

Available online at www.sciencedirect.com

Resuscitation Plus

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

Short paper

Why the Norwegian 2021 guideline for basic life support are different

Conrad Arnfinn Bjørshol^{a,b,c,*}, Trond Nordseth^{d,e}, Jo Kramer-Johansen^{f,g}

Keywords: CPR, Guidelines, Training

Introduction

Medical guidelines provide health care professionals with a framework for how they should treat patients and perform training. Although based on the available scientific evidence, their legitimacy depends on a transparent process for development and implementation. In the absence of sufficient evidence, consensus processes can be guided by values and preferences.¹

In cardiac arrest, death is imminent unless a chain of actions is initiated within minutes.² Therefore, guidelines for cardiopulmonary resuscitation (CPR) have existed for more than six decades.³ Time-critical actions like CPR,⁴ defibrillation⁵ and notification of emergency medical services (EMS),⁶ have improved outcomes for a large number of patients with out-of-hospital cardiac arrest (OHCA).

Norwegian guideline

The Norwegian guideline for basic life support (BLS) for lay people was published by the Norwegian Resuscitation Council (NRC) in June 2021.⁷ The following sequence is recommended for adult patients with reduced consciousness or without signs of life: Call the emergency medical communication center (EMCC), open the airways, examine respiratory efforts for 10 seconds in cooperation with the EMCC. If not breathing or abnormal breathing, start CPR (Fig. 1).⁷

Current European Resuscitation Council (ERC) guideline recommends lay rescues to open the airway and assess breathing before

calling the EMCC. The problem with this approach is that the EMCC will start by guiding airway management and assessment of breathing, so time will potentially be lost if lay people are trained to do this first. We believe lay people should be taught to call the EMCC as early as possible, even before airway maneuvers are performed.

Will the Norwegian guideline improve patient care?

In Norway, 85% of all OHCA patients receive bystander CPR before ambulance arrival.⁸ Despite this, overall 30-day survival for EMS-treated OHCA is only 14%. We rarely know the time interval between collapse and the initiation of CPR. Data from the Swedish Cardiac Arrest Registry indicate that there may be a time delay of several minutes between collapse and EMCC call, however such estimates are often prone to bias.⁹ In a Norwegian study, less than 20% of callers had initiated CPR prior to contacting the EMCC.¹⁰ In a Dutch study, only 11 of 285 callers used the term “cardiac arrest” in their communication with the EMCC.⁶ Some lay people may also have the impression that they are responsible for the decision to initiate CPR,¹¹ which may reflect how we have trained lay people for six decades in life saving measures. Thus, despite more than half a century of training, bystanders are still not consistently able to recognize OHCA, and CPR is commonly initiated by the EMCC. Especially in the presence of agonal breathing or seizures the identification of OHCA is delayed.^{12,13} With training, the EMCC can identify 95% of OHCA.¹⁴ In effect, the EMCC operate as a “team leader” in OHCA before ambulance arrival.¹⁵ We therefore argue that early involvement of the EMCC will reduce time to initiation of CPR.¹⁶ The Amer-

* Corresponding author at: RAKOS, Stavanger University Hospital, P. O. Box 8100, NO-4068 Stavanger, Norway.

E-mail address: Conrad.bjorshol@sus.no (C.A. Bjørshol).

<https://doi.org/10.1016/j.resplu.2023.100392>

Received 10 March 2023; Received in revised form 17 April 2023; Accepted 18 April 2023

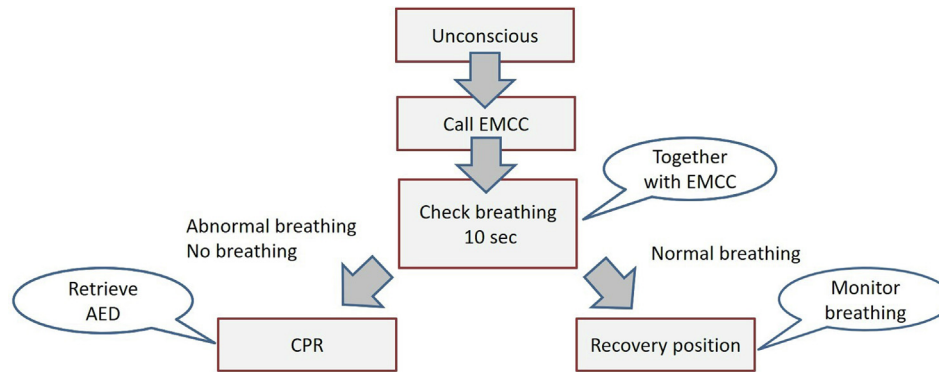


Fig. 1 – The Norwegian Basic Life Support guideline 2021.

