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Letter to the Editor

DECIDE – Are medical students capable of recognizing ECG-rhythms and deciding about defibrillation during cardiac arrest: An observational study

To the Editor,

Defibrillation represents a crucial part of cardiopulmonary resuscitation and increases neurological outcome and overall survival if a shockable rhythm is detected.^{1–3} Correct and rapid ECG-interpretation is vital to perform correct treatment and to avoid prolonged hands-off times during rhythm analysis.⁴ Current European Resuscitation Guidelines underline the importance of education regarding BLS and ALS.⁵ As of now, limited data exist that elucidate the acquisition and development of emergency competencies during medical studies.

Therefore, this study investigates the manual defibrillation skills of an almost complete cohort of medical students at the beginning of clinical training (5th semester) by measuring correctness-of-decision (COD) and time-to-decision (TTD) regarding defibrillation of 7 typical emergency ECGs.

This study was ethically approved by the Ethics Committee of the University of Cologne (No: 23-1007_1). 202 medical students were individually asked to decide whether defibrillation is indicated regarding the following ECGs: asystole (ASY), fine ventricular fibrillation (fVF), pulseless ventricular tachycardia (pVT), normofrequent sinus rhythm (nSR), pulseless electrical activity (PEA), coarse ventricular fibrillation (cVF), sinus bradycardia (SB). Since it would be practically and ethically unfeasible to give defibrillation decisions in the hands of students, we simulated this scenario using TruMonitor (Laerdal Medical GmbH, Puchheim, Germany) software running on an iPad (Apple, Cupertino, CA, USA) in a randomized order. Primary endpoints were correctness of decision and time to decision. Group comparisons (gender, prior medical education, experience in resuscitation and defibrillation) were performed by Odds Ratios (OR), means and two-tailed-*t*-test. According to current guidelines, fine and coarse VF and pVT were defined as shockable rhythms, nSR, SB, AS and PEA were defined as non-shockable rhythms.

In February 2023 201 out of 202 students participated voluntarily (99,5%) and were presented individually with the 7 ECGs during objective structured clinical examination (OSCE) for a maximum of 25 sec. each. For shockable rhythms, mean correctness-of-decision (%) and time-to-decision (seconds) were (Fig. 1): pVT [68%|5.4s];

fVF [90%|4.1s]; cVF [89%|3.7s]. For non-shockable rhythms, mean COD (%) and TTD (seconds) were: ASY [58%|3.0s], PEA [62%|6.2s], nSR [97%|2.9s], SB: [97%|3.4s]. No gender-related differences were detected. Students with prior medical training (nurse or paramedic) had a higher probability of detecting asystole correctly (OR 2.93, 95%-CI 1.58–5.45). Students who had prior experience in resuscitation or defibrillation, had higher odds of detecting PEA and asystole correctly (PEA: 2.16 [1.04–4.47] and 3.37 [1.23–9.27], respectively, ASY: 6.09 [2.57–14.42] and 7.90 [2.30–27.08], respectively).

Medical students at this stage of training showed inconsistent treatment decisions for emergency ECGs. Particularly, treatment decisions for pVT, ASY and PEA were identified as inadequate. We therefore recommend that medical students at the beginning of clinical training (5th semester) use Automated External Defibrillators (AEDs), even if this might result in longer hands-off times for rhythm analysis.⁶ Our results indicate that acquiring proficiency in manual defibrillation is not a straightforward process and necessitates comprehensive education and specific training in ALS.⁷ In alignment with current ERC-Guidelines, we want to highlight the importance of (curricular) educational programs that integrate specialized components of ALS using high-fidelity and in-situ simulations.^{5,8–10}

