This 2019 focused update to the American Heart Association advanced cardiovascular life support (ACLS) guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiovascular care is based on the evidence identified in systematic reviews and the resulting "2019 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations" from the International Liaison Committee on Resuscitation (ILCOR).[1] The draft advanced life support Consensus on Science With Treatment Recommendations was posted online for public comment,[2–4] and a summary containing the final wording of the Consensus on Science With Treatment Recommendations has been published simultaneously with this focused update.[1]

The expert writing group for this 2019 ACLS focused update reviewed both the 2019 Consensus on Science With Treatment Recommendations web-based documents and the studies included in the systematic reviews.[5–7] The writing group discussion and evidence reviews were conducted in light of the structure and resources of the out-of-hospital and in-hospital resuscitation systems and the providers who use these ACLS guidelines. In addition, the writing group determined Classes of Recommendation and Levels of Evidence (Table) according to the most recent recommendations of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines[8] by using the process detailed in the "2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care."[9]

This 2019 document updates the recommendations for use of advanced airways, vasopressors, and extracorporeal CPR (ECPR) during cardiac arrest only. These updates are in addition to those published in the 2017 and 2018 guidelines focused updates.[10,11] All other recommendations and algorithms published in "Part 7: Adult Advanced Cardiovascular Life Support" in the 2015 AHA guidelines update[12] and "Part 8: Adult Advanced Cardiovascular Life Support" in the "2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care"[13] remain the official recommendations of the American Heart Association Emergency Cardiovascular Care Science Subcommittee and writing groups.

USE OF ADVANCED AIRWAYS IN CARDIAC ARREST

To use advanced airways effectively, healthcare providers must maintain their knowledge and skills through frequent practice. Airway management during cardiac arrest usually begins with a basic strategy such as bag-mask ventilation (BMV). In addition to BMV, it may be helpful for providers to master an advanced airway strategy and a second (backup) strategy for use if they are unable to establish the first-choice airway adjunct.

Once an advanced airway is inserted, providers should immediately perform a thorough assessment to ensure that the airway device is properly positioned and effective. This assessment should minimize interruption of chest compressions. Assessment by physical examination consists of visualizing chest expansion bilaterally and listening over the epigastrium (breath sounds should not be heard) and the lung fields bilaterally (breath sounds should be equal and adequate). A device should also be used to confirm correct placement (see the Endotracheal Intubation Versus BMV—Updated 2019 section).

Providers should observe a persistent capnographic waveform with ventilation to confirm and monitor endotracheal tube (ETT) placement in the field, in the transport vehicle, on arrival at the hospital, and after any patient transfer to reduce the risk of unrecognized tube misplacement or displacement.

The use of capnography to confirm and monitor correct placement of supraglottic airways (SGAs) has undergone limited evaluation, and its utility will depend on airway design.[14,15] However, effective ventilation through an SGA device should result in a capnograph waveform during CPR and after return of spontaneous circulation (ROSC).

Once an advanced airway is in place during cardiac arrest, the providers performing CPR should no longer deliver cycles of CPR (ie, compressions interrupted by pauses for ventilation). Instead, the compressing provider should give continuous chest compressions at a rate of 100 to 120 per minute without pauses for ventilation. Ventilation is then provided at a rate of 10 breaths per minute (1 breath every 6 seconds). Asynchronous breaths are delivered unless ventilation can only be delivered successfully when compressions are paused. Providers should avoid delivering excessive ventilation during CPR because doing so can compromise venous return and cardiac output and decrease cerebral blood flow by causing direct vasoconstriction.[16]

Choice of an Advanced Airway—Updated 2019

BMV without an advanced airway device may not allow adequate ventilation in all patients during resuscitation from cardiac arrest and does not protect against pulmonary aspiration of orogastric secretions. As a result, advanced airway devices are frequently placed by providers during CPR. However, placement of an advanced airway during active compressions is challenging, often requiring interruption of chest compressions. Emergent intubation may result in a

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