ican Heart Association also state that "...witnesses to an unresponsive person should summon EMS and then be instructed by telecommunicators to initiate telephone-assisted CPR..."¹⁷ It may be in this earliest stage of OHCA that the effect of bystander CPR may be the greatest.¹⁸

Measurement of effect

We do not know whether the revised Norwegian guideline will affect patient outcome. Randomized clinical trials do not seem feasible in this setting. It is difficult to assess which early actions in the 'chain of survival' that affect the probability of survival for individual patients. We conclude that strong evidence for any recommendations for the early sequence of examinations and actions in these situations will be hard to find.

We are not concerned about adverse effects of the recommended change. In all telephone triage systems, an unconscious patient will trigger an emergency response so the consequence of over-triage should be negligible. Importantly, the Norwegian guidelines for BLS will allow bystanders to recognize cardiac arrest and commence CPR without loss of time in the medical response.

Possible positive effects will be hard to quantify, as any time intervals and actions performed before calling EMCC are difficult to measure. Future evaluation of time intervals may include more precise data collection using electronic records. Relieving bystanders of the responsibility to decide if the patient has cardiac arrest may decrease uncertainty, and enhance early initiation of the 'chain of survival'.¹⁸ Preparing participants at first aid courses for the most probable scenarios, will improve their preparedness to act and reduce the uncertainty and guilt that some experience afterwards.¹⁹ Most importantly, an alignment of expectations from first aid courses and what happens in real world will improve legitimacy of guidelines. This will be helpful for bystanders that suddenly find themselves in a life-and-death situation and the patient they treat.

Conflict of Interest

Conrad Arnfinn Bjørshol: Deputy board member of the Norwegian Resuscitation Council. Previous advisory board leader of national first aid campaign Saving lives together. Has received funding from Laerdal Medical Foundation for Acute Medicine, the Norwegian

Directorate of Health and the Western Norway Regional Health Authority.

Trond Nordseth: Chairman of the Norwegian Resuscitation Council. Otherwise no conflicts of interests to report.

Jo Kramer-Johansen: No financial conflicts of interest. Board member of Norwegian Resuscitation Council. Has received unrestricted research funding (25 000 Euro) from Laerdal foundation for non-related research project.

CRedit authorship contribution statement

Conrad Arnfinn Bjørshol: Conceptualization, Writing – original draft, Writing – review & editing, Visualization. **Trond Nordseth:** Conceptualization, Writing – review & editing, Visualization. **Jo Kramer-Johansen:** Conceptualization, Writing – review & editing, Visualization.

Author details

^aThe Regional Centre for Emergency Medical Research and Development (RAKOS), Stavanger University Hospital, Stavanger, Norway ^bDepartment of Anaesthesiology and Intensive Care, Stavanger University Hospital, Stavanger, Norway ^cDepartment of Clinical Medicine, University of Bergen, Bergen, Norway ^dDepartment of Anaesthesia and Intensive Care Medicine, St. Olav's University Hospital, NO-7030 Trondheim, Norway ^eDepartment of Circulation and Medical Imaging, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway ^fNorwegian National Advisory Unit on Prehospital Emergency Medicine (NAKOS), Division of Prehospital Services, Oslo University Hospital, Oslo, Norway ^gInstitute of Clinical Medicine, University of Oslo, Oslo, Norway

REFERENCES

- Wyckoff MH, Singletary EM, Soar J, et al. 2021 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations: Summary From the Basic Life Support; Advanced Life Support; Neonatal Life Support; Education, Implementation, and Teams; First

