
ICU Volume 9 - Issue 2 - Summer 2009 - Hypothermia Series

From Ambulance to ICU

The continuum of care is best divided into five distinct areas in order to identify all of the key roles. These areas include: prehospital care, emergency department care, specialty care (i.e. cardiac catheterisation lab, critical care transport teams), general inpatient care areas, and intensive care. We have also identified eleven possible points for patients to enter the hospital protocol (Figure 1).

Pre-hospital Care

Pre-hospital care providers include the first responders (fire departments, rescue squads, police, etc.), as well as emergency medical technicians, paramedics, air medical personnel, and EMS medical directors (physicians). It is important to not just consider the personnel in the ambulance, but to include everyone who may be involved in the pre-hospital care. In Charlotte, North Carolina (US) the ambulance service recently adopted a therapeutic hypothermia protocol. As part of the implementation stage, all 1100 members of the first response fire department (trained at the basic emergency medical technician level) were taught about the new protocol, and ways to assist paramedics with protocol implementation.

Emergency Department Care

It is important to incorporate the emergency department staff (including nurses, physicians and administrative staff) into the care plan progression, because they will be a focal triage point of care. The emergency department staff may initiate care, continue care in the emergency department, or facilitate immediate transfer – bypassing the emergency department and going directly to the cardiac catheterisation lab, or intensive care unit. Emergency departments at smaller hospitals may view the care in the emergency department as the terminal end point of care, and prepare the patient for transport to larger hospitals that have more extensive cardiac care services.

Specialty Care

Specialty care includes two major services, cardiac catheterisation and/or critical care transport to a larger hospital. Over half of all post-arrest patients will need to go to the cardiac catheterisation lab for intervention. It is important to remember that therapeutic hypothermia will not stop an evolving myocardial infarction. Only cardiac catheterisation or administration of thrombolytics will stop an evolving infarct. However, implementation of therapeutic hypothermia is not contraindicated in the patient who requires thrombolysis or cardiac catheterisation intervention. From experience, we have found that a large number of cardiologists at our hospital would prefer to perform a diagnostic cardiac catheterisation in the stable post-arrest patient despite the absence of indicators that point to an ongoing infarct (ST segment elevation, elevated cardiac markers). This is often a point of debate between the cardiologist and the intensivists. Intensivists would rather admit and observe the post-arrest patient in the ICU. Their rationale is that by postponing the catheterisation, the risk of causing any further aggravation to the post-arrest myocardium is minimised. In contrast, the cardiologists often want to perform a diagnostic catheterisation to locate any blockages.

Another important point of focus with regards to specialty care is the use of critical care transport teams. In hospitals without the benefit of comprehensive cardiology care, the patient will most likely be transported either by ground critical care units, or air medical units to the larger receiving hospital. The ground and air critical care units are usually staffed with a nurse/paramedic team, and some may include physicians such as those seen with the European model. These teams are well trained in critical care treatment, and will be able to continue therapeutic hypothermia as well as any concurrent treatment modalities such as pressor therapies, ventilator care, and thrombolytic administration. In smaller hospitals, it is important to account for the transfer of patients when developing the protocol.

General Inpatient Care Areas

Another sometimes overlooked area of inpatient care in hospitals are those of patients that do not meet criteria for admission to the intensive care unit, or in some cases, there are no intensive care beds available. With a lack of critical care beds in many facilities, patients that have historically been admitted to the intensive care unit are now being placed in step-down units. Whether the patient's illness warrants admission to this type of care area, or they are being held until a critical care bed is available, these patients are often at risk for suffering a cardiac arrest. When this occurs, staff must be alert to recognise the post-arrest patients that can benefit from therapeutic hypothermia. This requires training of the staff regarding the benefits of the therapy as well the steps to take to ensure that the patient is immediately evaluated and the treatment is started as soon as possible.

Intensive Care Units

The fifth and final area of care for the patient in therapeutic hypothermia protocol is admission into the intensive care unit. Patients who are being cared for using the therapeutic hypothermia protocol usually require a 1:1 or even 2:1 nurse to patient ratio. The level of care and acuity of such patients necessitates that they be cared for in the most advanced cardiovascular care units in the hospital. Patients who are expedited through the admission process in the hospital and arrive in the intensive care unit in a timely fashion will stand to receive the best care. When therapeutic hypothermia is initiated, the goal is to reach target temperature as quickly and as safely as possible. Multiple studies have shown that patients who arrive in the intensive care unit quickly will reach target temperatures faster. The rationale is quite simple.

Patients who receive care in the emergency department are subject to nurse care ratios that are four to five times that of the ratios seen in the

intensive care units. Although emergency department nurses are very skilled, the time required to manage the patients receiving therapeutic hypothermia is often more than the typical emergency department nurse can offer. This is attributed directly to staffing levels as well as the number of patients being cared for in emergency department. Also, patients seen in the emergency departments are subject to the availability of emergency physicians who may be tasked with caring for multiple critically ill or injured patients. The same reason that we have worked to expedite our myocardial infarctions through the emergency department and to the cardiac catheterisation lab also holds true for these patients. It has been proven time and time again that by expediting patient arrival to the intensive care setting, target temperature can be reached quickly, offering patients the best chance for survival possible.

