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Utilization of palliative care services for cardiac arrest patients undergoing therapeutic hypothermia: A retrospective analysis☆

Emily K. Zern[a,*], Michael N. Young[a], Taylor Triana[a], Meng Xu[b], Benjamin Holmes[a], Nyal Borges[a], John A. McPherson[a], Mohana B. Karlekar[c]

[a] Division of Cardiovascular Medicine, Vanderbilt University Medical Center, United States
[b] Department of Biostatistics, Vanderbilt University Medical Center, United States
[c] Division of General Medicine and Public Health, Section of Palliative Care, Vanderbilt University Medical Center, United States

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ABSTRACT

Background: Palliative care (PC) services are integral to the care of patients with advanced medical illnesses. Given the significant morbidity and mortality associated with cardiac arrest, we sought to measure the use and impact of PC in the care of patients treated with therapeutic hypothermia (TH).
Methods: We conducted a retrospective study of 317 consecutive patients undergoing TH after cardiac arrest. We compared intensive care unit (ICU) characteristics and clinical outcomes of subjects who received PC consultation (n = 125) to those who did not (n = 192).
Results: The proportion of TH patients with PC consultations increased to greater than 60% by 2013, corresponding to our institution's expansion of PC services, development of a dedicated PC unit, and integration of this service into our published TH protocol. In the TH population, time to return of spontaneous circulation (ROSC) was associated with higher inpatient mortality ($p < 0.001$) and placement of a PC consult ($p = 0.011$). TH patients who received PC consultation had longer ICU stays ($p = 0.034$), more ventilator days ($p < 0.001$), and higher inpatient mortality ($p < 0.001$). When these measures were analyzed cohort-wide comparing all TH patients pre- and post-2013, at which time the frequency of PC consultation had dramatically increased, there were no statistically significant differences in ICU care or outcomes.
Conclusion: In our population of cardiac arrest patients undergoing TH, the utilization of PC services has increased over time, particularly for those patients with high morbidity and mortality. Future randomized studies may further delineate optimal patient selection for PC consultation to better facilitate goals of care discussions and timely medical decision-making.

Introduction

Cardiac arrest is a significant and growing public health concern, with annual incidence approaching 430,000 for out-of-hospital cardiac arrest and 210,000 for in-hospital cardiac arrest.[1] Despite improvements in post-resuscitation care, long-term outcomes remain poor. Approximately 60% of patients with out-of-hospital cardiac arrest will die in the field, and of those who survive to the hospital, there is a 75% mortality rate.[2] Mild therapeutic hypothermia (TH) using surface or catheter-based cooling systems is now the standard of care in eligible comatose patients after cardiac arrest,[3–7] and there are data that targeted temperature management using mild TH reduces mortality and may lead to more favorable neurological outcomes.[4,7–10]

Given the significant morbidity and mortality in patients suffering cardiac arrest, complicated by the inherent challenges of neuroprognostication before and during hypothermia, there is a need for improved goals-of-care management for this high-risk population. Palliative care (PC) teams specialize in facilitating such discussions among patients, families, and providers to develop a medically appropriate plan of care consistent with a patient's wishes and values.[11,12] PC services are thus becoming an integral component in the care of patients with complex medical conditions and advanced medical therapies, and have been shown to be associated with improved symptoms, decrease cost, and enhance quality of life. In one multicenter study, PC consultation was associated with significant hospital cost savings with a nearly five-fold cost reduction in patients who died during admission.[13] Published

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* Corresponding author at: 55 Fruit St., Gray Bigelow 730, Department of Medicine, Boston, MA 02114, United State.
E-mail address: ezern@partners.org (E.K. Zern).

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data have also demonstrated an associated decreased length of stay in intensive care units (ICU).[14,15] Several landmark studies, including one study in a cardiac intensive care unit setting (CVICU), have shown that while early PC involvement may facilitate less overall aggressive care at the end of life, it does not decrease survival and may in fact improve quality of life.[15–17] Despite the significant value documented with PC involvement, integration of PC services into the TH population has not been previously studied.

The goal of the present study was to describe our institution's experience with the implementation of a protocol utilizing PC for comatose patients undergoing TH post-cardiac arrest. We also conducted a systematic review examining the potential association of PC consultation with underlying patient characteristics and clinical outcomes in this cohort.

