

CASE AND COMMENTARY: PEER-REVIEWED ARTICLE

When Is It Acceptable to Terminate Resuscitation in Prehospital Settings?

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Abstract

Given advances in resuscitation science that bring advanced cardiac life support (ACLS) to prehospital settings, emergency medical technicians (EMTs) and paramedics must make decisions about whether and when to terminate resuscitation and to transport a patient for whom ACLS is unsuccessful. Protocols for both vary across the United States. This article reviews ethical and scientific features of EMTs' and paramedics' decisions to initiate, continue, or terminate resuscitation.

Case

FF is 78 years old and found on the floor in her home by her adult child, JJ. FF is unresponsive and without a pulse; JJ immediately calls 911. A local volunteer emergency medical services (EMS) team—an ambulance with an emergency medical technician (EMT) and a paramedic—arrives promptly at the scene and initiates cardiopulmonary resuscitation (CPR) and advanced cardiac life support (ACLS). After 20 minutes without return of spontaneous circulation (ROSC), the paramedic determines FF to be dead. The paramedic explains to JJ that the team will call the county coroner to certify FF's death rather than transport FF to the nearest hospital, which is about 30 miles away. JJ asks, "Why don't you keep trying? Shouldn't you take FF to a hospital or at least call a doctor to make sure you've done all you can to save my mother?"

Commentary

Out-of-hospital cardiac arrest affects about 350 000 people per year in the United States; the rate of survival to discharge from the hospital is roughly 10.5% in the United States.¹ Factors such as a witnessed cardiac arrest, bystander CPR, duration of CPR less than 15 minutes, and response to initial treatments greatly improve the odds of not only ROSC but also survival to hospital discharge.^{2,3} Advances in prehospital medicine have brought ACLS—similar to that provided in many emergency departments—to the patient in the field via highly trained paramedics, without the delays and interruptions in resuscitation that transport to the hospital entails while CPR and ACLS are ongoing. Given the advances in prehospital resuscitation that have brought ACLS to the patient before they are brought to the hospital, a decision must be made by prehospital clinicians about when and which patients should be transported to a hospital and when

to terminate resuscitation on scene because additional care would be futile, ie, would no longer accomplish the physiologic goal of survival.^{4,5}

Decisions about whether to initiate, continue, or terminate resuscitation are some of the most challenging for clinicians to make and are followed by **difficult family discussions**. Clinicians not only must take into account the patient's and family's preferences and the potential benefits and harms of administering ACLS in the field but also must weigh the potential benefits of administering ACLS in the field against the harms of taking an ambulance out of service in the community for a longer period than if ACLS were initiated during transport. This case thus highlights how one of the most challenging discussions to have with patients' families is further complicated in the prehospital setting.

Prehospital Resuscitation

Prehospital resuscitation often begins with a bystander who, after calling EMS, communicates with a dispatcher who instructs the bystander on how to initiate CPR and dispatches emergency personnel of an appropriate level and number to a scene. EMS personnel are licensed or certified to provide prehospital care at 4 levels: emergency medical responder (EMR), EMT, advanced EMT, and EMT-paramedic. Paramedics are the only EMS personnel who are licensed to provide advanced life support (ALS) and ACLS throughout the country and are preferentially dispatched to cases involving cardiac arrest that would benefit from ACLS. Some EMS agencies might have limited access to paramedics and often dispatch EMTs to the scene to initiate basic life support until a paramedic can arrive or the patient can be transported to an emergency department. The scope of practice of EMS personnel is defined by a combination of national crisis standards of care, state regulatory requirements for licensure or certification, and protocols approved by their physician medical director.⁶ The EMS medical director is responsible for not only the supervision of EMS personnel but also the continuous **quality improvement** of EMS policies and care delivery.⁷ Whether the EMS team is volunteer or paid, the individuals on that team are all still credentialed and regulated by their own state regulatory agencies. In these ways, the EMS system can consistently ensure that the principles of beneficence, nonmaleficence, and justice are upheld at the patient and community level.

A decision of whether and when to start resuscitation is first and foremost made by prioritizing patient autonomy to the extent possible. In hospital settings, emergency personnel often have access to documentation regarding a patient's resuscitation preference if the patient has completed a Physician Order for Life Sustaining Treatment (POLST) or a Do Not Resuscitate (DNR) order with their physician. In the absence of a POLST or DNR or access to this documentation, a legal decision maker (if available), such as a health care proxy, legal guardian, or appropriate next of kin, should make the decision about resuscitation. If no one is available to assent to care, or those on scene do not refuse it, resuscitation is standard practice. However, resuscitation is not attempted if there are signs of irreversible death (eg, rigor mortis, dependent lividity [liver mortis], injuries not compatible with life, or decomposition).⁸