Options

There is much debate as to the optimal strategy to facilitate a patient receiving therapeutic hypothermia from the ambulance through the emergency department and on to the intensive care unit. Although it is important to get the patients either into the cardiac catheterisation lab, or intensive care unit quickly, the patient must be adequately evaluated to determine which of these is most appropriate. Some hospitals have chosen to have all patients evaluated initially in the emergency department. This option has much merit, as long as the patient can be quickly evaluated and expedited through the process. However, experience has shown in many hospitals despite the best intentions of the emergency department staff, treatment of these patients will be delayed when they have to be first evaluated in the emergency department.

Many physicians will want to assess the patient as soon as they enter the hospital to determine if any life saving interventions need to be immediately employed. Erlanger Medical Center in Chattanooga, Tennessee (US) has adopted a very innovative process to expedite the process of moving critically ill patients to the appropriate area of the hospital. The hospital assigns a highly trained nurse to critically ill patients to ensure that the prescribed treatment regimen is being followed. This nurse has no other responsibility other than ensuring that the patient is cared for during the acute period of his/her illness. These nurses are identified by colour coded shirts and function as a great advocate for the patient. This advocacy results in better outcomes.

Our hospital (Spartanburg Regional Medical Center) in Spartanburg, South Carolina (US) has adopted an innovative approach to caring for our pre-hospital patients who come to the hospital in protocol. Spartanburg Regional Medical Center is a 588-bed teaching hospital that serves over 100,000 patients a year. The hospital has 36 intensive care beds, is an accredited Level I Trauma Center and Primary Stroke Center, and has a Level III Neonatal Intensive Care Unit.

In our hospital, post-ROSC patients who are in therapeutic hypothermia protocol are brought directly from the field to the intensive care unit. The patient is allowed to bypass the often busy and overcrowded emergency departments (ours has 72-beds) and go right to definitive care. Once in the intensive care unit, an intensivist and cardiologist both evaluate the patient, and determine the best treatment modality for the patient prior to the patient being moved from the ambulance stretcher. Although this method has worked well for our facility, its success has been largely attributed to the collaboration of all members of the healthcare team. Establishing trust between hospital and pre-hospital staff is a must. Physicians and nurses working in these units do not typically receive patients directly from the field. Because of this atypical method of receiving the patient (bypassing the emergency department), relationships built upon training, familiarisation, and trust are of paramount importance.

Conclusions

Deciding which option is best for your hospital will depend on several factors. One of the underlying factors is the hospital's comfort level in the care provided by the pre-hospital providers. If the hospital is unsure of the quality of pre-hospital care, the patient is often best evaluated immediately in the emergency department. If the care provided is clinically competent by the prehospital personnel, the patient may benefit most by being taken directly to the intensive care unit or cardiac catheterisation (cath) lab. Some hospitals will base their decision on the report called in by the pre-hospital personnel. Depending on the patient's status and presentation, the receiving hospital physicians may decide where the patient will go. This decision is often easily made when the patient is coming from another hospital, and not when the patient is coming from the field simply because more information is available regarding the patient.

A second factor when determining the best option is the availability of the intensivists and cardiologists in the unit. Some hospitals may want the patient to be evaluated by physicians in the emergency department before consulting with the cardiologists and intensivists. Having the emergency physicians evaluate the patient first, may result in needless activation of specialty services such as the cath lab.

The protocol itself needs to be developed such that patients can easily transition between the different phases of care. By doing so, each of the key players will know and anticipate the care that the patient should have received in the prior stage. An example is found in our protocol. We found that the cardiac catheterisation lab wanted the patient to have pacer/defibrillator pads placed prior to the patient being brought into the catheterisation lab. This was a simple request, and a revision was made to our protocol so that all therapeutic hypothermia patients will have pacer/defibrillator pads placed in anticipation of going to the catheterisation lab. Other treatment modalities that have been addressed in a unified protocol are the use of sedatives and/or paralytics, glucose monitoring and control, and temperature monitoring. An added benefit of involving various staff in the continuum of care during development of the protocol is the discovery of equipment incongruities between pre-hospital and hospital, and even within units at the hospital.

Establishing shared ownership of the therapeutic hypothermia process by all members of the continuum is imperative. By allowing every person in the spectrum of care to participate in developing the protocol, key players in each stage will learn and recognise the priorities of the other stages.

Therapeutic hypothermia treatment has shown a great deal of promise in the care of post cardiac arrest patients. With further advances in temperature management and other treatment modalities, the number of patients that recover from cardiac arrest with a favourable neurological outcome will surely rise. Clinicians that collaborate with other members of the team, whether it is a cardiologist meeting with pre-hospital personnel, or an ICU nurse that meets with a critical care transport team, will set the stage for cooperation that results in better care and better outcomes. This therapy must know no boundary and be available to as many patients as possible.

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