

THE PRESENT AND FUTURE

COUNCIL PERSPECTIVES

Cardiac Arrest

A Treatment Algorithm for Emergent Invasive Cardiac Procedures in the Resuscitated Comatose Patient



Tanveer Rab, MD,* Karl B. Kern, MD,† Jacqueline E. Tamis-Holland, MD,‡ Timothy D. Henry, MD,§ Michael McDaniel, MD,|| Neal W. Dickert, MD, PhD,* Joaquin E. Cigarroa, MD,¶ Matthew Keadey, MD,# Stephen Ramee, MD,** on behalf of the Interventional Council, American College of Cardiology

ABSTRACT

Patients who are comatose after cardiac arrest continue to be a challenge, with high mortality. Although there is an American College of Cardiology Foundation/American Heart Association Class I recommendation for performing immediate angiography and percutaneous coronary intervention (when indicated) in patients with ST-segment elevation myocardial infarction, no guidelines exist for patients without ST-segment elevation. Early introduction of mild therapeutic hypothermia is an established treatment goal. However, there are no established guidelines for risk stratification of patients for cardiac catheterization and possible percutaneous coronary intervention, particularly in patients who have unfavorable clinical features in whom procedures may be futile and affect public reporting of mortality. An algorithm is presented to improve the risk stratification of these severely ill patients with an emphasis on consultation and evaluation of patients prior to activation of the cardiac catheterization laboratory. (J Am Coll Cardiol 2015;66:62-73)
© 2015 by the American College of Cardiology Foundation.

Over the past 30 years, significant advances have been made in resuscitation therapy for cardiac arrest victims, with improved survival and neurological outcomes (1,2). The vast majority of adult cardiac arrests are associated with obstructive coronary artery disease (3). Emergent coronary revascularization in appropriate patients, coupled with therapeutic hypothermia (TH) and hemodynamic support, has continued to improve outcomes (4,5). Therefore, the standard practice in many centers is to emergently activate the cardiac

catheterization laboratory (CCL) in patients presenting with cardiac arrest, the majority being out-of-hospital cardiac arrests (OHCAs). This is particularly true in cardiac arrest patients with ST-segment elevation myocardial infarction (STEMI). Although the 2013 American College of Cardiology Foundation (ACCF)/American Heart Association (AHA) guidelines for the management of STEMI (6) have a Class I recommendation for performing immediate angiography and percutaneous coronary intervention (PCI) in comatose patients with STEMI after OHCA when indicated,

The views expressed in this paper by the American College of Cardiology's (ACC's) Interventional Council do not necessarily reflect the views of the *Journal of the American College of Cardiology* or the ACC.

From the *Division of Cardiology, Emory University School of Medicine, Atlanta, Georgia; †Sarver Heart Center, University of Arizona, Tucson, Arizona; ‡Icahn School of Medicine, Mount Sinai Saint Luke's Hospital, New York, New York; §Division of Cardiology, Department of Medicine, Cedars-Sinai Heart Institute, Los Angeles, California; ||Division of Cardiology, Grady Memorial Hospital, Emory University School of Medicine, Atlanta, Georgia; ¶Knight Cardiovascular Institute, Oregon Health and Sciences University, Portland, Oregon; #Division of Emergency Medicine, Emory University Hospital, Emory University School of Medicine, Atlanta, Georgia; and the **Structural and Valvular Heart Disease Program, Ochsner Medical Center, New Orleans, Louisiana. Dr. Kern has served as a science advisory board member for Zoll Medical and PhysioControl Inc.; and has served on the speakers bureau for C.R. Bard. Dr. McDaniel is a consultant for Medtronic. Dr. Dickert has received grant funding from the Patient-Centered Outcomes Research Institute and the Greenwall Foundation. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

[Listen to this manuscript's audio summary by JACC Editor-in-Chief Dr. Valentin Fuster.](#)

Manuscript received March 11, 2015; revised manuscript received April 28, 2015, accepted May 5, 2015.



there are no guidelines for comatose cardiac arrest patients without ST-segment elevation on electrocardiogram (STE).

In patients with OHCA, 64% will be comatose, and the neurological status on presentation has a dramatic effect on subsequent mortality and mortality (7). Mortality in post-cardiac arrest patients with STEMI who are awake and undergo successful PCI is only 5%, but it increases to 50% if patients are comatose (7).

