[ 2 ] . [J]. , 2015, 27 3 : 161- 163 DOI: 10.3760/cmaj.issn.2095-4352.2015.03.001.

[ 3 ] , , , . 2015 [J]. , 2016, 31 6 : 617- 622 DOI: 10.3969/j.issn.1000-3614.2016.06.001.

[ 4 ] Writing Group Members, Mozaffarian D, Benjamin E J, *et al.* Executive summary: heart disease and stroke statistics—2016 update: a report from the American Heart Association [J]. Circulation, 2016, 133 4 : 447- 454 DOI: 10.1161/CIR.0000000000000666

[ 5 ] Zhang S. Sudden cardiac death in China: current status and future perspectives [J]. Europace, 2015, 17 Suppl 2 : ii14- ii18 DOI: 10.1093/europace/eu143

[ 6 ] Shao F, Li C S, Liang L R, *et al.* Outcome of out-of-hospital cardiac arrests in Beijing, China [J]. Resuscitation, 2014, 85 11 : 1411- 1417. DOI: 10.1016/j.resuscitation.2014.08.008

[ 7 ] Hua W, Zhang L F, Wu Y F, *et al.* Incidence of sudden cardiac death in China: analysis of 4 regional populations [J]. J Am Coll Cardiol, 2009, 54 12 : 1110- 1118 DOI: 10.1016/j.jacc.2009.06.016

[ 8 ] , , , . 97 823 [J]. , 2011, 23 2 : 99- 103 DOI: 10.3760/cmaj.issn.1003-0603.2011.02.011.

[ 9 ] , . [J]. , 2012, 21 1 : 9- 11. DOI: 10.3760/cmaj.issn.1671-0282.2012.01.002.

[10] , . [J]. , 2015, 36 1 : 87- 89. DOI: 10.3760/cmaj.issn.0254-6450.2015.01.020.

[11] Hazinski M F, Nolan J P, Aickin R, *et al.* Part 1: Executive Summary: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations [J]. Circulation, 2015, 132 16

Suppl 1 : S2-S39 DOI: 10.1161/CIR.000000000000270 [27] . . . . . 50 : . . . . . ? [J].

[12] . . . . . [J]. . . . . , 2013, 22 1 : 6-8 DOI: 10.3760/cmaj.issn 1671-0282.2013.01.002

. . . . . , 2000, 9 6 : 363 DOI: 10.3760/j.issn.1671-0282.2000.06.001. [28] . . . . . [J].

[13] . . . . . [J]. . . . . , 2005, 14 5 : 362-363 DOI: 10.3760/cmaj.issn.1671-0282.2005.05.002

. . . . . , 2004, 13 3 : 153-154 DOI: 10.3760/j.issn 1671-0282.2004.03.002 [29] . . . . . CPR<1

[14] . . . . . [J]. . . . . , 2013, 33 11 : 986-987. DOI: 10.3969/j.issn.1002-1949.2013.11.007.

. . . . . [J]. . . . . , 2006, 15 1 : 13-14 DOI: 10.3760/cmaj.issn.1671-0282.2006.01.003 [30] . . . . . [J].

[15] . . . . . [J]. . . . . , 2016, 3 4 : 20-22 DOI: 10.19450/j.cnki.jcrh.2016.04.006

[16] . . . . . : . . . . . [J]. [31] Hallstrom A P, Ornato J P, Weisfeldt M, *et al.* Public-access defibrillation and survival after out-of-hospital cardiac arrest [J]. *N Engl J Med*, 2004, 351 7 : 637-646 DOI: 10.1056/NEJMoA040566

. . . . . , 2015, 40 9 : 693-698 DOI: 10.11855/j.issn.0577-7402.2015.09.02 [32] Travers A H, Perkins G D, Berg R A, *et al.* Part 3 Adult Basic Life Support and Automated External Defibrillation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations [J]. *Circulation*, 2015, 132 16 Suppl 1 : S51-S83 DOI: 10.1161/CIR.000000000000272

[17] Neuspiel D R, Kuller L H. Sudden and unexpected natural death in childhood and adolescence [J]. *JAMA*, 1985, 254 10 : 1321-1325 DOI: 10.1001/jama.1985.03360100071016 [33] . . . . . : . . . . . [J].

. . . . . , 2009, 21 6 : 323-324 DOI: 10.3760/cmaj.issn.1003-0603.2009.06.002

[18] Winkel B G, Risgaard B, Sadjadih G, *et al.* Sudden cardiac death in children 1-18 years : symptoms and causes of death in a nationwide setting [J]. *Eur Heart J*, 2014, 35 13 : 868-875 DOI:10.1093/eurheartj/ehu509 [34] Girotra S, Nallamothu B K, Spertus J A, *et al.* Trends in survival after in-hospital cardiac arrest [J]. *N Engl J Med*, 2012, 367 20 : 1912-1920 DOI: 10.1056/NEJMoA1109148

[19] Chugh S S, Reinier K, Balaji S, *et al.* Population-based analysis of sudden death in children: The Oregon Sudden Unexpected Death Study [J]. *Heart Rhythm* 2009, 6 11 : 1618-1622 DOI: 10.1016/j.hrthm.2009.07.046 [35] Berdowski J, Beekhuis F, Zwindeman A H, *et al.* Importance of the first link: description and recognition of an out-of-hospital cardiac arrest in an emergency call [J]. *Circulation*, 2009, 119 15 : 2096-2102 DOI: 10.1161/CIRCULATIONAHA.108.768325

[20] Baars H F, van der Smagt J J, Doevendans P A. Clinical cardiogenetics [M]. London: Springer, 2011: 401-412 [36] Roppolo L P, Westfall A, Pepe P E, *et al.* Dispatcher assessments for agonal breathing improve detection of cardiac arrest [J]. *Resuscitation*, 2009, 80 7 : 769-772. DOI: 10.1016/j.resuscitation.2009.04.013

[21] Wu Q, Zhang L, Zheng J, *et al.* Forensic pathological study of 1 656 cases of sudden cardiac death in southern China [J]. *Medicine* Baltimore , 2016, 95 5 :170-172. DOI: 10.1097/MD.0000000000002707. [37] Stipulante S, Tubes R, El Fassi M, *et al.* Implementation of the ALERT algorithm: a new dispatcher-assisted telephone cardiopulmonary resuscitation protocol, in non-Advanced Medical Priority Dispatch System AMPDS Emergency Medical Services centres [J]. *Resuscitation*, 2014, 85 2 : 177-181. DOI: 10.1016/j.resuscitation.2013.10.005

[22] Amtz H R, Willich S N, Schreiber C, *et al.* Diurnal, weekly and seasonal variation of sudden death. Population-based analysis of 24 061 consecutive cases [J]. *Eur Heart J*, 2000, 21 4 : 315-320 DOI: 10.1053/ehj.1999.1739 [38] Fujie K, Nakata Y, Yasuda S, *et al.* Do dispatcher instructions facilitate bystander-initiated cardiopulmonary resuscitation and improve outcomes in patients with out-of-hospital cardiac arrest? a comparison of family and non-family bystanders [J]. *Resuscitation*, 2014, 85 3 : 315-319. DOI: 10.1016/j.resuscitation.2013.11.013

[23] . . . . . [J]. . . . . , 2009, 29 5 : 457-458 DOI: 10.3969/j.issn.1002-1949.2009.05.022 [39] Ringh M, Rosenqvist M, Hollenberg J, *et al.* Mobile-phone dispatch of laypersons for CPR in out-of-hospital cardiac arrest [J].

