SUBJECT: Antibiotics for Open Fractures **PAGE:** 1 of 2
UPDATED: 2/25/2020, 5/23/2022, 10/06/2022 **EFFECTIVE:** 12/15/2022

RECOMMENDATION(S): Kyle J. Kalkwarf, MD **APPROVAL:** 12/15/2022
CONCURRENCE(S): Drs. Steven Cherney, Simon Mears, Ryan Dare, Allison Jenkins, Rebecca Smith

PURPOSE: To facilitate appropriate and timely management of patients with musculoskeletal injury

MANAGEMENT OF OPEN FRACTURES:

1. Sterile dressing with normal saline-soaked gauze
2. Irrigation of gross contamination at the discretion of the orthopedic attending
3. IV ABX should be given within 1 hour of ED arrival. ABX selection is outlined in Table 1

Table 1. Antibiotic Selection by Fracture Type

Fracture/Wound Type (including GSW)	**First-line Agent(s)**	**Alternative Agent(s) for known anaphylaxis to PCN or cephalosporins**	**Duration**
Type I: Blunt or Penetrating <1 cm and clean	Cefazolin 2 g IV q8h	Clindamycin 900 mg IV q8h	ABX should be initiated within 1 hour of arrival ABX should be dc'ed within 24 hours after initial debridement and closure, either via primary repair or negative pressure dressing OR **no more than 72 hours total from time of injury** ABX should NOT be given solely for presence of a drain
Type II: Blunt or Penetrating 1-10 cm without significant soft tissue damage/involvement			
Type III: Blunt or Penetrating >10 cm, segmental fx (e.g., multiple fx to same bone), extensive soft tissue damage, traumatic amputation, femur fx	Ceftriaxone 2 g IV q24h	Clindamycin 900 mg IV q8h PLUS Gentamicin 5 mg/kg IV x 1 dose	
Contamination Farm-related, crush or vascular injury, fecal contamination, standing water, soil	Above ABX PLUS Metronidazole 500 mg IV q8h x 24h		
Open Mandible fx	None	None	
Facial fx (closed or open), Open Skull fx (without CSF leak)*, Sinus, Anterior/Posterior Table	None	None	

*For **Open Skull fx with CSF leak**, please see Traumatic Pneumocephalus Guidelines for appropriate management
-ABX with similar spectrums used for other injuries may suffice but must be discussed with trauma attending or pharmacist

4. If there is open tissue (blunt or penetrating mechanism) over a bone that may be fractured, but the patient is not able to get radiography images to properly diagnose a fracture and give antibiotics less than one hour after arrival, antibiotics should be given empirically until the presence or absence of an open fracture is confirmed. This should be done to limit underdosing of antibiotics for open fractures.
5. Open fractures should be fixed operatively within 24 hours. If this is not possible, they should be washed out at the bedside by the orthopedic team within 24 hours of injury.
6. For all fracture types, patients must receive cefazolin (or clindamycin, if allergy) within 1 hour of the start of surgery. In cases where it has been more than half of the typical redosing interval, an additional pre-op dose must be given.
7. The open fracture wound should be surgically covered (flap) within 4 days definitive fixation.

These guidelines were prepared by the UAMS ACS Division. They are intended to serve only as a guideline based on current review of the medical literature and practice. They are neither policies nor protocols. Their use is at the discretion of the managing physician.

PERFORMANCE IMPROVEMENT MONITORING: (Expected Outcomes)

1. Time of Injury to initial washout of open fracture: within 24 hours.
2. Timing of antibiotics prior to or within 1 hour of Emergency Department arrival.
3. Timing of surgical wound coverage within 4 days from definitive fixation.

REFERENCES:

1. DePestel DD, Benninger MS, Danziger L, et al. Cephalosporin use in treatment of patients with penicillin allergies. J Am Pharm Assoc (2003). 2008 Jul-Aug;48(4):530-40.
2. Hoff WS, Bonadies JA, Cachecho R, et al. East Practice Management Guidelines Work Group: update to practice management guidelines for prophylactic antibiotic use in open fractures. J Trauma. 2011 Mar;70(3):751-4.
3. Davis M, Della Rocca G, Brenner M. ACS TQIP best practices in the management of orthopaedic trauma. Chicago, IL: American College of Surgeons. 2015.
4. Dunkel N, Pittet D, Tovmirzaeva L, et al. Short duration of antibiotic prophylaxis in open fractures does not enhance risk of subsequent infection. Bone Joint J. 2013 Jun;95-B(6):831-7.
5. Rodriguez L, Jung HS, Goulet JA, Cicalo A, Machado-Aranda DA, Napolitano LM. Evidence-based protocol for prophylactic antibiotics in open fractures: improved antibiotic stewardship with no increase in infection rates. J Trauma Acute Care Surg. 2014 Sep;77(3):400-7.
6. Ratilal BO, Costa J, Pappamikail L, Sampaio C. Antibiotic prophylaxis for preventing meningitis in patients with basilar skull fractures. Cochrane Database of Systematic Reviews. 2015(4).
7. Zalavras CG. Prevention of infection in open fractures. Infectious Disease Clinics. 2017 Jun 1;31(2):339-52.
8. Zosa BM, Elliott CW, Kurlander DE, Johnson F, Ho VP, Claridge JA. Facing the facts on prophylactic antibiotics for facial fractures: 1 day or less. Journal of Trauma and Acute Care Surgery. 2018 Sep 1;85(3):444-50.
9. Sagi, H, Patzakis, M. Evolution in the Acute Management of Open Fracture Treatment? Part 2. 2021 Sep; 35(9): p 457-464.

These guidelines were prepared by the UAMS ACS Division. They are intended to serve only as a guideline based on current review of the medical literature and practice. They are neither policies nor protocols. Their use is at the discretion of the managing physician.