If a decision is made to attempt resuscitation, it must then be decided whether to treat a patient on scene or while transporting that patient to a hospital. Providing ACLS in a moving ambulance is particularly challenging due not only to the space limitations and unpredictability of a moving vehicle but also the limited number of personnel. Performing CPR is tiring, especially during **a long transport**, and not all EMS agencies

have access to automated compression devices that can provide consistent compressions during transport. Given these limitations—and that paramedics receive a high level of training to deliver a similar standard of care as in an emergency department—resuscitating a patient on scene not only is safer for the patient and EMS personnel but also can often result in better, uninterrupted care than trying to deliver care while moving the patient. A study of 15 383 matched patients showed that the survival rate with a favorable neurologic outcome among patients who were resuscitated on scene prior to transport was more than twice as high than among those who were immediately transported to the hospital.⁹ This finding adds to the large body of literature demonstrating that high-quality CPR and ACLS with minimal interruptions provided by EMS on scene until ROSC leads to better outcomes for nontraumatic causes of cardiac arrest than extensive treatment during transport to the hospital.^{10,11,12}

Terminating CPR

A decision to terminate resuscitation in hospital settings must account for many factors, including why the patient is suffering a cardiac arrest. Conditions such as acute blood loss can be more easily corrected than pulseless electrical activity caused by overwhelming sepsis. In the hospital, clinicians have access to more information about the patient's condition to guide their decision-making than in the prehospital setting. However, rates of survival and survival with meaningful neurologic function are still poor in the hospital setting. Studies have demonstrated that rates of survival of witnessed in-hospital cardiac arrests range from 7% to 26%.³ Recent data have shown that performing ACLS immediately in the hospital setting does reach a point of diminishing returns: patients have less than a 1% chance of meaningful neurologic recovery (defined as moderate cognitive disability or better) at 32 minutes of ACLS and less than a 1% chance of survival to discharge at 39 minutes.^{13,14} While this information is useful, it may not translate directly to the prehospital setting. In one study of out-of-hospital cardiac arrests, 90% of patients with good neurologic outcomes had ROSC within 20 minutes, and 99% within 37 minutes.¹³ Those with favorable features—such as a shockable rhythm, bystander CPR, and a witnessed cardiac arrest—not only had a higher likelihood of ROSC with a favorable neurologic outcome but also shorter time to ROSC.¹⁴ However, many EMS agencies work with their medical directors to create protocols for terminating CPR in the absence of robust professional society recommendations¹⁵ that therefore have an exceedingly low likelihood of achieving a favorable outcome, similar to physicians making the decision in hospital settings.

Protocols

If ROSC is achieved by EMS personnel, transport to the hospital for continued care is the next step. However, CPR cannot continue indefinitely. For the patient, CPR is not without its own harms, such as broken ribs and anoxic brain injuries. When these risks outweigh the potential benefit of ROSC, offering continued CPR does not align with the principle of nonmaleficence. In addition, EMS agencies must consider whether it is fair to the rest of the community to have an ambulance unavailable to a patient suffering from a stroke, for example, in order to transport to the hospital a patient for whom the interventions that are possible are considered medically futile.¹⁶ Providing care in an emergency vehicle can lead to injuries to EMS personnel, motor vehicle collisions, and decreased access to care for the community,^{17,18} all of which harm the public.

EMS personnel work within protocols under the medical direction of a physician. Protocols for determination of when to terminate resuscitation are created by either state agencies or local agencies' EMS medical director. It is important to note that

physician oversight of the determination of death is necessary by state law but that this determination does not require a physician to be physically present with the patient at the time of determination. Thus, many protocols call for the paramedic on scene to act as a surrogate for the physician. To help guide the creation of these protocols, the National Association of EMS Physicians, the American Heart Association, and other organizations have endorsed criteria for the termination of resuscitation in the field.^{17,19,20} The following are minimum criteria²¹:

- Cardiac arrest not witnessed by EMS personnel.
- Shockable rhythm not identified by an automated external defibrillator or electronic monitor.
- No ROSC during ACLS.

Since it has been shown that EMS personnel have low confidence in predicting the outcome of a cardiac arrest and can be conflicted about making a decision themselves,²² discussion of terminating CPR in the field has focused on decision-aid protocols. Criteria for termination of resuscitation varies. For example, only around 50% of departments that have protocols for terminating resuscitation require online medical direction from a physician.¹⁵ Additionally, even the duration of CPR in the emergency department before termination of resuscitation varies from 11 minutes to 45 minutes.²³ While no US-based agency has endorsed a specific duration for CPR, the European Resuscitation Council recommends at least 20 minutes.²⁴ When termination of resuscitation protocols are put into place, they become the standard of care for that department and, by following the protocol, the EMS personnel can feel confident that their decision-making is supported.

Conclusion

In this case, the EMS team performed ACLS for 20 minutes with no ROSC or other signs of reversible causes of cardiac arrest. Some have argued that, even in cases with exceedingly poor chances of ROSC in which the family desires resuscitation, EMS personnel should consider the family at bedside and perform CPR for a short time to show the family that everything was done and to help with closure.²⁵ However, continuing CPR when the chances of meaningful survival are exceedingly poor is also not always in the best interest of the patient whose chest is being compressed repeatedly. By following the department policy on termination of resuscitation approved by the medical director, a paramedic would be within the standard of care. Although difficult to make, decisions to terminate resuscitation must both respect the patient's dignity by not subjecting the patient to interventions with little benefit and uphold beneficence by emotionally supporting the loved one who is experiencing grief.²⁶ When discussing terminating resuscitation in the prehospital setting, the clinician must be honest about the futility of continuing treatment and make it clear that continued care would be the same as that delivered in an emergency department but is often at the expense of a patient's dignity.

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Editor's Note

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