[24] Kronick S L, Kurz M C, Lin S, *et al.* Part 4: systems of care and continuous quality improvement: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care [J]. *Circulation*, 2015, 132 18 Suppl 2 : S397-413 DOI: 10.1161/CIR.000000000000258

[25] Mozaffarian D, Benjamin E J, Go A S, *et al.* Heart disease and stroke statistics— 2015 update: a report from the American Heart Association [J]. *Circulation*, 2015, 131 4 : e29-e322 DOI:10.1161/CIR.000000000000152

[26] . . . . . [J]. . . . . , 2011, 27 12 : 8

- N Engl J Med, 2015, 372 : 2316-2325 DOI: 10.1056/NEJMoa1406038
- [40] Ringh M, Fredman D, Nordberg P, *et al.* Mobile phone technology identifies and recruits trained citizens to perform CPR on out-of-hospital cardiac arrest victims prior to ambulance arrival [J]. Resuscitation, 2011, 82 : 1514-1518 DOI:10.1016/j.resuscitation.2011.07.033
- [41] Zijlstra J A, Stieglis R, Riedijk F, *et al.* Local lay rescuers with AEDs, alerted by text messages, contribute to early defibrillation in a Dutch out-of-hospital cardiac arrest dispatch system [J]. Resuscitation, 2014, 85 : 1444-1449 DOI:10.1016/j.resuscitation.2014.07.020
- [42] Lund-Kordahl I, Olasveengen T M, Lorentz T, *et al.* Improving outcome after out-of-hospital cardiac arrest by strengthening weak links of the local Chain of Survival; quality of advanced life support and post-resuscitation care [J]. Resuscitation, 2010, 81 : 422-426 DOI: 10.1016/j.resuscitation.2009.12.020
- [43] Perkins G D, Jacobs I G, Nadkarni V M, *et al.* Cardiac arrest and cardiopulmonary resuscitation outcome reports: update of the Utstein Resuscitation Registry Templates for Out-of-Hospital Cardiac Arrest: a statement for healthcare professionals from a task force of the International Liaison Committee on Resuscitation American Heart Association, European Resuscitation Council, Australian and New Zealand Council on Resuscitation, Heart and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Council of Southern Africa, Resuscitation Council of Asia ; and the American Heart Association Emergency Cardiovascular Care Committee and the Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation [J]. Resuscitation, 2015, 96 : 328-340 DOI:10.1161/CIRC.000000000000144
- [44] Shao F, Li C S, Liang L R, *et al.* Incidence and outcome of adult in-hospital cardiac arrest in Beijing, China [J]. Resuscitation, 2016, 102 : 51-56 DOI: 10.1016/j.resuscitation.2016.02.002
- [45] Berg R A, Sutton R M, Holubkov R, *et al.* Ratio of PICU versus ward cardiopulmonary resuscitation events is increasing [J]. Crit Care Med, 2013, 41 : 2292-2297 DOI: 10.1097/CCM.0b013e31828cf0c0
- [46] Girotra S, Cram P, Spertus J A, *et al.* Hospital variation in survival trends for in-hospital cardiac arrest [J]. J Am Heart Assoc, 2014, 3 : e000871 DOI: 10.1161/JAHA.114.000871
- [47] Peberdy M A, Cretikos M, Abella B S, *et al.* Recommended guidelines for monitoring, reporting, and conducting research on medical emergency team, outreach, and rapid response systems: an Utstein-style scientific statement: a scientific statement from the International Liaison Committee on Resuscitation American Heart Association, Australian Resuscitation Council, European Resuscitation Council, Heart and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Council of Southern Africa, and the New Zealand Resuscitation Council ; the American Heart Association Emergency Cardiovascular Care Committee; the Council on Cardiopulmonary, Perioperative, and Critical Care; and the Interdisciplinary Working Group on Quality of Care and Outcomes Research [J]. Resuscitation, 2007, 75 : 412-433 DOI: 10.1161/CIRCULATIONAHA.107.186227
- [48] Devita M A, Bellomo R, Hillman K, *et al.* Findings of the first consensus conference on medical emergency teams [J]. Crit Care Med, 2006, 34 : 2463-2478 DOI: 10.1097/01.CCM.0000235743.38172.6E
- [49] Al-Qahtani S, Al-Dorzi H M, Tamim H M, *et al.* Impact of an intensivist-led multidisciplinary extended rapid response team on hospital-wide cardiopulmonary arrests and mortality [J]. Crit Care Med, 2013, 41 : 506-517 DOI: 10.1097/CCM.0b013e318271440b
- [50] Chan P S, Khalid A, Longmore L S, *et al.* Hospital-wide code rates and mortality before and after implementation of a rapid response team [J]. JAMA, 2008, 300 : 2506-2513 DOI:10.1001/jama.2008.715
- [51] Buist M D, Moore G E, Bernard S A, *et al.* Effects of a medical emergency team on reduction of incidence of and mortality from unexpected cardiac arrests in hospital: preliminary study [J]. BMJ, 2002, 324 : 7334 : 387-390 DOI: 10.1136/bmj.324.7334.387
- [52] . ——— [J]. , 2015, 24 : 1-21 DOI: 10.3760/cma.j.issn.1671-0282.2015.01.007
- [53] Yeung J, Meeks R, Edelson D, *et al.* The use of CPR feedback/prompt devices during training and CPR performance: a systematic review [J]. Resuscitation, 2009, 80 : 743-751 DOI: 10.1016/j.resuscitation.2009.04.012
- [54] Hunziker S, Johansson A C, Tschann F, *et al.* Teamwork and leadership in cardiopulmonary resuscitation [J]. J Am Coll Cardiol, 2011, 57 : 2381-2388 DOI: 10.1016/j.jacc.2011.03.017
- [55] Bhanji F, Donoghue A J, Wolff M S, *et al.* Part 14: education: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care [J]. Circulation, 2015, 132 : 561-573 DOI:10.1161/CIR.000000000000268
- [56] Spearpoint K G, Gruber P C, Brett S J. Impact of the immediate life support course on the incidence and outcome of in-hospital cardiac arrest calls: an observational study over 6 years [J]. Resuscitation, 2009, 80 : 638-643 DOI: 10.1016/j.resuscitation.2009.03.002
- [57] Zhang S, Singh B, Rodriguez D A, *et al.* Improve the prevention of sudden cardiac arrest in emerging countries: the Improve SCA clinical study design [J]. Europace, 2015, 17 : 1720-1726 DOI:10.1093/europace/eu103
- [58] Priori S G, Blomström-Lundqvist C, Mazzanti A, *et al.* 2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death [J]. Rev Esp Cardiol Engl Ed, 2016, 69 : 176 DOI: 10.1016/



j.rec.2016.01.001.

[59] . [M]. 2004 520-573

[60] . [J]. 2014 29 12 961-963 DOI: 10.3969/j.issn.1000-3614.2014.12.001.

[61] . [J]. 2013 28 5 323-326. DOI: 10.3969/j.issn.1000-3614.2013.05.002

[62] . [M]. 2015 624-625

[63] . [J]. 2007 15 5 433-435 DOI: 10.3969/j.issn.1673-7245.2007.05.025

[64] . 2015 ESC [J]. 2015 30 Z2 37-47. DOI: 10.3969/j.issn.1000-3614.2015.Z2.009

[65] . [J]. 2008 22 3 194-197.

