

EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE



In any ER patients will present with any and all types of lacerations. To be a great healthcare provider you must be able to recognize the severity of a laceration and the appropriate steps that must be taken to decrease chances of infection and promote good wound healing. This month we will explore the proper methods of assessing and cleaning lacerations.

EM CASE OF THE WEEK

EM Case of the Week is a monthly “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.



Wound Care of Lacerations

A 64yo man is brought into the ER with an open laceration of left hand. The man says he debark a cruise ship and tripped 3 hours ago. He extended his left hand to catch himself and received the laceration. The man states he landed in dirt and gravel. No other injuries or loss of consciousness was sustained. The man has hypertension, which he takes Lisinopril/HCTZ. Last tetanus shot was “way over 30 years” ago. He did not sustain any other injuries in the fall. On exam his left hand has a 5cm laceration on the palmar crease. Laceration went as deep as the subcutaneous tissue and no tendons, ligaments, muscles were involved. Patient was able to move all digits and sensory was intact. Which of the following is FALSE?

- A. A. The man will need IM tetanus toxoid.
- B. Irrigation with 10% Betadine before is indicated prior to closure.
- C. Thoroughly remove and irrigate any foreign bodies in the wound using normal saline.
- D. The wound is contaminated, therefore the man will require antibiotic prophylaxis.
- E. The man should get an x-ray of the hand.



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Wound Care of Lacerations

The correct answer is B. A quick flush of Betadine to “clean” the laceration before suturing is not the correct answer in treating a patient with a laceration. **A laceration should best be rinsed and flushed with high pressure (15-25psi) and high volume of normal saline.** Even usage of potable tap water shows no difference in wound infection rates compared with sterilized normal saline. **The key to decreased infection and inflammation are high pressure flushes using syringes, splash guard caps, or other methods that can create a high pressure stream.** The use of standard 10% Betadine is not recommended because it is tissue toxic and has not been shown to reduce infection rates. Diluted Betadine to 1% is less tissue toxic, but there is limited evidence showing any better outcomes than using normal saline or potable water.

Take Home Points

- Proper high pressure irrigation of the wound is key to prevent infection (sterile saline equivalent to potable tap water)
- Thoroughly examine wound for any foreign bodies before closure (use x-ray, MRI, CT, U/S if necessary)
- Make the decision to delay primary closure if wound is heavily contaminated
- Check tetanus history of patient
- Sterile gloves have shown no advantages over non-sterile gloves

A patient who presents to the ED should always first be immediately stabilized. Afterwards lacerations and wounds can be assessed. If trauma or fall is the cause, questions pertaining to other injuries that can be life threatening/altering should be ascertained (i.e. head traumas, abdominal traumas, etc.). The history of the laceration including how long ago the injury occurs, possible foreign bodies, and the cause of the laceration are all important to management of the patient.

As clinicians the patient’s medical history can also play a factor on healing and infections of the laceration. So it is important to outline that extreme of ages, diabetes, renal failure, obesity, malnutrition, immunosuppressed, and history of connective tissue disorders can increase the probability of infection.

Tetanus

Table 2. Tetanus Prophylaxis Recommendations.

Tetanus History	Clean Minor Wounds	All Other Wounds
< 3 doses in primary series*	Give tetanus toxoid only	Give toxoid and immune globin
Primary 3 Series Completed		
Last < 5 years ago	No toxoid required	No toxoid needed
Last > 5 years ago and < 10	No toxoid required	Give toxoid
Last > 10 years ago	Give toxoid	Give toxoid

For a list of educational lectures, grand rounds, workshops, and didactics please visit

<http://www.BrowardER.com>

and click on the “Conference” link. All are welcome to attend !

Anesthesia

Do not be afraid to use local anesthesia, 1% lidocaine injection or topical lidocaine, for evaluation, cleaning, and closing of the laceration. The injection should preferably through non-contaminated wound margins. The use of topical lidocaine gel can be used on the face and as well as in children. Of important note, if any injections contain epinephrine avoid injecting into poorly vascularized areas such as ears, toes, and fingers.

Foreign Bodies

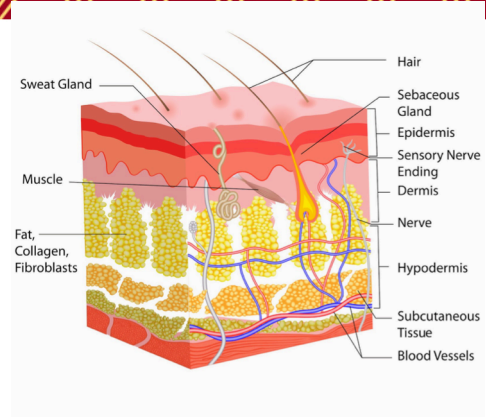
In this patient an x-ray of his hand was performed to look for any fractures, as well as any foreign bodies. If it is a deep wound a visual inspection can miss small glass and debris. "The most common retained foreign body by far is glass - representing over 50% of retained objects in some series." X-rays are useful to locate broken glass as small as 2mm; MRI or CT is useful to locate wood and plastics.

Irrigation

To minimize foreign bodies and reduce infections proper irrigation is required. Normal saline and potable tap water have shown similar outcomes in infection rates after wound closure. A 1975 study by Rodeheaver demonstrated that irrigation at 15 psi removed 85% of bacterial contamination from a wound, whereas low pressure (1 psi) removed only 49%. The saline SplashCap can produce up to 15 psi. A syringe with a 19-gauge catheter can produce 11-17 psi.

Delayed Primary Closure

If a wound is highly contaminated or if the wound is more than 19 hours old delayed primary closure is recommended. Historical factors (i.e. diabetes, immunocompromised) lower the time threshold to consider delayed closure. In delayed primary closure, the wound is irrigated and covered with gauge and then rechecked in 3-4 days; and by then if no infection exists the wound can be closed.



Consultation?

If the laceration is deep enough that it breaks through the subcutaneous tissue and into the fascia layer a consultation to orthopedic surgeon may be required. The fascia layer involves tendons, muscles, and nerves. Lacerations into the fascia layer are known as "complex" lacerations, rather than "simple" lacerations of the dermis layers. Complex sutures may also require multilayer sutures.

Staples, Sutures, DermaBond

DermaBond is used in areas where there are low tensile forces, such as the face. When using staples, concerns arise if the patient is required to be scanned in an MRI or CT, due to causing artifacts. The suture size of the area should be the smallest to resist the wound tension. If using non-absorbable sutures or staples, they should be removed after about 7 days. Facial sutures should be removed within 3-5 days. Areas of higher tension can be removed after 10-14 days.

Antibiotics

Incised, clean, early traumatic wounds do not require prophylactic antibiotics. Antibiotics have been indicated for patient with prosthetic devices or at risk for developing endocarditis. Wounds that are contaminated obviously do require antibiotics. Topical antibiotics after closure (bacitracin or Neosporin) are shown to reduce infections.

THIS WEEK'S CASE WAS WRITTEN BY PORNCHAI KITTIVARAKARN, OMS-IV FROM NSU-COM. PORNCHAI DID HIS 4TH YEAR EM ROTATION AT BHMC IN FEBRUARY. HE PLANS ON GOING INTO INTERNAL MEDICINE.