Methods

Clinical setting and palliative care protocol

We conducted a retrospective observational study of resuscitated cardiac arrest patients undergoing TH in a 27-bed CVICU of an academic tertiary care hospital (Vanderbilt University Medical Center; Nashville, Tennessee). A TH steering committee – composed of interventional cardiologists, intensivists, anesthesiologists, neurologists, and PC physicians – advises the CVICU on all post-cardiac arrest protocols. In 2007, the steering committee integrated a decision-based PC consultation into the institution's original TH protocol ("Code Ice", Supplemental Fig. S1 in the online version at DOI: 10.1016/j.resuscitation.2016.12.014) due to the high morbidity, mortality, and complex decision-making related to this patient subset.[18] This was predicated on the idea that PC involvement would be instrumental in helping CVICU teams and families delineate patients' goals of care, particularly when addressing end-of-life issues such as medical futility or transitioning to comfort measures while deescalating aggressive therapies.[19] Per protocol, PC can be consulted at time of admission, and the patient is evaluated within 48 h (a delay of 48 h was written into the protocol as a necessity in after-hours admission of post-cardiac arrest patients). Most often, this consultation occurred before the rewarming process has been completed. PC providers also meet with family members to discuss the TH process, expectations, advance directives, and conditions a patient would find acceptable in terms of quality of life.

Once the CVICU medical team has sufficient data to recommend prognosis, the PC team then facilitates a family meeting to further discuss goals of care. In situations where the prognosis is poor and the patient or his or her medical-decision maker articulates that the anticipated quality of life would be unacceptable, PC and CVICU teams recommend a transition to comfort care either using an established protocol (Supplemental Fig. S2 in the online version at DOI: 10.1016/j.resuscitation.2016.12.014) immediately in the CVICU or in a dedicated inpatient PC unit (established 2011) where full support can be continued until the family is prepared to withdraw aggressive life-sustaining measures of care.

Patient inclusion criteria and data collection

A total of 317 patients were admitted to the CVICU between May 2007 and April 2014 for TH following successful resuscitation from cardiac arrest. Under approval by the university's Institutional Review Board, we recorded data encompassing baseline patient demographics, medical comorbidities, cardiac arrest characteristics, and post-cardiac arrest management including utilization of invasive positive pressure ventilation, vasopressors, inotropes, or mechanical circulatory support devices. Additional relevant data collected included presence and timing of a do not resuscitate (DNR) order, general statement of poor prognosis by a clinician, ICU and hospital length of stay, and disposition upon hospital discharge. Presence or absence of PC consultation and timing of PC consultation during hospitalization were documented using an institutional database of all PC consultations and cross-referenced within the electronic medical record for each subject. These data were all routinely recorded as part of clinical care and were extracted retrospectively in a non-blinded fashion.

Patients who received PC consultation were compared to those who did not with regards to baseline admission characteristics, CVICU management while hospitalized, placement of a DNR order, length of stay, and disposition upon hospital discharge. In addition, these same characteristics were examined pre- and post-January 1, 2013, at which time PC services and staffing expanded on an institutional level including the addition of a dedicated inpatient

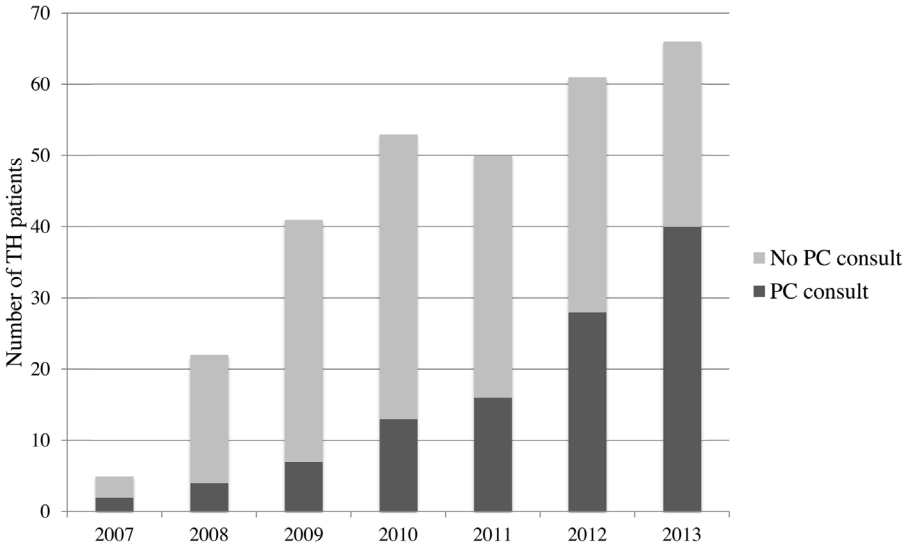

Fig. 1. The number of TH patients, with and without PC consultation, from 2007 to 2013. The first quarter of 2014 was excluded for graphical representation, with total number TH 21 and number of those receiving PC consult 15 within this time frame.
PC = palliative care, TH = therapeutic hypothermia.