[66] Sharma A K, Singh J P, Heist E K. Stress cardiomyopathy: diagnosis, pathophysiology, management, and prognosis [J]. *Crit Pathw Cardiol* 2011 10 3 142-147. DOI: 10.1097/HPC.0b013e31822f4d37.

[67] Lieve K V van der Werf C, Wilde A A. Catecholaminergic polymorphic ventricular tachycardia [J]. *Circ J* 2016 80 6 1285-1291. DOI: 10.1253/circj.CJ-16-0326

[68] Yoshikawa T. Takotsubo cardiomyopathy a new concept of cardiomyopathy: clinical features and pathophysiology [J]. *Int J Cardiol* 2015 182 3 297-303. DOI: 10.1016/j.ijcard.2014.12.116

[69] Schwartz P J, Priori S G, Spazzolini C *et al.* Genotype-phenotype correlation in the long-QT syndrome: gene-specific triggers for life-threatening arrhythmias [J]. *Circulation* 2001 103 1 89-95. DOI: 10.1161/01.CIR.103.1.89

[70] Priori S G, Wilde A A, Horie M *et al.* Executive summary: HRS/EHRA/APHRS expert consensus statement on the diagnosis and management of patients with inherited primary arrhythmia syndromes [J]. *Europace* 2013, 15 10 1389-1406. DOI: 10.1016/j.hrthm.2013.07.021.

[71] Behr E R, Dalageorgou C, Christiansen M *et al.* Sudden arrhythmic death syndrome: familial evaluation identifies inheritable heart disease in the majority of families [J]. *Eur Heart J*. 2008 29 23 1670-1680. DOI: 10.1093/eurheartj/ehn219.

[72] Kleinman M E, Brennan E E, Goldberger Z D *et al.* Part 5: Adult basic life support and cardiopulmonary resuscitation quality: 2015 American Heart Association Guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care [J]. *Circulation*, 2015, 132 18 Suppl 2 S414-S435. DOI: 10.1161/CIR.000000000000259

[73] Lerner E B, Rea T D, Bobrow B J *et al.* Emergency medical service dispatch cardiopulmonary resuscitation prearrival instructions to improve survival from out-of-hospital cardiac arrest: a scientific statement from the American Heart Association [J]. *Circulation*, 2012 125 4 648-655. DOI: 10.1161/CIR.0b013e31823e5fc.

[74] Clawson J, Olda C, Scott G *et al.* Effect of a Medical Priority Dispatch System key question addition in the seizure/convulsion/fitting protocol to improve recognition of ineffective agonal breathing [J]. *Resuscitation*, 2008 79 2 257-264. DOI: 10.1016/j.resuscitation.2008.06.006

[75] Frederick K, Bixby E, Orzel M N *et al.* Will changing the emphasis from 'pulseless' to 'no signs of circulation' improve the recall scores for effective life support skills in children? [J]. *Resuscitation* 2002 55 3 255-261. DOI: 10.1016/S0300-9572(02)00269-1.

[76] Lapostolle F, Le Toumelin P, Agostinucci J M *et al.* Basic cardiac life support providers checking the carotid pulse: performance, degree of conviction, and influencing factors [J]. *Acad Emerg Med* 2004 11 8 878-880. DOI: 10.1197/j.aem.2004.02.528

[77] Moule P. Checking the carotid pulse: diagnostic accuracy in students of the healthcare professions [J]. *Resuscitation* 2000 44 3 195-201. DOI: 10.1016/S0300-9572(00)00139-8

[78] Bohm K, Rosenqvist M, Hollenberg J *et al.* Dispatcher-assisted telephone-guided cardiopulmonary resuscitation: an underused lifesaving system [J]. *Eur J Emerg Med* 2007 14 5 256-259. DOI: 10.1097/MEJ.0b013e32823a3cd1.

[79] White L, Rogers J, Bloomingdale M *et al.* Dispatcher-assisted cardiopulmonary resuscitation: risks for patients not in cardiac arrest [J]. *Circulation*, 2010, 121 1 : 91-97. DOI: 10.1161/CIRCULATIONAHA.109.872366

[80] Hallstrom A P, Cobb L A, Johnson E *et al.* Dispatcher-assisted CPR: implementation and potential benefit. A 12-year study [J]. *Resuscitation*, 2003, 57 2 123-129. DOI: 10.1016/S0300-9572(03)00005-4

[81] Nummi J, Pettilä V, Biber B *et al.* Effect of protocol compliance to cardiac arrest identification by emergency medical dispatchers [J]. *Resuscitation*, 2006 70 3 463-469. DOI: 10.1016/j.resuscitation.2006.01.016

[82] Idris A H, Guffey D, Pepe P E *et al.* Chest compression rates and survival following out-of-hospital cardiac arrest [J]. *Crit Care Med* 2015, 43 4 840-848. DOI: 10.1097/CCM.0000000000000824

[83] Idris A H, Guffey D, Aufderheide T P *et al.* Relationship between chest compression rates and outcomes from cardiac arrest [J]. *Circulation*, 2012, 12 24 3004-3012. DOI: 10.1161/CIRCULATIONAHA.111.059535

[84] Vadeboncoeur T, Stolz U, Panchal A *et al.* Chest compression depth and survival in out-of-hospital cardiac arrest [J]. *Resuscitation* 2014, 8 2 182-188. DOI: 10.1016/j.resuscitation.2013.10.002

[85] Stiell I G, Brown S P, Christenson J *et al.* What is the role of chest compression depth during out-of-hospital cardiac arrest resuscitation? [J]. *Crit Care Med*, 2012, 40 4 1192-1198. DOI:

