

MANAGEMENT AND PROGNOSIS OF COMA AFTER CARDIAC ARREST: MGH GUIDELINE FOR CARE

The Postanoxic Coma Neurophysiology Consult (PCNC) Service, part of the MGH Epilepsy/Neurophysiology Service, provides neurological consultations to assist with management and prognosis of patients who are comatose following cardiac arrest, particularly patients undergoing therapeutic hypothermia. This guideline is based on a synthesis of the current best evidence regarding the value and limitations of ancillary testing and management options for neurological management of postanoxic coma.

Patient Selection

The following guidelines are intended for comatose cardiac arrest patients for whom neurological prognosis is in question. These guidelines do not apply to patients who are awakening rapidly, are brain dead, or who have suffered an isolated respiratory arrest. For brain death testing, please see the specific guideline available on the MGH stroke service website (“Death Determination Using Brain Criteria in the Adult”, <https://hospitalpolicies.ellucid.com/documents/view/1326/13938/>.) and the MGH Epilepsy Service website.

As described in the [Guideline of Care for Hypothermia After Cardiac Arrest](#), the Acute Stroke service should be routinely consulted prior to the initiation of the 24-hour hypothermia protocol for coma after cardiac arrest, and subsequently the Stroke/ICU Neurology and PCNC consult services should be involved in following the patient to assist with neurological prognosis and management. The PCNC service works closely with the Stroke/ICU service to provide neurophysiologically-informed prognostic and management guidance, based on the best available clinical evidence in relation to continuous EEG monitoring, somatosensory evoked potentials (SSEP), neuroimaging findings, and the patient’s evolving clinical status (see below).

Recommendations for Initial Management and Evaluation

Based on experience and our review of the literature, we currently recommend the following as a general approach to the evaluation of patients with postanoxic coma. This approach is meant as a guideline, should be modified as clinically indicated, and may not apply to all patients.

1. Clinical neurological examination, with particular attention to pupillary responses, corneal reflexes, oculocephalic reflexes, and motor responses. Exams should be documented daily while coma persists, for a minimum of two weeks or until a decision to withdraw care.
2. Continuous EEG (cEEG) monitoring should be considered in all patients with postanoxic coma. For patients undergoing induced hypothermia, cEEG should begin prior to or during cooling and continue for at least the first 24 hours after completion of rewarming. Presence or absence of EEG reactivity should

be documented after rewarming (off sedation) by the EEG/Neurophysiology service based on direct bedside examination.

3. Patients found to have seizures on EEG should be treated with anticonvulsants, targeting seizure control. Patients found to have status epilepticus on EEG, with or without myoclonus, should be considered for treatment with IV antiepileptic drugs targeting electrographic burst suppression for at least 24 hours, in which case exam & testing that would otherwise take place during the period of burst suppression should be postponed until after at least 24 hours of burst suppression, and then performed off sedation.
4. Consider median SSEPs should be performed no earlier than 48 hours post-arrest, or 48 hours post-rewarming if the patient underwent induced hypothermia.
5. Consider sending serum neuron-specific enolase (NSE) on day 1-3 post arrest, or on day 1-3 after rewarming in patients who have undergone induced hypothermia. (Note that while higher values generally correlate with worse prognosis, and a value of 33 is often cited as indicating poor prognosis, no definitive "cutoff" value is known, and cooling may artificially lower NSE values. Thus NSE values must be interpreted within the context of the other data.)
6. Consider CT at 48 hours post-arrest or 48 hours post-rewarming. If obvious widespread injury is absent, consider proceeding with brain MRI.
7. If a brain MRI is planned, it should be performed on day 3-5. (MRI findings in hypoxic ischemic changes are often dynamic, especially early on; imaging done earlier than day 3 may be misleading.)
8. A prognostication worksheet will be completed and left in the chart by the Postanoxic Coma Neurophysiology Consult (PCNC) Service service after completing the day 3 exam, or after cEEG and SSEP assessments are completed.

The timing of studies indicated above is summarized in the following table:

During cooling	cEEG					Exam
Day 1*						
Day 2*	MRI					
Day 3*		Exam				
Day 4*						
Day 5*						
Day >5*						

* Days are defined relative to cardiac arrest if induced hypothermia is not used. Otherwise, days above are relative to completion of rewarming. In case of burst suppression undertaken for seizures, days are relative to the end of the initial 24 hour burst suppression period.

The Decision To Withdraw Aggressive Care

This is ultimately based on a clinician's individual judgment and patient and family wishes, but factors to consider include:

1. Age
2. Comorbidities (either pre-existing or subsequent to the arrest)
3. Prior wishes of the patient
4. We recommend using all of the available data, including the clinical examination, EEG and SSEP findings, serum biomarkers (when sent) and neuroimaging findings to assist the clinician's decision.
5. Some patients have a delayed recovery to a good neurological state. When in doubt about the prognosis, particularly in younger patients, consider allowing more time (e.g. 2-3 weeks) to see if recovery appears more likely (e.g. improving neurological exam).

Selected References

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Disclaimer

Clinical situations and considerations may vary. This working guideline has been developed for use by our team at MGH in appropriate circumstances. Changes in our practice may occur without notice. We make no statements or warranties about appropriateness or utility of this working guideline in other clinical environments. This guideline has not been evaluated in a blinded randomized clinical trial.