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EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE

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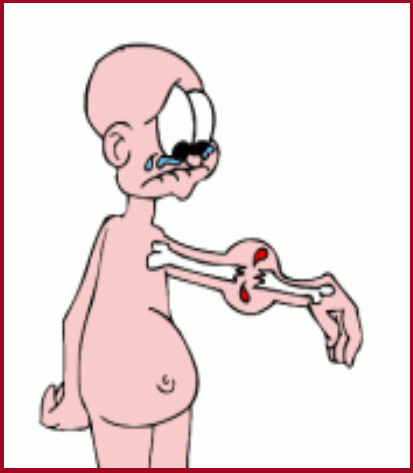
Open Fractures: ER Management



Open fractures are commonly encountered in the emergency room. With prompt recognition and treatment of these fractures, ER staff can begin taking the first steps to ensure satisfactory outcomes for these traumatic injuries.

A 27-year-old man sustains an open tibia fracture during a motorcycle accident. The open wound is located anteriorly and measures 5 cm in length. The wound is contaminated with dirt and oil from the road. He had his full 3 doses of tetanus vaccination as an infant. He also had a tetanus booster vaccination 18 months ago when he began a new job. In addition to intravenous antibiotics, what tetanus prophylaxis should be administered?

A. No tetanus vaccination is required since his last immunization was within 5 years

B. Administer 0.5 mL of tetanus toxoid immunization

C. Administer 250 U of tetanus immunoglobulin

D. Administer 0.5 mL of tetanus toxoid AND 250 U of tetanus immunoglobin in the SAME leg

E. Administer 0.5 mL of tetanus toxoid AND 250 U of tetanus immunoglobin in DIFFERENT legs

EM CASE OF THE WEEK

EM Case of the Week is a weekly "pop quiz" for ED staff. The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

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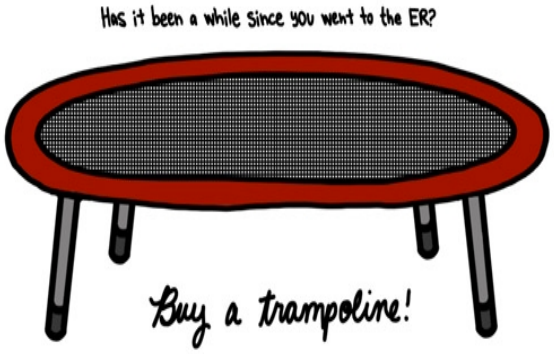

Take Home Points

- According to the literature, the most important intervention for reducing infections following open fractures is the administration of IV antibiotics within 3 hours of the injury.
- Open fractures are orthopedic URGENCIES. Fracture wash out in the operating room can be delayed up to 24 hours after injury.
- For all open fractures, a history regarding the patients tetanus immunizations should be obtained.
- All patients with open fractures should receive Cefazolin (Ancef) unless an allergy exists. Alternatives include Clindamycin or a flouroquinolone.

Open Fractures

The correct answer is A. Since this patient was able to give his previous tetanus immunization history which included complete childhood doses as well as a booster 18 months prior, he does not need to be administered a tetanus toxoid booster. Obtaining tetanus prophylaxis after an open fracture can be life saving. When patients are able to give health providers reliable immunization history, they should use this information to guide prophylactic treatment.

When a patient comes into the ED unresponsive or with AMS, or if he/she is a poor historian, the health care provider should assume they have not had adequate tetanus immunizations. In these situations, tetanus prophylaxis must be given. It is the type of wound that dictates what prophylaxis is needed. Small "poke-hole" wounds in these patients require only the 0.5 mL toxoid dose. Larger or more contaminated wounds require both the 0.5 mL toxoid dose as well as a dose (amount varies by age) of tetanus immunoglobulin.

In patients that are able to communicate that they had their childhood tetanus vaccinations, the time of their last booster dose is important. If it has been over 5 years since their booster, a 0.5 mL toxoid dose will be needed. If it has been less than 5 years since the patient's last booster, no prophylaxis is needed.