- 10.1097/CCM.0b013e31823bc8bb.
- [86] Stiell I G, Brown S P, Nichol G, *et al.* What is the optimal chest compression depth during out-of-hospital cardiac arrest resuscitation of adult patients? [J]. *Circulation*, 2014, 130 22 1962-1970. DOI: 10.1161/CIRCULATIONAHA.114.008671.
- [87] Helleveuo H, Sainio M, Nevalainen R, *et al.* Deeper chest compression—more complications for cardiac arrest patients? [J]. *Resuscitation*, 2013, 84 6 760-765. DOI: 10.1016/j.resuscitation.2013.02.015.
- [88] Edelson D P, Abella B S, Kramer-Johansen J, *et al.* Effects of compression depth and pre-shock pauses predict defibrillation failure during cardiac arrest [J]. *Resuscitation*, 2006, 71 2 137-145. DOI: 10.1016/j.resuscitation.2006.04.008.
- [89] Cheskes S, Schmicker R H, Christenson J, *et al.* Perishock pause: an independent predictor of survival from out-of-hospital shockable cardiac arrest [J]. *Circulation* 2011 124 1 58-66. DOI: 10.1161/CIRCULATIONAHA.110.010736.
- [90] , . [J]. , 2013 25 11 703-704. DOI: 10.3760/cma.j.issn.0365-4352.2013.11.017.
- [91] Meaney P A, Bobrow B J, Mancini M E, *et al.* Cardiopulmonary resuscitation quality: improving cardiac resuscitation outcomes both inside and outside the hospital: a consensus statement from the American Heart Association [J]. *Circulation*, 2013, 128 4 417-435. DOI: 10.1161/CIR.0b013e31829d8654.
- [92] , . [J]. 2002 14 10 582-583. DOI: 10.3760/cma.j.issn.1003-0603.2002.10.002.
- [93] Qvigstad E, Kramer-Johansen J, Tømte Ø, *et al.* Clinical pilot study of different hand positions during manual chest compressions monitored with capnography [J]. *Resuscitation*, 2013, 84 9 1203-1207. DOI: 10.1016/j.resuscitation.2013.03.010.
- [94] Orłowski J P. Optimum position for external cardiac compression in infants and young children [J]. *Ann Emerg Med*, 1986, 15 6 667-673. DOI: 10.1016/S0196-0644 86 80423-1.
- [95] Niles D E, Sutton R M, Nadkarni V M, *et al.* Prevalence and hemodynamic effects of leaning during CPR [J]. *Resuscitation*, 2011, 82 Suppl 2 : S23-S26. DOI: 10.1016/S0300-9572 11 70147-2.
- [96] Fried D A, Leary M, Smith D A, *et al.* The prevalence of chest compression leaning during in-hospital cardiopulmonary resuscitation [J]. *Resuscitation*, 2011, 82 8 1019-1024. DOI: 10.1016/j.resuscitation.2011.02.032.
- [97] SOS-KANTO study group. Cardiopulmonary resuscitation by bystanders with chest compression only—SOS-KANTO: an observational study [J]. *Lancet*, 2007, 369 9565 920-926. DOI: 10.1016/S0140-6736 07 60451-6.
- [98] Bobrow B J, Spaite D W, Berg R A, *et al.* Chest compression only CPR by lay rescuers and survival from out-of-hospital cardiac arrest [J]. *JAMA*, 2010, 304 13 1447-1454. DOI: 10.1001/jama.2010.1392.
- [99] Panchal A R, Bobrow B J, Spaite D W, *et al.* Chest compression only cardiopulmonary resuscitation performed by lay rescuers for adult out-of-hospital cardiac arrest due to non-cardiac aetiologies [J]. *Resuscitation*, 2013, 84 4 435-439. DOI: 10.1016/j.resuscitation.2012.07.038.
- [100] Svensson L, Böhm K, Castrén M, *et al.* Compression-only CPR or standard CPR in out-of-hospital cardiac arrest [J]. *N Engl J Med*, 2010, 363 5 434-442. DOI: 10.1056/NEJMoa0908991.
- [101] Rea T D, Fahrenbruch C, Culley L, *et al.* CPR with chest compression alone or with rescue breathing [J]. *N Engl J Med* 2010 363 5 : 423-433. DOI: 10.1056/NEJMoa0908993.
- [102] Elam J O, Greene D G, Schneider M A, *et al.* Head-tilt method of oral resuscitation [J]. *J Am Med Assoc*, 1960, 172 8 812-815. DOI: 10.1001/jama.1960.03020080042011.
- [103] Singletary E M, Zideman D A, De Buck E D, *et al.* Part 9: First aid: 2015 international consensus on first aid science with treatment recommendations [J]. *Circulation*, 2015 132 16 Suppl 1 S269-S311. DOI: 10.1161/CIR.0000000000000278.
- [104] Litman R S, Wake N, Chan L M, *et al.* Effect of lateral positioning on upper airway size and morphology in sedated children [J]. *Anesthesiology*, 2005, 103 3 484-488. DOI: 10.1097/0000542-200509000-00009.
- [105] Arai Y C, Fukunaga K, Hirota S, *et al.* The effects of chin lift and jaw thrust while in the lateral position on stridor score in anesthetized children with adenotonsillar hypertrophy [J]. *Anesth Analg* 2004 99 6 1638-1641. DOI: 10.1213/01.ANE.0000135637.95853.1C.
- [106] Hastings R H, Wood P R. Head extension and laryngeal view during laryngoscopy with cervical spine stabilization maneuvers [J]. *Anesthesiology*, 1994, 80 4 825-831. DOI: 10.1097/0000542-199404000-00015.
- [107] Berg R A, Hemphill R, Abella B S, *et al.* Part 5: adult basic life support: 2010 American Heart Association Guidelines for cardiopulmonary resuscitation and emergency cardiovascular care [J]. *Circulation*, 2010, 122 18 Suppl 3 : S685-S705. DOI: 10.1161/CIRCULATIONAHA.110.970939.
- [108] Wenzel V, Idris A H, Banner M J, *et al.* The composition of gas given by mouth-to-mouth ventilation during CPR [J]. *Chest* 1994 106 6 1806-1810. DOI: 10.1378/chest.106.6.1806.
- [109] Dörjes V, Ocker H, Hagelberg S, *et al.* Smaller tidal volumes with room air are not sufficient to ensure adequate oxygenation during bag-valve-mask ventilation [J]. *Resuscitation*, 2000, 44 1 37-41. DOI: 10.1016/S0300-9572 99 00161-6.
- [110] Safar P, Elam J O. Advances in cardiopulmonary resuscitation—the Wolf Creek Conference on cardiopulmonary resuscitation [M]. New York: Springer-Verlag, 1977 73-79.
- [111] Larsen M P, Eisenberg M S, Cummins R O, *et al.* Predicting survival from out-of-hospital cardiac arrest: a graphic model [J]. *Ann Emerg Med*, 1993, 22 11 1652-1658. DOI: 10.1016/

S0196-0644-05-81302-2

[112] Eftestøl T, Wik L, Sunde K, *et al.* Effects of cardiopulmonary resuscitation on predictors of ventricular fibrillation defibrillation success during out-of-hospital cardiac arrest [J]. *Circulation*, 2004, 110 1 10-15 DOI: 10.1161/01.CIR.0000133323.15565.75

[113] Bobrow B J, Clark L L, Ewy G A, *et al.* Minimally interrupted cardiac resuscitation by emergency medical services for out-of-hospital cardiac arrest [J]. *JAMA*, 2008, 299 10 1158-1165 DOI:10.1001/jama.299.10.1158

[114] Rea T D, Helbock M, Perry S, *et al.* Increasing use of cardiopulmonary resuscitation during out-of-hospital ventricular fibrillation arrest: survival implications of guideline changes [J]. *Circulation*, 2006, 114 25 2760-2765 DOI: 10.1161/CIRCULATIONAHA.106.654715

[115] van Alem A P, Chapman F W, Lank P, *et al.* A prospective, randomised and blinded comparison of first shock success of monophasic and biphasic waveforms in out-of-hospital cardiac arrest [J]. *Resuscitation* 2003 58 1 17-24 DOI: 10.1016/S0300-9572-03-00106-0

[116] Neumar R W, Otto C W, Link M S, *et al.* Part 8: adult advanced cardiovascular life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care [J]. *Circulation*, 2010, 122 18 Suppl 3 : S729-S767 DOI: 10.1161/CIRCULATIONAHA.110.970988

[117] Rea T D, Olsufka M, Bemis B, *et al.* A population-based investigation of public access defibrillation: role of emergency medical services care [J]. *Resuscitation*, 2010, 81 2 : 163-167 DOI: 10.1016/j.resuscitation.2009.10.025

[118] Hanefeld C, Lichte C, Mentges-Schröter I, *et al.* Hospital-wide first-responder automated external defibrillator programme: 1 year experience [J]. *Resuscitation*, 2005, 66 2 : 167-170 DOI: 10.1016/j.resuscitation.2005.01.014

[119] Link M S, Berkow L C, Kudenchuk P J, *et al.* Part 7: adult advanced cardiovascular life support: 2015 American Heart Association Guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care [J]. *Circulation*, 2015, 132 18 Suppl 2 : S444-S464 DOI: 10.1161/CIR.0000000000000261.

