

## HYPOTHERMIA in Trauma

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In Texas, except during December and January, hypothermia does not concern many of us. With so many advances in pre-hospital trauma support and the ever-increasing number of traumas, we are able to see more traumas make it not only to the EDs, but to the operating room as well.

Some professionals are now arguing that the new "golden hour" happens in the operating room when the trauma patient reaches their physiological limit. At the scene, in transport, and in the trauma room the most overlooked parameter when it comes to resuscitating the patient is the temperature. While we are concerned with blood pressure, heart rate, and respirations, a low body temperature could indicate or precipitate syndromes that lead to the demise of a patient.

Hypothermia is defined as the heat loss that exceeds that body's ability to generate heat. It is estimated that as many as 66% of all trauma patients arrive into the emergency room with hypothermia. Most of the time in Texas, we really do not worry about that much, but as you probably have noticed it's not that hot yet. It is also

estimated that as many as 57% of all trauma patients suffer hypothermia in the hospital and that the majority of the temperature loss occurred in the emergency department. Some of the factors that predispose a patient to heat loss would

For non-trauma patients, mild hypothermia would be 32-35 degrees C; moderate hypothermia <32 degrees C; and severe hypothermia <28 degrees C. Mild hypothermia for trauma patients is 34-36 degrees C, while moderate hypothermia is 32-34 degrees C and severe hypothermia is <32 degrees C.

As you can see, the numbers are increased for trauma patients due to the risks of such deadly complications as acidosis, cardiac rhythm changes, and coagulopathies. The differences between trauma and non-trauma patient ranges give us a buffer to prevent these problems from happening.

Hypothermia is further

classified as primary which is exposure related and secondary which includes head injuries that may cause abnormal thermogenesis due to injury to the hypothalamus, injuries that may cause exposure, sepsis, and general anesthesia which blocks sympathetic nerve responses.

Symptoms related to Mild hypothermia (34-36 degrees C) include: shivering, hyperreflexia, tachycardia, hypertension,

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include such things as; ambient temperature, exposure due to and for assessment of injuries, age, severity of injuries, exposure of body cavities during surgery, impaired thermogenesis, amount of transfusion, and elevated alcohol level.

Hypothermia is generally classified into three categories: mild, moderate, and severe. Classifications are different for trauma patients than non-injured patients.

## Hypothermia

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increased cardiac output, tachypnea, confusion, cognitive impairment, increased HCT, and respiratory alkalosis.

Symptoms seen with moderate hypothermia (32-34 degrees C) include: sympathetic nerve impairment, bradycardia, atrial fibrillation or flutter, prolonged ECG, bradypnea, decreased lung compliance, loss of consciousness, and coagulopathy.

Symptoms of severe hypothermia (< 28 degrees C) include: ventricular irritability, decreased myocardial contractility, severe hypotension, decreased or absent respirations, hyperkalemia, and unconsciousness.

Coagulopathy and acidosis are very often seen with patients who are hypothermic. Hypothermia causes increased oxygen consumption in a patient who is probably already oxygen deficient due to injuries therefore producing acidosis. Hypothermia also causes decreased platelet function, alteration in the enzymatic kinetics of the coagulation cascade, and inhibits the fibrinolytic system which is when our little friend Disseminated Intra-vascular Coagulation shows up!! These side effects can be quickly reversed with rewarming.

Three summers ago I had the fortunate opportunity to work with the burn team at Brooke Army Medical Center. The unfortunate part of the experience was the temperatures we worked in. Our skin is our number one defense mechanism against heat loss and infection. Burn patients lose a lot of heat due to ambient room temperature, therefore, we worked in rooms heated up to 98 degrees in some instances because the patients body temperature was so tenuous. Ninety percent of metabolic heat is lost through the skin surface.

**“ The first thing that you can do in the health care arena is to recognize the problem. Temperatures should be taken as soon as possible. Steps should be taken.....”**

The first thing that you can do in the health care arena is to RECOGNIZE THE PROBLEM. Temperatures should be taken as soon as possible. If even mild hypothermia is present steps should be taken to restore the patient to normothermic status. This can be done using warm water in gloves, warm blankets, covering the patient and not leaving them exposed. In the hospital setting, circulating water mattresses, hotline fluid warmers, the use of fluid warmers, air warmers, and increasing the room temperature slightly can also help. Respiratory humidification can cut down on evaporative heat loss. Internal rewarming consists of the use of warm peritoneal dialysis and arterial/venous rewarming. Baseline assessments of every aspect of the patient both primary and secondary is the quickest way to assure minimal complications whether you are picking up a patient from the scene or admitting them to the ICU.

Therefore, even in Texas in summer, we must not only observe and be prepared to treat our patients for heat exhaustion and heat stroke, but hypothermia as well. ■



### Hayes and Small receive awards

Mr. Stan Hayes (left) and Mr. Jesse Small received NCTTRAC Citizen Injury Prevention Awards at the March General Session of NCTTRAC. Mr Hayes assisted in developing and producing the “Choices” RAC video and the RAC Public Service Announcement. Mr. Small has allowed many extrication classes for EMS students and used autos and signs for hospitals at his facility and has always been willing to assist with the use of his Auto Parts store. Congratualtions to both of these individuals for their time and efforts on behalf of the NCTTRAC!