

CRMC Antibiotic Prophylaxis in Open Fracture Protocol

Recommendations:

Type I and II open fractures:

- Preferred: cefazolin 2 gm IV q8 (3 gm if > 120 kg)
- Beta-lactam allergy: clindamycin 900 mg IV q8
- Known MRSA colonization: add vancomycin 15 mg/kg IV q12
- Duration of prophylaxis: 24 hrs

Type III open fractures (no gross contamination):

- Preferred: ceftriaxone 2 gm IV q24
- Beta-lactam allergy: Clindamycin 900 mg IV q8 + levofloxacin 500 mg IV q24
- Known MRSA colonization: Add vancomycin 15 mg/kg IV q 12
- Duration: 48 hrs or 24 hrs after wound closure, whichever is shorter

Type III open fractures (gross contamination with soil/fecal material)

- Preferred: ceftriaxone 2 gm IV q 24 + metronidazole 500 mg IV q 8
- Beta-lactam allergy: levofloxacin 500 mg IV q24 + metronidazole 500 mg IV q8
- Known MRSA colonization: Add vancomycin 15 mg/kg IV q 12
- Duration: 48 hrs after wound closure
- Consider infectious disease consult

Type III open fractures (with standing open water)

- Preferred: piperacillin/tazobactam 4.5 gm IV q 8 hrs
- Beta-lactam allergy: levofloxacin 500 mg IV q24 + metronidazole 500 mg IV q8
- Known MRSA colonization: Add vancomycin 15 mg/kg IV q 12
- Duration: 48 hrs after wound closure
- Consider infectious disease consult

- ❖ In patients with potential clostridial contamination (farm related injuries), high dose PCN (3-4 million units IV) should be added to the above regimens
- ❖ Gustilo and Anderson found that 70% of open wounds were contaminated by bacteria and argued that antibiotic therapy was a therapeutic rather than prophylactic measure
- ❖ Multiple level 1 and 2 studies have demonstrated the efficacy of first generation cephalosporins in reducing the rate of infection following open fractures; in the United States, cefazolin is the only first generation cephalosporin available in IV form. It is effective against most gram-positive cocci as well as a few gram-negative rods.
- ❖ Extending antibiotic coverage beyond gram positive organisms for type III open fractures has traditionally been common practice based on the historic high rate of gram negative wound infections

- ❖ Optimal duration of antibiotic course is not well defined; there is currently no evidence that extending antibiotic coverage beyond 24 hrs after wound closure, even for type III injuries, decreases the rate of infection.
- ❖ Rodriguez L, et al. found that eliminating aminoglycosides and implementing an evidence based protocol resulted in no increase in skin and soft tissue infections

TABLE 1. Open Fractures—Gustilo Classification^{1,2}

Type I	Open fracture with a skin wound <1 cm in length and clean.
Type II	Open fracture with a laceration >1 cm in length without extensive soft tissue damage, flaps, or avulsions.
Type III	Open segmental fracture with >10 cm wound with extensive soft tissue injury or a traumatic amputation (special categories in Type III include gunshot fractures and open fractures caused by farm injuries).
III _A	Adequate soft tissue coverage.
III _B	Significant soft tissue loss with exposed bone that requires soft tissue transfer to achieve coverage.
III _C	Associated vascular injury that requires repair for limb preservation.

References:

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3. 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; 95-B:831-7
4. Anderson A, Miller AD, Boodstaver PB. Antimicrobial prophylaxis in open lower extremity fractures. *Open Access Emergency Medicine.* 2011; 3:7-11.
5. Hoff WS, Bonadies JHA, Cachecho R, Dorlac WC. East Practice Management Guidelines Work Group: update to practice management guidelines for prophylactic antibiotic use in open fractures. *J Trauma.* 2011; 70(3): 751-4.
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7. Halawi MJ and Morwood MP. Acute Management of Open Fractures: An Evidence-Based Review. Orthopaedics. 2015: Vol 38, Num 11: e1025 – 33.