[120] Haghara A, Hasegawa M, Abe T, *et al.* Prehospital epinephrine use and survival among patients with out-of-hospital cardiac arrest [J]. *JAMA*, 2012, 307 11 : 1161-1168 DOI: 10.1001/jama.2012.294

[121] Kosciuk C, Pinawin A, McGovern H, *et al.* Rapid epinephrine administration improves early outcomes in out-of-hospital cardiac arrest [J]. *Resuscitation*, 2013, 84 7 : 915-920 DOI: 10.1016/j.resuscitation.2013.03.023

[122] Kudenchuk P J, Cobb L A, Copass M K, *et al.* Amiodarone for resuscitation after out-of-hospital cardiac arrest due to ventricular fibrillation [J]. *N Engl J Med*, 1999, 341 12 : 871-878 DOI:10.1056/NEJM199909163411203

[123] Dorian P, Cass D, Schwartz B, *et al.* Amiodarone as compared with lidocaine for shock-resistant ventricular fibrillation [J]. *N Engl J Med*, 2002, 346 12 : 884-890 DOI: 10.1056/NEJMoa013029

[124] Kudenchuk P J, Brown S P, Daya M, *et al.* Amiodarone, lidocaine, or placebo in out-of-hospital cardiac arrest [J]. *N Engl J Med*, 2016, 374 18 : 1711-1722 DOI: 10.1056/NEJMoa1514204

[125] Dybvik T, Strand T, Steen P A. Buffer therapy during out-of-hospital cardiopulmonary resuscitation [J]. *Resuscitation*, 1995, 29 2 : 89-95 DOI: 10.1016/0300-9572-95-00850-S.

[126] Vukmir R B, Katz L. Sodium bicarbonate improves outcome in prolonged prehospital cardiac arrest [J]. *Am J Emerg Med*, 2006, 24 2 : 156-161 DOI: 10.1016/j.ajem.2005.08.016

[127] Paradis N A, Martin G B, Rivers E P, *et al.* Coronary perfusion pressure and the return of spontaneous circulation in human cardiopulmonary resuscitation [J]. *JAMA*, 1990, 263 8 : 1106-1113 DOI: 10.1001/jama.1990.03440080084029

[128] Atkins D L, Berger S, Duff J P, *et al.* Part 11: pediatric basic life support and cardiopulmonary resuscitation quality: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care [J]. *Circulation*, 2015, 132 18 Suppl 2 : S519-S525 DOI:10.1161/CIR.0000000000000265

[129] Sayre MR, Berg R A, Cave D M *et al.* Hands-only compression-only cardiopulmonary resuscitation: a call to action for bystander response to adults who experience out-of-hospital sudden cardiac arrest: a science advisory for the public from the American Heart Association Emergency Cardiovascular Care Committee [J]. *Circulation*, 2008, 117 16 : 2162-2167 DOI: 10.1161 /CIRCULATIONAHA . 107.188380

[130] [J]. , 2013, 22 9 : 957-959 DOI: 10.3760/cmaj.issn.1671-0282.2013.09.004

[131] [J]. , 2016, 28 7 : 651-653 DOI: 10.3760/cmaj.issn.2095-4352.2016.07.018

[132] Zhang S, Liu Q, Han S, *et al.* Stand ard versus Abdominal Lifting and Compression CPR [J]. *Evid Based Complement Alternat Med*, 2016, 2016 9416908 DOI: 10.1155/2016/9416908

[133] [J]. , 2014, 26 10 : 689-691 DOI: 10.3760/cmaj.issn.2095-4352.2014.10.001.

[134] Boczar M E, Howard M A, Rivers E P, *et al.* A technique revisited: hemodynamic comparison of closed- and open- chest cardiac massage during human cardiopulmonary resuscitation [J]. *Crit Care Med*, 1995, 23 3 : 498-503 DOI: 10.1016/0300-9572-96-83756-7.

[135] 2005 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. Part 4: advanced life support [J]. *Resuscitation*, 2005, 67 2-3 : 213-247 DOI: 10.1016/j.resuscitation.2005.09.018

- [136] Dunning J, Fabbri A, Kolh P H, *et al.* Guideline for resuscitation in cardiac arrest after cardiac surgery [J]. *Eur J Cardiothorac Surg*, 2009, 36 1 : 3-28 DOI: 10.1016/j.ejcts.2009.01.033
- [137] Paradis N A, Martin G B, Rivers E P. Use of open chest cardiopulmonary resuscitation after failure of standard closed chest CPR: illustrative cases [J]. *Resuscitation*, 1992, 24 1 : 61-71. DOI:10.1016/0300-9572(92)90174-B.
- [138] . [J]. , 2014, 23 4 : 369-370 DOI: 10.3760/cma.j.issn.1671-0282.2014.04.003
- [139] Maekawa K, Tanno K, Hase M, *et al.* Extracorporeal cardiopulmonary resuscitation for patients with out-of-hospital cardiac arrest of cardiac origin: a propensity-matched study and predictor analysis [J]. *Crit Care Med*, 2013, 41 5 : 1186-1196 DOI: 10.1097/CCM.0b013e31827ca4c8
- [140] Chen Y S, Lin J W, Yu H Y, *et al.* Cardiopulmonary resuscitation with assisted extracorporeal life-support versus conventional cardiopulmonary resuscitation in adults with in-hospital cardiac arrest: an observational study and propensity analysis [J]. *Lancet*, 2008, 372 9638 : 554-561. DOI: 10.1016/S0140-6736(08)60958-7.
- [141] Chen Y S, Chao A, Yu H Y, *et al.* Analysis and results of prolonged resuscitation in cardiac arrest patients rescued by extracorporeal membrane oxygenation [J]. *J Am Coll Cardiol*, 2003, 41 2 : 197-203 DOI: 10.1016/S0735-1097(02)02716-X.
- [142] Brooks S C, Anderson M L, Bruder E, *et al.* Part 6: alternative techniques and ancillary devices for cardiopulmonary resuscitation: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care [J]. *Circulation*, 2015, 132 18 Suppl 2 : S436-S443 DOI: 10.1161/CIR.0000000000000260
- [143] Taylor G J, Rubin R, Tucker M, *et al.* External cardiac compression: a randomized comparison of mechanical and manual techniques [J]. *JAMA*, 1978, 240 7 : 644-646 DOI: 10.1001/jama.1978.03290070046013
- [144] Perkins G D, Lall R, Quinn T, *et al.* Mechanical versus manual chest compression for out-of-hospital cardiac arrest: PARAMEDIC : a pragmatic, cluster randomised controlled trial [J]. *Lancet*, 2015, 385 9972 : 947-955 DOI: 10.1016/S0140-6736(14)61886-9.
- [145] Rubertsson S, Lindgren E, Smekal D, *et al.* Mechanical chest compressions and simultaneous defibrillation vs conventional cardiopulmonary resuscitation in out-of-hospital cardiac arrest: the LINC randomized trial [J]. *JAMA*, 2014, 311 1 : 53-61. DOI:10.1001/jama.2013.282538
- [146] Ong M E, Omato J P, Edwards D P, *et al.* Use of an automated, load-distributing band chest compression device for out-of-hospital cardiac arrest resuscitation [J]. *JAMA*, 2006, 295 22 : 2629-2637. DOI: 10.1001/jama.295.22.2629
- [147] Ristagno G, Castillo C, Tang W, *et al.* Miniaturized mechanical chest compressor: a new option for cardiopulmonary resuscitation [J]. *Resuscitation*, 2008, 76 2 : 191-197. DOI: 10.1016/j.resuscitation.2007.07.004
- [148] . [J]. , 2002, 11 6 : 367. DOI: 10.3760/cmaj.issn.1671-0282.2002.06.002
- [149] . [J]. , 2007, 16 8 : 895-896 DOI: 10.3760/cmaj.issn.1671-0282.2007.08.035
- [150] Truhlář ě A, Deakin C D, Soar J, *et al.* European Resuscitation Council Guidelines for Resuscitation 2015: Section 4. Cardiac arrest in special circumstances [J]. *Resuscitation*, 2015, 95 8 : 148-201. DOI: 10.1016/j.resuscitation.2015.07.017.
- [151] Ogawa T, Akahane M, Koike S, *et al.* Outcomes of chest compression only CPR versus conventional CPR conducted by lay people in patients with out of hospital cardiopulmonary arrest witnessed by bystanders: nationwide population based observational study [J]. *BMJ*, 2011, 342 jan27 1 : c7106 DOI: 10.1136/bmj.c7106
- [152] Acker C G, Johnson J P, Palevsky P M, *et al.* Hyperkalemia in hospitalized patients: causes, adequacy of treatment, and results of an attempt to improve physician compliance with published therapy guidelines [J]. *Arch Intern Med*, 1998, 158 8 : 917-924 DOI:10.1001/archinte.158.8.917.
- [153] Smellie W S. Spurious hyperkalaemia [J]. *BMJ*, 2007, 334 7595 : 693-695. DOI: 10.1136/bmj.39119.607986.47.
- [154] Alfonso A V, Isles C, Geddes C, *et al.* Potassium disorders—clinical spectrum and emergency management [J]. *Resuscitation*, 2006, 70 1 : 10-25. DOI: 10.1016/j.resuscitation.2005.11.002
- [155] Brown D J, Brugger H, Boyd J, *et al.* Accidental hypothermia [J]. *N Engl J Med*, 2012, 367 20 : 1930-1938 DOI: 10.1056/NEJMra1114208
- [156] Gilbert M, Busund R, Skagseth A, *et al.* Resuscitation from accidental hypothermia of 13.7 degrees C with circulatory arrest [J]. *Lancet*, 2000, 355 9201 : 375-376 DOI: 10.1016/S0140-6736(00)01021-7.
- [157] Gordon L, Paal P, Ellerton J A, *et al.* Delayed and intermittent CPR for severe accidental hypothermia [J]. *Resuscitation*, 2015, 90 46-49. DOI: 10.1016/j.resuscitation.2015.02.017.
- [158] Bouchama A, Knochel J P. Heat stroke [J]. *N Engl J Med*, 2002, 346 25 : 1978-1988 DOI: 10.1056/NEJMra011089
- [159] Nolan J P, Soar J, Cariou A, *et al.* European Resuscitation Council and European Society of Intensive Care Medicine Guidelines for Post-resuscitation Care 2015: Section 5 of the European Resuscitation Council Guidelines for Resuscitation 2015 [J]. *Resuscitation*, 2015, 95 10 : 202-222. DOI: 10.1016/j.resuscitation.2015.07.018
- [160] Dhani S, Panesar S S, Roberts G, *et al.* Management of anaphylaxis: a systematic review [J]. *Allergy*, 2014, 69 2 : 168-175. DOI:10.1111/all.12318



