Response to Improving the Success Rate of Chest Compression-Only CPR by Untrained Bystanders in Adult Out-of-Hospital Cardiac Arrest: Maintaining Airway Patency May Be the Way Forward

To the Editor

We would like the opportunity to clarify one of the points made in the recent commentary by Ho et al.1 The authors state that, in 2015, the International Liaison Committee on Resuscitation eliminated rescue breathing as a whole from adult out-of-hospital cardiac arrest cardiopulmonary resuscitation (CPR). This is not strictly correct. The precise wording from the basic life support section of the 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations is as follows: “We recommend that chest compressions should be performed for all patients in cardiac arrest (strong recommendation, very-low-quality evidence). We suggest that those who are trained and willing to give rescue breaths do so for all adult patients in cardiac arrest (weak recommendation, very-low-quality evidence).”2

Thus, while compression-only CPR is recommended for bystanders who have not been trained in conventional CPR, for those who have been trained, International Liaison Committee on Resuscitation still advocates the addition of rescue breaths.

The proposal by Ho et al1 to add chin lift and head-turn to the technique of compression-only CPR is interesting and worthy of further study. One of the best studies documenting the tidal volumes generated by chest compressions remains that by Safar et al3 which was undertaken in anesthetized paralyzed healthy volunteers in 1962. This study measured tidal volumes generated by chest compressions with (1) no airway maneuver, (2) shoulder elevation resulting in head tilt, (3) combined oropharyngeal airway/head tilt/jaw thrust, or (4) tracheal tube. Average tidal volume with oropharyngeal airway/head tilt/jaw thrust or tracheal tube was only 156 mL (range, 0–390 mL) and exceeded anatomic dead space (1 mL/2.2 kg body weight) in only 17 of 30 patients. With shoulder elevation, only 6 of 30 subjects had tidal volumes exceeding anatomic dead space (range, 0–200 mL). When no airway maneuver was performed, 0 of 30 subjects had detectable ventilation. The study did not examine the effects of jaw thrust alone, head tilt with chin lift, or head turning on tidal volumes generated by chest compressions. Although these results demonstrate that a patent airway improves ventilation during compression-only CPR, it remains to be determined if the tidal volumes that can be achieved are sufficient to have a beneficial effect on patient outcomes. Although airway maneuvers by untrained providers during CPR are unlikely to cause harm, clinical evidence of effectiveness and benefit should be the driving force behind any change in treatment recommendations or guidelines.

Jerry P. Nolan, FRCA, FRCEM, FRCP, FFICM
Gavin D. Perkins, MD, FRCP, FFICM
Robert W. Neumar, MD, PhD
Theresa M. Olasveengen, MD
University of Bristol School of Clinical Science
Bristol, United Kingdom
ejerry.nolan@nhs.net

Passive Ventilation in Chest Compression-Only CPR by Untrained Bystanders: A Reply

In Response

We thank Dr Nolan et al for their insightful comments. We wish to emphasize that our opinion pertains only to out-of-hospital cardiac arrest by untrained bystanders, as clearly stated in the title (and repeatedly in the text) of our article,2 and that we have not in any way suggested that the International Liaison Committee on Resuscitation (ILCOR) has recommended elimination of ventilation from out-of-hospital cardiopulmonary resuscitation (CPR) by trained personnel. We also thank Nolan et al for the data by Safar et al3 on passive ventilation generated by chest compressions in anesthetized healthy volunteers. This study deserves a few considerations. First, even though the generated tidal volumes were modest, they exceeded anatomic dead space in the majority (57%) of patients in whom airway patency was secured by artificial airway devices/maneuvers.3 Notably, the authors followed a resuscitation protocol that recommended chest compressions to be 3–4 cm deep.4 It is, therefore, plausible that more vigorous compressions (at least 5 cm deep, allowing complete chest recoil), as recommended by current resuscitation guidelines,5 would have generated greater tidal volumes. Second, a 3-inch shoulder elevation was associated with tidal volumes exceeding anatomic dead volumes.

REFERENCES


DOI: 10.1213/ANE.0000000000002506

Jerry P. Nolan, FRCA, FRCEM, FRCP, FFICM
Gavin D. Perkins, MD, FRCP, FFICM
Robert W. Neumar, MD, PhD
Theresa M. Olasveengen, MD
University of Bristol School of Clinical Science
Bristol, United Kingdom
ejerry.nolan@nhs.net

February 2018 • Volume 126 • Number 2 www.anesthesia-analgesia.org 723

Copyright © 2017 International Anesthesia Research Society. Unauthorized reproduction of this article is prohibited.