

Management of Open Fractures

Open fractures are fractures that communicate with the external environment, and are treated as any other trauma with 2 steps: in the emergency room, and the operating room.

Emergency Room (ER):

- 1- **Primary survey: ABCDE!!!** If at any of the ABCDE steps the patient had trouble, redo all the steps again, to assure life saving.
- 2- **Secondary survey: head-to-toe evaluation of the trauma patient, including a complete history and physical examination, including the reassessment of all vital signs. Each region of the body must be fully examined.**
 - **AMPLE History:**
 - **A: Allergies.**
 - **M: Medications.**
 - **P: Past medical and surgical histories.**
 - **L: Last intake of meal. (For anesthesiology purposes; if the patient took a meal an hour before the trauma, aspiration is feared; therefore, type of anesthesia differs.)**
 - **E: Events leading up to injury/illness.**
 - **Examination: once cleared from primary and secondary surveys, examine properly under anesthesia, and include the joints above and below bone affected. (Open fractures can be so small, they may be missed, and only identified by small droplets of fat on the wound, indicating exposure of matrix.)**
- **Once the patient is cleared from primary and secondary surveys, you move on to dealing with the open fracture(s), precisely in the order mentioned below.**
- 3- ***Gustilo classification* of open fractures, which depends on wound size, and degree of contamination.**
 - I. **Less than 1 cm, and clean wound.**
 - **Antibiotic: 1st generation cephalosporin (cefazolin); anti-staphylococcus aureus (the source of infection is mainly the skin).**
 - II. **1-10 cm, and moderately contaminated wound.**
 - **Antibiotic: 1st generation cephalosporin (cefazolin), and aminoglycosides (gentamicin).**
 - III. **More than 10 cm, and/or severely contaminated wound.**
 - A. **De-gloving injury: sloughing of skin over wound.**
 - B. **Fracture extends to periosteum.**
 - C. **Vascular injury that isn't corrected by re-alignment and requires surgery to be corrected.**
 - **Antibiotic: triple therapy: 1st generation cephalosporin (cefazolin), aminoglycosides (gentamicin), and penicillin.**
- **All antibiotics for all types of open fractures are given therapeutically, and not prophylactically. (given 3 days to 1 week post operatively, but it's controversial.)**

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- 4- **Tetanus vaccination:**
 - If the patient took the vaccine within the past 5 years, give a live attenuated vaccine (active).
 - If the patient was never vaccinated, give him/her both passive and active immunization.
- 5- **Remove gross contamination, gauge.**
- 6- **Compress the bleeding.**
- 7- **Immobilization: by a 3-sided back slab and not a complete cast, because the patient will shortly be taken to the OR, and to prevent compartment syndrome from occurring.**
- 8- **X-rays:**
 - **Chest:** for pneumothorax before taking the patient to the OR.
 - **Anterior-posterior:** for medial and lateral dislocations.
 - **Lateral:** for angulations.
 - **Both AP and lateral views are done for the above and below joints for rotations (if it is not parallel).**
 - **Bilaterally in children.**
- **Now that the patient is stable, he/she are clear for the OR; an operation called “debridement and external fixation”. (The sooner the patient is operated on, the better.)**

Operating Room (OR):

- 1- **Debridement and remove gross contamination.**
- 2- **Irrigation with normal saline.**
 - **Debride obviously necrotic tissue only, questionable tissue is left.**
 - **Once cleaned and irrigated, leave the wound open, and check it after 1-2 days.**
 - **After 1-2 days, check on questionable tissue, if it became necrotic, remove it, and if it's healthy, leave it. Also check on the wound, if it's still not clean, clean and irrigate it again, and check it after 1-2 days.**
 - **Check it after 1-2 days again, and so on until it is a satisfyingly clean wound.**
 - **Remove the bone that is not attached to any soft tissue (hanging).**
- 3- **Culture.**
- 4- **External fixators are used for type III open fractures. Indications:**
 - **Internal fixators cannot be used, because the wound is already infected, and it may lead to osteomyelitis.**
 - **Soft tissue problems like pain and blisters.**
 - **(Internal fixators are only used for types I and II, along with open reduction.)**
- 5- **Plastic surgeons for closing the wound, and vascular surgeons.**

Lecture notes with Dr. Bakarman and session notes with Dr. Bin Nasser.
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