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: [Bernd W. Böttiger is treasurer of the European Resuscitation Council (ERC), Founder of the ERC Research NET, Chairman of the German Resuscitation Council (GRC), Member of the „Advanced Life Support (ALS) Task Force of the International Liaison Committee on Resuscitation (ILCOR), Member of the Executive Committee of the German Interdisciplinary Association for Intensive Care and Emergency Medicine (DIVI), Founder of the “Deutsche Stiftung Wiederbelebung”, Federal Medical Advisor of the German Red Cross (DRK), Member of the Advisory Board of the “Deutsche

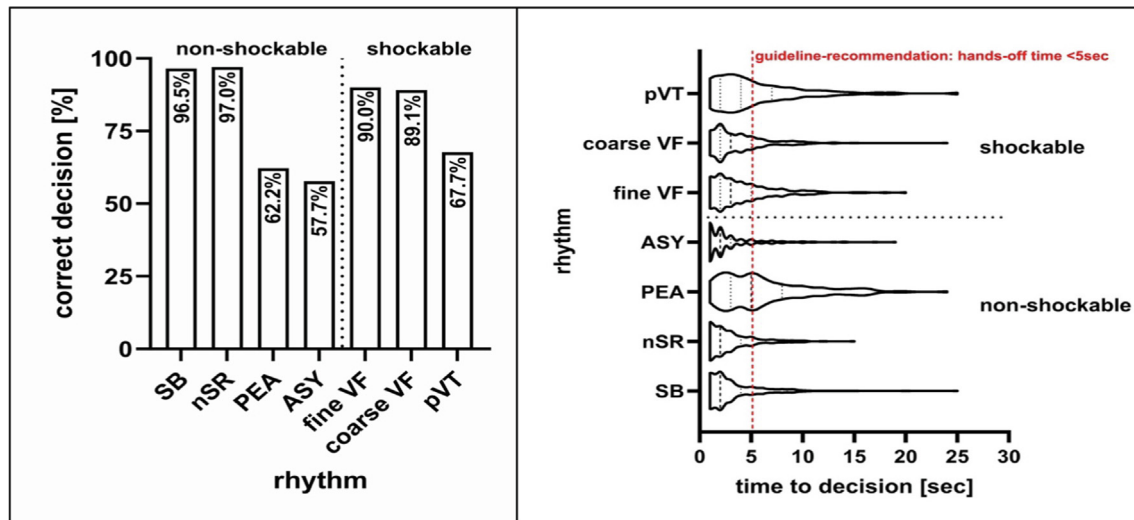


Fig. 1 – Correctness-of-decision and time-to-decision for each rhythm presented to the participants. The abbreviations utilized are delineated within the text. In the violin plot, the thickness of the respective area represents the distribution of values, the dotted lines represent the 25th and 75th percentile, the dashed line represents the median.

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Niels-Benjamin Adams*

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Department of Anesthesiology and Intensive Care Medicine, Kerpener Str. 62, 50937 Cologne, Germany

Megan Mittag

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Office of the Vice Dean of Studies, Joseph-Stelzmann-Str. 20, 50937 Cologne, Germany

Christoph Stosch

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Office of the Vice Dean of Studies, Joseph-Stelzmann-Str. 20, 50937 Cologne, Germany

Sabine Bornemann

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Office of the Vice Dean of Studies, Joseph-Stelzmann-Str. 20, 50937 Cologne, Germany

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Jana Adams

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Department of Obstetrics and Gynecology, Kerpener Str. 34, 50937 Cologne, Germany

Bernd W. Böttiger

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Department of Anesthesiology and Intensive Care Medicine, Kerpener Str. 62, 50937 Cologne, Germany

Wolfgang A. Wetsch

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Department of Anesthesiology and Intensive Care Medicine, Kerpener Str. 62, 50937 Cologne, Germany

Hendrik Drinhaus

University of Cologne, Faculty of Medicine and University Hospital of Cologne, Department of Anesthesiology and Intensive Care Medicine, Kerpener Str. 62, 50937 Cologne, Germany

* Corresponding author at: Department of Anaesthesiology and Intensive Care Medicine, University Hospital of Cologne, Kerpener Str. 62, 50937 Köln Germany.

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