[161] Muraro A, Roberts G, Worm M *et al.* Anaphylaxis: guidelines from the European Academy of Allergy and Clinical Immunology [J]. *Allergy*, 2014, 69 8 : 1026-1045. DOI: 10.1111/all.12437.

[162] Soar J, Pumphrey R, Cant A, *et al.* Emergency treatment of anaphylactic reactions—guidelines for healthcare providers [J]. *Resuscitation*, 2008, 77 2 : 157-169. DOI: 10.1016/j.resuscitation.2008.02.001.

[163] Smith J E, Rickard A, Wise D. Traumatic cardiac arrest [J]. *JR Soc Med*, 2015, 108 1 : 11-16. DOI: 10.1177/0141076814560837.

[164] Kleber C, Giesecke M T, Lindner T, *et al.* Requirement for a structured algorithm in cardiac arrest following major trauma: epidemiology, management errors, and preventability of traumatic deaths in Berlin [J]. *Resuscitation*, 2014, 85 3 : 405-410. DOI: 10.1016/j.resuscitation.2013.11.009.

[165] Soar J, Nolan J P, Böttiger B W, *et al.* European Resuscitation Council Guidelines for Resuscitation 2015: Section 3. Adult advanced life support [J]. *Resuscitation*, 2015, 95 10 : 100-147. DOI: 10.1016/j.resuscitation.2015.07.016.

[166] Jansen J O, Thomas R, Loudon M A, *et al.* Damage control resuscitation for patients with major trauma [J]. *BMJ*, 2009, 338 338 : b1778. DOI: 10.1136/bmj.b1778.

[167] Holcomb J B, Tilley B C, Baraniuk S, *et al.* Transfusion of plasma, platelets, and red blood cells in a 1:1:1 vs a 1:1:2 ratio and mortality in patients with severe trauma: the PROPPR randomized clinical trial [J]. *JAMA*, 2015, 313 5 : 471-482. DOI: 10.1001/jama.2015.12.

[168] Holcomb J B, Jenkins D, Rhee P, *et al.* Damage control resuscitation: directly addressing the early coagulopathy of trauma [J]. *J Trauma*, 2007, 62 2 : 307-310. DOI: 10.1097/TA.0b013e3180324124.

[169] Roberts I, Shakur H, Afolabi A, *et al.* The importance of early treatment with tranexamic acid in bleeding trauma patients: an exploratory analysis of the CRASH-2 randomised controlled trial [J]. *Lancet*, 2011, 377 9771 : 1096-1101, 1101.e1-2. DOI: 10.1016/S0140-6736(11)60278-X.

[170] Matsumoto H, Mashiko K, Hara Y, *et al.* Role of resuscitative emergency field thoracotomy in the Japanese helicopter emergency medical service system [J]. *Resuscitation*, 2009, 80 11 : 1270-1274. DOI: 10.1016/j.resuscitation.2009.08.010.

[171] Escott M E, Gleisberg G R, Kimmel K, *et al.* Simple thoracostomy. Moving beyond needle decompression in traumatic cardiac arrest [J]. *JEMS*, 2014, 39 4 : 26-32.

[172] Massarutti D, Trillò G, Berlot G, *et al.* Simple thoracostomy in prehospital trauma management is safe and effective: a 2-year experience by helicopter emergency medical crews [J]. *Eur J Emerg Med*, 2006, 13 5 : 276-280. DOI: 10.1097/00063110-200610000-00006.

[173] Burlew C C, Moore E E, Moore F A, *et al.* Western Trauma Association critical decisions in trauma: resuscitative thoracotomy [J]. *J Trauma Acute Care Surg*, 2012, 73 6 : 1359-1363. DOI: 10.1097/TA.0b013e318270c2df.

[174] Lavonas E J, Drennan I R, Gabrielli A, *et al.* Part 10: special circumstances of resuscitation: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care [J]. *Circulation*, 2015, 132 18 Suppl 2 : S501-S518. DOI: 10.1161/CIR.0000000000000264.

[175] Konstantinides S V, Torbicki A, Agnelli G, *et al.* 2014 ESC guidelines on the diagnosis and management of acute pulmonary embolism [J]. *Eur Heart J*, 2014, 35 43 : 3033-3069, 3069a-3069k. DOI: 10.1093/eurheartj/ehu283.

[176] Böttiger B W, Amtz H R, Chamberlain D A, *et al.* Thrombolysis during resuscitation for out-of-hospital cardiac arrest [J]. *N Engl J Med*, 2008, 359 25 : 2651-2662. DOI: 10.1056/NEJMa070570.