- Aid Task Forces; and the COVID-19 Working Group. *Resuscitation* 2021;169:229–311.
- Nolan J, Soar J, Eikeland H. The chain of survival. *Resuscitation* 2006;71:270–1.
 - Poulsen H. Emergency Resuscitation. *Acta Anaesthesiol Scand* 1961.
 - Waalewijn RA, Tijssen JG, Koster RW. Bystander initiated actions in out-of-hospital cardiopulmonary resuscitation: results from the Amsterdam Resuscitation Study (ARRESUST). *Resuscitation* 2001;50:273–9.
 - Hallstrom AP, Ornato JP, Weisfeldt M, et al. Public-access defibrillation and survival after out-of-hospital cardiac arrest. *N Engl J Med* 2004;351:637–46.
 - Berdowski J, Beekhuis F, Zwinderman AH, Tijssen JG, Koster RW. Importance of the first link: description and recognition of an out-of-hospital cardiac arrest in an emergency call. *Circulation* 2009;119:2096–102.
 - NRR retningslinjer for gjenoppliving av nyfødte, barn og voksne 2021 - Grunnleggende hjerte-lungeredning (HLR) til voksne. Norsk Resuscitasjonsråd, 2021. Accessed 20.02.22 at https://nrr.org/images/nedlasting/pdf/NRR_Guidelines_2021_Grunnleggende_HLR_voksne.pdf
 - Nordseth T., Bjørshol C.A., Kramer-Johansen J., Rajka T., Kvam A., Olasveengen T.M. 2021 guidelines for basic life support. The Norwegian Resuscitation Council; 2023. Accessed 02.05.23 at https://nrr.org/images/pdf/2023/Norwegian_2021_basic_life_support_guidelines-English%20summary_published280423.pdf.
 - Tjelmeland I, Kramer-Johansen J, Nilsen JE, et al. Årsrapport for 2021 med plan for forbedringstiltak. Oslo: NAKOS; 2022.
 - Herlitz J, Lindqvist J, Svensson C, et al. Årsrapport 2016. Göteborg; 2016.
 - Hardeland C, Claesson A, Blom MT, et al. Description of call handling in emergency medical dispatch centres in Scandinavia: recognition of out-of-hospital cardiac arrests and dispatcher-assisted CPR. *Scand J Trauma Resusc Emerg Med* 2021;29:88.
 - Mathiesen WT, Birkenes TS, Lund H, Ushakova A, Søreide E, Bjørshol CA. Public knowledge and expectations about dispatcher assistance in out-of-hospital cardiac arrest. *J Adv Nurs* 2018;75:783–92.
 - Fukushima H, Panczyk M, Hu C, et al. Description of Abnormal Breathing Is Associated With Improved Outcomes and Delayed Telephone Cardiopulmonary Resuscitation Instructions. *J Am Heart Assoc* 2017;6:e005058.
 - Schwarzko M, Yin L, Hergert L, Drucker C, Counts CR, Eisenberg M. Seizure-like presentation in OHCA creates barriers to dispatch recognition of cardiac arrest. *Resuscitation* 2020;156:230–6.
 - Hardeland C, Skare C, Kramer-Johansen J, et al. Targeted simulation and education to improve cardiac arrest recognition and telephone assisted CPR in an emergency medical communication centre. *Resuscitation* 2017;114:21–6.
 - Linderth G, Hallas P, Lippert FK, et al. Challenges in out-of-hospital cardiac arrest - A study combining closed-circuit television (CCTV) and medical emergency calls. *Resuscitation* 2015;96:317–22.
 - Viereck S, Palsgaard Møller T, Kjær Ersbøll A, Folke F, Lippert F. Effect of bystander CPR initiation prior to the emergency call on ROSC and 30 day survival-An evaluation of 548 emergency calls. *Resuscitation* 2017;111:55–61.
 - Sawyer KN, Camp-Rogers TR, Kotini-Shah P, et al. Sudden Cardiac Arrest Survivorship: A Scientific Statement From the American Heart Association. *Circulation* 2020 CIR0000000000000747.
 - Deakin CD. The chain of survival: Not all links are equal. *Resuscitation* 2018;126:80–2.
 - Mathiesen WT, Bjørshol CA, Braut GS, Søreide E. Reactions and coping strategies in lay rescuers who have provided CPR to out-of-hospital cardiac arrest victims: a qualitative study. *BMJ Open* 2016;6:e010671.