



Part II: 2020 AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care – Post Arrest Care

Key Article

Panchal AR, et al. Part 3: Adult Basic and Advanced Life Support. 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2020; 142: S366-S468.

Background

- Most patients with ROSC following cardiac arrest will die due to neurologic injury, especially in OHCA.
- Thus, much of post-arrest care focuses on mitigating secondary neurologic injury.
 - Optimization of cerebral perfusion pressure
 - Management of oxygen and CO₂ levels
 - TTM
 - Detection and treatment of seizures
- Given the complexities of caring for the post-arrest patient, a multidisciplinary team is preferred
- As a recap, the 2020 AHA Updates are based on systematic reviews, scoping reviews, and evidence updates
- AHA assigns a Class of Recommendation (COR) based on strength and consistency of evidence and impact to patients; Level of Evidence (LOE) based on quantity, quality, relevance, and consistency of available evidence
 - COR
 - 1 – strong
 - 2a – moderate
 - 2b – weak
 - 3 – no benefit
 - LOE
 - A – high quality evidence from more than 1 RCT; meta-analysis of high-quality RCTs; 1 or more RCTs corroborated by high-quality registry studies
 - B –R: moderate-quality evidence from 1 or more RCTs; meta-analysis of moderate quality RCTs
 - B – NR: moderate quality evidence from 1 or more well designed, well executed nonrandomized studies, observational studies, or registry studies
 - C – LD: randomized or nonrandomized observational or registry studies with limitations of design or execution
 - C – EO: consensus of expert opinion based on clinical experience

Early Post-Resuscitation Period

- A comprehensive, structured, multidisciplinary system of care should be implemented in a consistent manner for the treatment of post-arrest patients (COR 1; LOE B – NR)
- A 12-lead ECG should be obtained ASAP after ROSC to determine presence of a STEMI (COR 1; LOE B – NR)
- To avoid hypoxia in the immediate post-arrest period, it is reasonable to place patients on the highest available O₂ concentration until SpO₂ or PaO₂ can be measured (COR 2a; LOE C - EO)
 - Based on expert opinion that hypoxia may exist, primarily in the prehospital setting, when SpO₂ or PaO₂ cannot be measured, and may worsen end-organ damage

Blood Pressure Management

- It is preferable to avoid hypotension by maintaining a SBP of at least 90 mm Hg or a MAP of at least 65 mm Hg in the post-arrest period (COR 2a; LOE B – NR)
 - Hypotension may worsen brain injury
 - Optimal MAP is not clear
 - Several observational studies have evaluated post-arrest MAP targets and outcomes
 - Most have not detected any differences in survival, or survival with favorable neurologic outcomes, but they are not powered for such outcomes
 - A recent observational study comparing outcomes in patients with MAP 70-90 and those > 90 mm Hg found an association with better outcomes
 - There is a trend towards benefit when targeting a MAP of 80 mm Hg but this remains unproven at the time of these updates

Oxygenation and Ventilation after ROSC

- Recommend avoiding hypoxemia in all patients with ROSC (COR 1; LOE B – NR)
- Once reliable measurements of SpO₂ are available, avoid hyperoxemia by titrating FiO₂ to maintain SpO₂ 92-98% (COR 2b; LOE B – R)
 - A 2020 ILCOR systematic review found 5 RCTs comparing titrated or lower FiO₂ administration strategy. Overall no difference found in clinical outcomes but these trials were underpowered
 - A recent large RCT compared usual care with aggressive avoidance of hyperoxemia in vented critically ill patients and found no difference between groups but increased survival in intervention arm of subgroup of post-arrest patient
- Maintain a PaCO₂ within physiologic range of 35-45 mm Hg (COR 2b; LOE B – R)
 - 2 RCTs comparing a strategy of high-normal PaCO₂ (44-46 mm Hg) with low-normal (33-35 mm Hg) and a moderate hypercapnia (50-55 mm Hg) with normocapnia (35-45 mm Hg) found no difference in outcome

- 6 observational trials also evaluated this topic and had inconsistent results with significant risk of bias

