

Test Your Trauma Knowledge: answer can be found at the end of the newsletter.

Which of the following is TRUE regarding burns?

- A. Alkali chemical burns should be neutralized with a dilute acid rather than warm water.
- B. Patients who sustain thermal burns are at lower risk for hypothermia.
- C. Initial treatment of partial thickness burns should include antibiotic cream and cold compresses.
- D. An electrical burn with a small external injury associated with a clenched hand indicates deep soft-tissue injury.
- E. The Parkland formula should be used to determine the effectiveness of fluid resuscitation.

Quote of the month:

"To know even one life has breathed easier because you have lived. This is to have succeeded."—Ralph Waldo Emerson

Featured Trauma Topic

The Lethal Trauma Diamond Part 2: Acidosis



The lethal trauma diamond is a cycle of four physiological derangements that can result in excessive blood loss, lead to hypovolemic shock, and increase the risk of death. The four points of the diamond are coagulopathy, acidosis, hypothermia (the trauma triad) and hypocalcemia. These components are all interrelated, and one will affect the others. We will explore acidosis in this edition of Trauma Talk.

The range of pH is 0-14. Water is considered neutral, with a pH of 7. Human blood is slightly alkaline or basic with a normal pH averaging between 7.35 to 7.45 in arterial blood. The body regulates pH using buffer systems, the respiratory system and renal system. When the pH drifts low (acidosis) it can impair the production of thrombin and other clotting factors needed to help control hemorrhage. With continued bleeding and the loss of oxygen-carrying hemoglobin, the organs and tissues do not get as much oxygen as needed. Therefore, the body will shift from aerobic metabolism (using oxygen to create energy) to the less effective anaerobic metabolism. Lactic acid is a byproduct of anaerobic metabolism and this results in lactic acid build up.

There are two things that can worsen the acidosis from hemorrhage. The first challenge is when the trauma patient also has a respiratory acidosis as a result of hypoventilation and rising CO₂. Common causes may include the use of narcotics or alcohol, traumatic brain injuries, chest trauma such as flail chest, or medical conditions such as COPD. The second cause of worsening acidosis is excessive resuscitation with crystalloid solutions. Normal saline has a pH of 5.5 and is far more acidic than human blood. For this reason, hospital fluid resuscitation guidelines have reduced the amount of normal saline from 2 liters to up to one liter. Although Lactated Ringers has a higher pH of 6.5, it contains lactate and is incompatible with many medications and blood products. Ideally, if a patient requires additional fluid resuscitation beyond 1 liter of normal saline, blood products would be administered. If blood is not available and arrival to a trauma center is delayed, administer Normal Saline in 500cc boluses and frequently reassess VS and clinical response. Medical Control should be contacted for further guidance and possible orders for TXA and Norepinephrine as level of care dictates.

Acidosis in the severely injured patient can have devastating effects and make it difficult to stabilize the patient. Not only does acidosis result in clotting problems, but severe acidosis can render critical medications ineffective. Stop the bleeding and initiate transport within 10 minutes of extrication. Apply oxygen and keep the patient warm. Administer IV fluids, medications and blood as your level of care dictates. Notify the trauma center as you leave the scene, providing the lowest noted BP. Update with changes in condition.

Abdominal Evisceration



An abdominal evisceration is when abdominal organs protrude out of a penetrating wound or surgical site. This could range from a small loop of bowel poking out of a stab wound to a fully open abdomen from a chain saw accident. Treatment should take place prior to moving the patient.

1. Keep the patient calm and provide reassurance. Flex uninjured knees up to relax the abdominal muscles and minimize the chance of further expulsion of bowel.
2. Do not attempt to push the organs back inside. Handle the exposed organs as little as possible. If you must move them and sterile gloves are not available, utilize large sterile sheets to prevent you from touching them.
3. Cover the organs with sterile gauze moistened with normal saline. It is very important to keep the organs moist and covered.
4. Cover with an occlusive dressing and seal with tape on all sides. You can use baby bunting foil, the inside surface of an IV bag or other occlusive materials.
5. For large eviscerations, cover with additional bulky dressings to prevent heat loss.
6. Keep the patient warm and treat for shock.
7. Notify the trauma center as you leave the scene and transport immediately.



Meet a member of the Trauma Team:



BRAVE (Buffalo Rising Against Violence at ECMC) is a program which provides support to victims of violence while they are in the hospital and after discharge. Services are available 24/7 for victims of shootings, stabbings, assault/sexual assault, domestic violence and more. Some examples of services include therapy and support, court advocacy, safety planning, assistance with Crime Victims Reimbursement applications and transportation. BRAVE is the only designated Trauma Recovery Center in the region and an offsite location was opened in 2024.

Emergency Department Procedure Change

We have changed the procedure for processing of patients who are cleared by the triage RN to go to the waiting room. EMS crews will now be asked to exit to the waiting room through the doors across from the command center (for location convenience) and EMS crews will also be asked to request that patients walk through the weapons detection unit. This will help us increase the safety of our patients and staff and increase the likelihood of identifying a potential risk that can be easily missed due to the metal of the stretcher.

Test Your Trauma Knowledge answer: Which of the following is TRUE regarding burns?

Answer: D: An electrical burn with a small external injury associated with a clenched hand indicates deep soft-tissue injury.

A clenched hand or contracture with a small electrical entrance wound is an indication that there is a deep soft-tissue injury that may not be visible to the eye. There could be significant muscle necrosis underneath relatively normal looking skin. Electrical current travels inside blood vessels and nerves and can cause thrombosis and nerve injury. Patients should be transported to a burn center.

We would love to hear any suggestions, questions or requests for future issues. Please forward them to bmoses@ecmc.edu

Q&A: In future issues, we would like to answer your questions. Please use the QR code to submit a question to be answered in future editions of Trauma Talk.