[177] Māj G, Melisurgo G, De Bonis M, *et al.* ECLS management in pulmonary embolism with cardiac arrest: which strategy is better? [J]. *Resuscitation*, 2014, 85 10 : e175-e176. DOI: 10.1016/j.resuscitation.2014.03.309.

[178] Park J H, Shin S D, Song K J, *et al.* Epidemiology and outcomes of poisoning-induced out-of-hospital cardiac arrest [J]. *Resuscitation*, 2012, 83 1 : 51-57. DOI: 10.1016/j.resuscitation.2011.07.005.

[179] Nordt S P, Clark R F. Midazolam: a review of therapeutic uses and toxicity [J]. *J Emerg Med*, 1997, 15 3 : 357-365. DOI: 10.1016/S0736-4679(97)00022-X.

[180] Braz L G, Mello N S, do N P, *et al.* Perioperative cardiac arrest: a study of 53 718 anaesthetics over 9 yr from a Brazilian teaching hospital [J]. *Br J Anaesth*, 2006, 96 5 : 569-575. DOI: 10.1093/bja/ael065.

[181] Alpert M A. Sudden cardiac arrest and sudden cardiac death on dialysis: Epidemiology, evaluation, treatment, and prevention [J]. *Hemodial Int*, 2011, 15 Suppl S1 : S22-S29. DOI: 10.1111/j.1542-4758.2011.00598.x.

[182] Müller M P, Hänsel M, Stehr S N, *et al.* A state-wide survey of medical emergency management in dental practices: incidence of emergencies and training experience [J]. *Emerg Med J*, 2008, 25 5 : 296-300. DOI: 10.1136/emj.2007.052936.

[183] Laurent F, Augustin P, Zak C, *et al.* Preparedness of dental practices to treat cardiac arrest: availability of defibrillators [J]. *Resuscitation*, 2011, 82 11 : 1468-1469. DOI: 10.1016/j.resuscitation.2011.06.013.

[184] Hung K K, Cocks R A, Poon W K, *et al.* Medical volunteers in commercial flight medical diversions [J]. *Aviat Space Environ Med*, 2013, 84 5 : 491-497. DOI: 10.3357/ASEM.3452.2013.

[185] O'Rourke M F, Donaldson E, Geddes J S. An airline cardiac arrest program [J]. *Circulation*, 1997, 96 9 : 2849-2853. DOI: 10.1161/01.CIR.96.9.2849.

[186] Hamon K G, Asif I M, Klossner D, *et al.* Incidence of sudden cardiac death in National Collegiate Athletic Association athletes [J]. *Circulation*, 2011, 123 15 : 1594-1600. DOI: 10.1161/CIRCULATIONAHA.110.004622.

- [187] Maron B J, Gohman T E, Kyle S B, *et al.* Clinical profile and spectrum of commotio cordis [J]. *JAMA*, 2002, 287 9 : 1142-1146 DOI: 10.1001/jama.287.9.1142
- [188] Maron B J, Haas T S, Ahluwalia A, *et al.* Increasing survival rate from commotio cordis [J]. *Heart Rhythm* 2013, 10 2 : 219-223 DOI: 10.1016/j.hrthm.2012.10.034
- [189] Szpilman D, Bierens J J, Handley A J, *et al.* Drowning [J]. *N Engl J Med*, 2012, 366 22 : 2102-2110. DOI: 10.1056/NEJMa1013317.
- [190] Szpilman D, Webber J, Quan L, *et al.* Creating a drowning chain of survival [J]. *Resuscitation*, 2014, 85 9 : 1149-1152 DOI:10.1016/j.resuscitation.2014.05.034
- [191] Dyson K, Morgans A, Bray J, *et al.* Drowning related out-of-hospital cardiac arrests: characteristics and outcomes [J]. *Resuscitation*, 2013, 84 8 : 1114-1118. DOI: 10.1016/j.resuscitation.2013.01.020
- [192] Say L, Chou D, Gemmill A, *et al.* Global causes of maternal death: a WHO systematic analysis [J]. *Lancet Glob Health*, 2014, 2 6 : e323-333 DOI: 10.1016/S2214-109X(14)70227-X
- [193] Lipman S, Cohen S, Einav S, *et al.* The Society for Obstetric Anesthesia and Perinatology consensus statement on the management of cardiac arrest in pregnancy [J]. *Anesth Analg*, 2014, 118 5 : 1003-1016. DOI: 10.1213/ANE.000000000000171.
- [194] Teodorescu C, Reinier K, Dervan C, *et al.* Factors associated with pulseless electric activity versus ventricular fibrillation: the Oregon sudden unexpected death study [J]. *Circulation*, 2010, 122 21 : 2116-2122 DOI: 10.1161/CIRCULATIONAHA.110.966333
- [195] Van Hoeyweghen R J, Bossaert L L, Mullie A, *et al.* Survival after out-of-hospital cardiac arrest in elderly patients. Belgian Cerebral Resuscitation Study Group [J]. *Ann Emerg Med*, 1992, 21 10 : 1179-1184 DOI: 10.1016/S0196-0644(95)81742-1.
- [196] Grimaldi D, Dumas F, Perier M C, *et al.* Short- and long-term outcome in elderly patients after out-of-hospital cardiac arrest: a cohort study [J]. *Crit Care Med*, 2014, 42 11 : 2350-2357. DOI: 10.1097/CCM.0000000000000512
- [197] Bunch T J, White R D, Khan A H, *et al.* Impact of age on long-term survival and quality of life following out-of-hospital cardiac arrest [J]. *Crit Care Med*, 2004, 32 4 : 963-967. DOI: 10.1097/01.CCM.0000119421.73520.B6
- [198] , . [J]. , 2002, 14 4 : 195-196 DOI: 10.3760/cmaj.issn.1003-0603.2002.04.001.
- [199] . [J]. , 2013, 33 2 : 177-179 DOI: 10.3969/j.issn.1002-1949.2013.2.024
- [200] Yeung J, Chilwan M, Field R, *et al.* The impact of airway management on quality of cardiopulmonary resuscitation: an observational study in patients during cardiac arrest [J]. *Resuscitation*, 2014, 85 7 : 898-904. DOI: 10.1016/j.resuscitation.2014.02.018
- [201] Kajino K, Iwami T, Kitamura T, *et al.* Comparison of supraglottic airway versus endotracheal intubation for the pre-hospital treatment of out-of-hospital cardiac arrest [J]. *Crit Care*, 2011, 15 5 : R236 DOI: 10.1186/cc10483
- [202] Roberts B W, Kilgannon J H, Chansky M E, *et al.* Association between postresuscitation partial pressure of arterial carbon dioxide and neurological outcome in patients with post-cardiac arrest syndrome [J]. *Circulation*, 2013, 127 21 : 2107-2113 DOI:10.1161/CIRCULATIONAHA.112.000168
- [203] Bellomo R, Bailey M, Eastwood G M, *et al.* Arterial hyperoxia and in-hospital mortality after resuscitation from cardiac arrest [J]. *Crit Care*, 2011, 15 2 : R90 DOI: 10.1186/cc10090
- [204] Beylin M E, Peman S M, Abella B S, *et al.* Higher mean arterial pressure with or without vasoactive agents is associated with increased survival and better neurological outcomes in comatose survivors of cardiac arrest [J]. *Intensive Care Med*, 2013, 39 11 : 1981-1988 DOI: 10.1007/s00134-013-3075-9
- [205] Sunde K, Pytte M, Jacobsen D, *et al.* Implementation of a standardised treatment protocol for post resuscitation care after out-of-hospital cardiac arrest [J]. *Resuscitation*, 2007, 73 1 : 29-39 DOI: 10.1016/j.resuscitation.2006.08.016
- [206] Dumas F, Cariou A, Manzo-Silberman S, *et al.* Immediate percutaneous coronary intervention is associated with better survival after out-of-hospital cardiac arrest: insights from the PROCAT Parisian Region Out of hospital Cardiac Arrest registry [J]. *Circ Cardiovasc Interv*, 2010, 3 3 : 200-207. DOI: 10.1161/CIRCINTERVENTIONS.109.913665
- [207] Zanuttini D, Armellini I, Nucifora G, *et al.* Impact of emergency coronary angiography on in-hospital outcome of unconscious survivors after out-of-hospital cardiac arrest [J]. *Am J Cardiol*, 2012, 110 12 : 1723-1728. DOI: 10.1016/j.amjcard.2012.08.006
- [208] Hollenbeck R D, McPherson J A, Mooney M R, *et al.* Early cardiac catheterization is associated with improved survival in comatose survivors of cardiac arrest without STEMI [J]. *Resuscitation*, 2014, 85 1 : 88-95 DOI: 10.1016/j.resuscitation.2013.07.027.
- [209] Bro-Jeppesen J, Kjaergaard J, Wanscher M, *et al.* Emergency coronary angiography in comatose cardiac arrest patients: do real-life experiences support the guidelines? [J]. *Eur Heart J Acute Cardiovasc Care*, 2012, 1 4 : 291-301. DOI: 10.1177/2048872612465588
- [210] Reynolds J C, Callaway C W, El Khoudary S R, *et al.* Coronary angiography predicts improved outcome following cardiac arrest: propensity-adjusted analysis [J]. *J Intensive Care Med*, 2009, 24 3 : 179-186 DOI: 10.1177/0885066609332725
- [211] Bernard S A, Gray T W, Buist M D, *et al.* Treatment of comatose survivors of out-of-hospital cardiac arrest with induced hypothermia [J]. *N Engl J Med*, 2002, 346 8 : 557-563. DOI:10.1056/NEJMa003289