Immunization History	Clean, Minor Wound (GA I)	GS II and III
Unknown History or <3 doses	• Give vaccine only	• Give vaccine • Give immune globulin
Vaccination complete (3 prior doses)	• No prophylaxis if last dose within 10 years • Give vaccine if >10 years since last dose	• No prophylaxis if last dose within 5 years • Give vaccine if >5 years since last dose

Discussion:
Open fractures, previously referred to as compound fractures, are osseous disruptions that result in soft tissue damage and a break in the overlying skin. In these fractures, there is a direct communication between bone and the environment. Contamination of the wound is often present. The potential of developing an infection can be prevented with prompt treatment in the emergency department.

Open fractures often occur via high-energy mechanisms, and over 1/3 of patients with an open fracture will have multiple injuries. Any skin laceration over an extremity that has a long bone fracture must be considered to be a result of the fracture until proven otherwise.

Classification:

The Gustilo and Anderson classification is used to guide antibiotic treatment administered in the emergency department.

Grade	Wound size	Soft tissue	Contamination	Antibiotic
I	<1cm	Minimal	Minimal	1st generation Cephalosporin
II	1-10cm	Moderate	Moderate	1st generation Cephalosporin
III a	>10cm	Severe	Severe •Soil •Delay >12 Hr •Fresh water •Salt water •Farm •Bowel	1st generation Cephalosporin + Aminoglycoside •Fresh Water → Add Flouroquinolone •Farm/Bowel → Add Penicillin G
III b	" "	Severe: Needs full thickness tissue flap repair		
III c	" "	Severe: Vascular repair needed		

Emergency Department Management:

- **ABCDE**
  Initial fracture management and treatment occurs after trauma assessment and resuscitation of the patient.
- **Antibiotics**
  Time to antibiotics has been proven to be the most important intervention available to prevent infection! **Antibiotics should be administered within 3 hours of the trauma to avoid an increased risk of infection.** For all open fractures, cefazolin (Ancef) is first line.
  A common problem encountered in the emergency department is patients with a reported allergy to penicillin/cephalosporins. In these cases, clindamycin is usually the second choice. Other antibiotics that can be used are vancomycin or flouroquinolones. Also, appropriate tetanus prophylaxis should be administered.

- **Control Bleeding**

Active bleeding should be controlled using direct pressure over the wound. No tourniquets or blind clamping of vessels should be preformed.

- **Assessment**

The patient's surrounding soft tissue should then be examined and one should look for other lacerations, bruising, or any deformities. Compartments should be palpated to check for compressibility to rule out associated compartment syndrome. A neurovascular exam can then be done to check for nerve/arterial damage caused by the fracture.

- **Dressing / Splinting**

The open wound can now be irrigated with sterile saline if there is going to be a delay in getting the patient to the operating room. A sterile saline soaked dressing can be applied over the open wound. Splinting should then be performed to minimize soft tissue damage and to give the patient some pain relief.

- **Orthopedic Surgery**

Open fractures are considered orthopedic urgencies. **Pain management should be initiated immediately.** As long as there is no vascular damage, neurologic deficits, or compartment syndrome present, surgery can be delayed up to 24 hours without increased incidence of infection so long as antibiotics are initiated during initial emergency department management.

1.) Abbasi, David. "Open Fractures Management." Trauma. Orthobullets, Web. 10 Sept. 2015.
2.) Egol, Kenneth A., Kenneth J. Koval, Joseph D. Zuckerman, and Kenneth J. Koval. "Open Fractures." Handbook of Fractures. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins Health, 2010. Print.
3.) Taylor, Ben. "Gustilo Classification." *Trauma*. Orthobullets, 18 Jan. 2015.

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This month's case was written by Scott Polansky. Scott is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at BHMC in April 2016. Scott will be completing his residency in orthopedic surgery at