Although PCI can offer important benefits to resuscitated patients who remain comatose, current quality metrics and public reporting programs have not recognized the expected high mortality rate in this population and may de incentivize appropriate care. Whereas door-to-balloon time (D2B) in OHCA patients is excluded from core measures, hospital and operator mortality are key performance metrics and are not excluded. In addition, insurance programs offer hospitals quality improvement programs with significant financial reward if the adjusted mortality rate after PCI is <1%. Therefore, public reporting of adverse outcomes in this high-risk population without adequate risk adjustment, coupled with financial incentives for hospitals with low PCI mortality, has created a significant misalignment of goals. There is concern in the interventional community that this may lead to risk-averse behavior, resulting in suboptimal care by not providing early cardiac catheterization to appropriate patients.

RISK STRATIFICATION

Early risk stratification of patients with OHCA in the emergency room and the recommendations for early angiography vary considerably amongst providers and institutions. Many regional STEMI systems include automatic activation of the CCL for all STEMI and OHCA patients. The role of first responders, emergency room doctors, and noncardiologists focuses on the process, rather than the appropriateness of the activation. Although many patients have improved outcomes with an early invasive approach, some patient subsets may not derive a benefit and may experience excess risk.

A strategy to reliably identify patients who benefit from early angiography and those who benefit from compassionate supportive care is clearly needed. An algorithm may assist front line clinicians in identifying appropriate cardiac arrest patients for emergent cardiac catheterization. Recently, our European colleagues published a comprehensive review delineating their approach to OHCA patients (8). Although our approach addresses the care of OHCA patients in

the United States, we hope that continued universal dialogue and research will accelerate improved outcomes in this critically ill population. We propose an algorithm to best risk stratify cardiac arrest patients who are comatose on presentation for emergent CCL activation for coronary angiography and possible intervention (**Central Illustration**).

EXPLANATION OF THE ALGORITHM

The principal purpose of this algorithm is to provide an easily implementable aid in identifying appropriate care for all comatose survivors of cardiac arrest and to identify patients who are unlikely to receive substantial benefit from an early invasive approach.

CARDIAC ARREST, RETURN OF SPONTANEOUS CIRCULATION, AND THE COMATOSE PATIENT.

This algorithm focuses on patients who have experienced OHCA and have achieved return of spontaneous circulation (ROSC), but remain comatose. Although an initial shockable rhythm, such as ventricular tachycardia (VT) or ventricular fibrillation (VF), improves the likelihood of ROSC (6,9-11) and of a favorable outcome (12), non-shockable rhythms may also be caused by coronary artery occlusion (12).

Successfully resuscitated comatose patients represent a heterogeneous population with a baseline survival rate of only 25%. With hypothermia and PCI, survival improves to 60%, with favorable neurological outcomes achieved in 86% of survivors (3,4,10,12-15) (**Table 1**). However, the presence of certain unfavorable features reduces the likelihood of a good outcome.

TARGETED TEMPERATURE MANAGEMENT WITH MILD TH AND CORONARY ANGIOGRAPHY POST-CARDIAC ARREST.

Early initiation of targeted temperature management (TTM) is critical and should neither delay nor interfere with an early invasive approach. TTM is the active control of systemic body temperature to limit tissue injury after ischemia-reperfusion conditions occurring from cardiac arrest. The use of mild TH has been demonstrated to improve survival and neurological outcomes when combined with PCI in patients with OHCA who remain comatose on presentation (11,12,16-28). One nonrandomized report found an associated 20% increase in mortality rate with every hour of delay in initiating cooling (12). In 2002, 2 randomized clinical trials found that lowering body temperature to 32°C to 34°C for 12 to 24 h in those still comatose after being resuscitated from VF OHCA improved survival and neurological

ABBREVIATIONS AND ACRONYMS

ACCF	= American College of Cardiology Foundation
AHA	= American Heart Association
CCL	= cardiac catheterization laboratory
ECG	= electrocardiogram
OHCA	= out-of-hospital cardiac arrest
PCI	= percutaneous coronary intervention
ROSC	= return of spontaneous circulation
STE	= ST-segment elevation on electrocardiogram
STEMI	= ST-segment elevation myocardial infarction
TH	= therapeutic hypothermia
TTM	= targeted temperature management

Download English Version:

<https://daneshyari.com/en/article/2943783>

Download Persian Version:

<https://daneshyari.com/article/2943783>

[Daneshyari.com](https://daneshyari.com)