[212] Nielsen N, Wetterslev J, Cronberg T, *et al.* Targeted temperature management at 33 versus 36 after cardiac arrest [J]. *N Engl J Med*, 2013, 369 : 2197-2206 DOI: 10.1056/NEJMoa1310519

[213] Kjaergaard J, Nielsen N, Winther-Jensen M *et al.* Impact of time to return of spontaneous circulation on neuroprotective effect of targeted temperature management at 33 or 36 degrees in comatose survivors of out-of-hospital cardiac arrest [J]. *Resuscitation*, 2015, 96 : 310-316 DOI: 10.1016/j.resuscitation.2015.06.021.

[214] Bro-Jeppesen J, Hassager C, Wanscher M *et al.* Post-hypothermia fever is associated with increased mortality after out-of-hospital cardiac arrest [J]. *Resuscitation*, 2013, 84 : 1734-1740 DOI:10.1016/j.resuscitation.2013.07.023

[215] Zandbergen E G, Hijdra A, Koelman J H, *et al.* Prediction of poor outcome within the first 3 days of postanoxic coma [J]. *Neurology*, 2006, 66 : 62-68. DOI: 10.1212/01.wnl.0000191308.22233.88

[216] Legriel S, Hilly-Ginoux J, Resche-Rigon M *et al.* Prognostic value of electrographic postanoxic status epilepticus in comatose cardiac-arrest survivors in the therapeutic hypothermia era [J]. *Resuscitation*, 2013, 84 : 343-350 DOI: 10.1016/j.resuscitation.2012.11.001.

[217] Hirsch L J, LaRoche S M, Gaspard N, *et al.* American Clinical Neurophysiology Society's Standardized Critical Care EEG Terminology: 2012 version [J]. *J Clin Neurophysiol*, 2013, 30 : 1-27. DOI: 10.1097/WNP.0b013e3182784729

[218] Bouwes A, Binnekade J M, Zandstra D F, *et al.* Somatosensory evoked potentials during mild hypothermia after cardiopulmonary resuscitation [J]. *Neurology*, 2009, 73 : 1457-1461. DOI:10.1212/WNL.0b013e3181bf98f4

[219] Fugate J E, Wijdicks E F, Mandrekar J, *et al.* Predictors of neurologic outcome in hypothermia after cardiac arrest [J]. *Ann Neurol*, 2010, 68 : 907-914 DOI: 10.1002/ana.22133

[220] Mlynash M, Campbell D M, Leproust E M, *et al.* Temporal and spatial profile of brain diffusion-weighted MRI after cardiac arrest [J]. *Stroke*, 2010, 41 : 1665-1672 DOI: 10.1161/STROKEAHA.110.582452

[221] Reisinger J, Höllinger K, Lang W, *et al.* Prediction of neurological outcome after cardiopulmonary resuscitation by serial determination of serum neuron-specific enolase [J]. *Eur Heart J*, 2007, 28 : 52-58 DOI: 10.1093/eurheartj/ehl316

[222] Tiainen M, Roine R O, Pettilä V, *et al.* Serum neuron-specific enolase and S-100B protein in cardiac arrest patients treated with hypothermia [J]. *Stroke*, 2003, 34 : 2881-2886. DOI:10.1161/01.STR.0000103320.90706.35

[223] Sandroni C, Cavallaro F, Callaway C W, *et al.* Predictors of poor neurological outcome in adult comatose survivors of cardiac arrest: a systematic review and meta-analysis. Part 2: Patients treated with therapeutic hypothermia [J]. *Resuscitation*, 2013, 84 : 1324-1338 DOI: 10.1016/j.resuscitation.2013.06.020

[224] Sandroni C, Cavallaro F, Callaway C W, *et al.* Predictors of poor neurological outcome in adult comatose survivors of cardiac arrest: a systematic review and meta-analysis. Part 1: patients not treated with therapeutic hypothermia [J]. *Resuscitation*, 2013, 84 : 1310-1323 DOI: 10.1016/j.resuscitation.2013.05.013

[225] Patroniti N, Sangalli F, Avalli L. Post-cardiac arrest extracorporeal life support [J]. *Best Pract Res Clin Anaesthesiol*, 2015, 29 : 497-508 DOI: 10.1016/j.bpa.2015.09.004

[226] [JCD], , 2014, 8 : 117-122 DOI: 10.3877/cmaj.issn.1647-3303.2014.03.001.

[227] Ordes A, Morrison WE, Rossano J W, *et al.* An underrecognized benefit of cardiopulmonary resuscitation: organ transplantation [J]. *Crit Care Med*, 2013, 41 : 2794-2799. DOI: 10.1097/CCM.0b013e31829a7202

[228] Mateos-Rodríguez A A, Navalpotro-Pascual J M, Del Rio Gallegos F, *et al.* Out-hospital donors after cardiac death in Madrid, Spain: a 5-year review [J]. *Australas Emerg Nurs J*, 2012, 15 : 164-169 DOI: 10.1016/j.aerj.2012.05.002

[229] Alonso A, Fernández-Rivera C, Villaverde P, *et al.* Renal transplantation from non-heart-beating donors: a single-center 10-year experience [J]. *Transplant Proc*, 2005, 37 : 3658-3660 DOI: 10.1016/j.transproceed.2005.09.104