Seizure Diagnosis and Management

- Recommend treatment of clinically apparent seizures in adult post-arrest survivors (COR 1; LOE C – LD)
 - Untreated, clinically apparent seizures are thought to be potentially harmful to the brain
- Recommend promptly performing and interpreting an EEG for the diagnosis of seizures in all comatose patients after ROSC (COR 1; LOE C – LD)
 - A 2020 ILCOR systematic review did not specifically address the timing and method to obtain EEGs in post-arrest patients who remain comatose
 - No direct evidence that EEG to detect non-convulsive status improves outcomes
- Consider treatment of non-convulsive status diagnosed by EEG only (COR 2b; LOE C – LD)
 - Non-convulsive seizures are common after cardiac arrest
 - It is currently unknown whether treating these seizures is associated with improved outcome
- The same anticonvulsant regimens used for the treatment of seizures caused by other etiologies can be used (COR 2b; LOE C – LD)
 - No specific agent is recommended
- Seizure prophylaxis in adult post-arrest patients is not recommended (COR 3; LOE B – R)
 - 2 RCTs comparing seizure prophylaxis with no seizure prophylaxis did not find any difference in seizure occurrence or survival with favorable neurologic outcome

Targeted Temperature Management

- Recent reports of decreasing utilization of TTM in recent years – thought that this may be due to studies demonstrating noninferiority of TTM at 36 C and clinicians equating this to normothermia
- Many uncertainties remain with TTM – whether temperature should vary depending on patient characteristics, how long TTM should be maintained, how quickly should it be started
- Indications for TTM
 - Recommend TTM for adults who do not follow commands after ROSC from OCHA and any initial rhythm (COR 1; LOE B – R)
 - Recommend TTM for adults who do not follow commands after ROSC from ICHA from an initial nonshockable rhythm (COR 1; LOE B – R)
 - Based on recent HYPERION study (we reviewed on CCPM) that compared TTM at 33 to 37 C in patients who were comatose after OHCA and IHCA with initial nonshockable rhythm
 - Survival with favorable neurologic outcome was higher in those that were treated with 33 C

- Recommend TTM for adults who do not follow commands after ROSC from IHCA with initial shockable rhythm (COR 1; LOE B – NR)
 - No RCTs of TTM in IHCA with initial shockable rhythm have been performed
 - This recommendation is based solely on extrapolation from OHCA studies
- Performance of TTM
 - Recommend selecting and maintaining a constant temperature between 32 and 36 C (COR 1; LOE B – R)
 - It is reasonable that TTM be maintained for at least 24 hours after achieving target temperature (COR 2a; LOE B – NR)
 - There is 1 underpowered RCT that found no difference in outcomes between those who received TTM for 24 or 48 hrs
 - May be reasonable to actively prevent fever in comatose patients after TTM (COR 2b; LOE C – LD)
 - Fever after ROSC is associated with poor neurologic outcome in patients not treated with TTM.
 - However, it has not been studied whether treatment of fever actually improves outcomes
 - Do not recommend routine use of rapid infusion of cold IVFs for prehospital cooling of patients after ROSC (COR 3; LOE A)

PCI after ROSC

- Patients with cardiac arrest due to a shockable rhythm have high rates of CAD
 - STEMI on post-arrest ECG: 96%
 - Refractory VF/VT: 85%
 - NSTEMI on post-arrest ECG: up to 42%
- Successful PCI is associated with improved survival across multiple observational studies
- Coronary angiography should be performed emergently for all post-arrest patients with a suspected cardiac cause and a STEMI on ECG (COR 1; LOE B – NR)
- Emergent coronary angiography is reasonable for select adult patients who remain comatose after OCHA of suspected cardiac origin but no evidence of STEMI on ECG (hemodynamically unstable, electrically unstable) (COR 2a; LOE B – NR)
 - The COACT trial found no improvement in survival in patients resuscitated from OCHA with an initial shockable rhythm in whom no STEMI was present on ECG
 - However, only 5% of patients in the study had an acute coronary occlusion

Other Post-Resuscitation Care

- The benefit of any specific target range for glucose management is uncertain (COR 2b; LOE B – R)
 - There is no specific evidence in cardiac arrest patients for optimal glucose management
 - It is reasonable to follow the same approach for general critically ill patients and use insulin to target a blood glucose of 150-180 mg/dL

- The routine use of prophylactic antibiotics in post-arrest patients is uncertain (COR 2b; LOE B – R)
 - A 2020 ILCOR systematic review found 2 RCTs and a number of small observational studies that evaluated the effect of prophylactic ABX on outcomes in post-arrest patients. The RCTs did not find a difference in survival or outcome
 - One study did find a lower incidence of pneumonia but this did not translate into outcome benefit
- The routine use of steroids for patients with shock after ROSC is of uncertain value (COR 2b; LOE B – R)
 - Since the last update in 2015, 2 randomized trials have been completed on steroids on shock after ROSC – only 1 was published
 - Did not find a difference in shock reversal or outcome
 - A large observational trial was also published that did report an association with improved survival
 - No conclusive evidence to demonstrate benefit in the post-arrest patient population