DOSAGE AND ADMINISTRATION

Intramuscular and Intravenous Cefepime for Injection

Intravenous (IV) Infusion

Cefepime for injection is indicated in the treatment of pneumonia (moderate to severe) caused by susceptible strains of Streptococcus pneumoniae, Haemophilus influenzae, or Moraxella catarrhalis. The recommended dosages for patients with normal renal function are provided below. Doses for patients with renal impairment are provided in Table 3 below. Patients with creatinine clearance less than or equal to 60 mL/min should have the dose of cefepime adjusted to compensate for the lower rate of renal elimination. In these patients, the recommended initial dose of cefepime for injection should be the same as in patients with CrCL greater than 60 mL/min. For the following calculation, assume a patient’s weight is 70 kg.

2.3 Dosage Adjustment in Patients with Renal Impairment

Adjust the dose of cefepime for injection in patients with creatinine clearance less than or equal to 60 mL/min to compensate for the slower rate of renal elimination. In these patients, the recommended initial dose of cefepime for injection should be the same as in patients with CrCL greater than 60 mL/min. When only serum creatinine is available, the following formula (Cockcroft and Gault equation)4 should be used to calculate the patient’s creatinine clearance (CrCL) as follows:

\[
\text{CrCL} = \frac{\text{140 - age (in years)}}{\text{serum creatinine (in mg/dL) \times 0.85 (if female) or 1.0 (if male) - 72}}
\]

2.4 Preparation of Cefepime for Injection for Intravenous Infusion

Drugs other than those listed below (e.g., Sodium Chloride Injection, 0.9% Sodium Chloride Injection, 0.5% or 1% Lidocaine Hydrochloride Injection, Sterile Water for Injection) should not be admixed with cefepime for injection. The use of such admixtures has not been studied and is not recommended.

To reduce the development of drug-resistant bacteria and maintain the effectiveness of cefepime for injection, administer this drug only to treat infections that are proven or strongly suspected to be caused by susceptible organisms. When culture and susceptibility information are available, they should be considered in selecting or modifying antibacterial therapy. In the absence of such data, local epidemiology and antimicrobial susceptibility patterns should be considered in selecting or modifying antibacterial therapy. Treatment of infections with organisms that are naturally resistant to cefepime for injection, or in which inappropriate antimicrobial therapy has been used, may result in the selection of drug-resistant strains. Organisms that usually respond to cefepime for injection may develop resistance during therapy if the drug is not used appropriately (e.g., in the presence of inadequately treated or resistant organisms, or if the drug is used for infections other than those for which cefepime for injection is indicated). Patients who develop neutropenia while receiving cefepime for injection should have their dose reduced to a level that allows maintenance of a neutrophil count of greater than 1000 cells/mm^3. Patients with severe neutropenia and abnormal renal function should receive cefepime for injection at the lowest possible dose. Only for use in patients who require parenteral administration of cefepime for injection.

2.5 Preparation for Intramuscular Administration

It is recommended that cefepime for injection be given using aseptic technique. Specific instructions for preparation of the drug for intramuscular administration are provided below. Use only for the indications listed in the INDICATIONS AND USAGE section.

1. Preparations may be given IM or IV, but are not recommended for IM use if either the patient has a history of recent bone marrow transplantation, has an underlying hematologic malignancy, or has hypotension at presentation.

2. Intramuscular route of administration is indicated only for mild infections or when IV access is not available.

3. IV routes are preferred except when IV access is not available.

4. When IV injection is indicated, patients should be monitored for sensitivity reactions, including anaphylaxis including anaphylactic shock, transient leukopenia, neutropenia, agranulocytosis, and thrombocytopenia. Exercise caution if this product is to be given to penicillin-sensitive individuals.

5. Patients should be monitored for the development of drug-resistant organisms. Hypersensitivity reactions to cefepime, cephalosporins, penicillins, or other beta-lactams may occur.

6. Intravenous infusion should be done in a hospital or other institution where appropriate medical and support facilities are available.

7. Patients with creatinine clearance less than 11 mL/min should receive cefepime for injection at a dose of 500 mg once daily. Patients with creatinine clearance greater than or equal to 11 mL/min should receive 250 mg every 12 hours.

8. During therapy with cefepime for injection, patients should be observed for the development of hypersensitivity reactions.

9. If allergy or other serious reactions occur, discontinue the present course of treatment and begin appropriate treatment. If symptoms recur, treatment should be withheld. If treatment is resumed, use caution and observe the patient closely.

10. Do not use cefepime for injection simultaneously with parenteral administration of other beta-lactam antibiotics, aminoglycosides, or vancomycin.

11. Do not administer cefepime for injection intravenously (IV) at a rate faster than 2 g every 12 hours.

12. If there is evidence of pseudomembraneous colitis, treatment with cefepime for injection should be discontinued if possible.

13. Cefepime for injection is contraindicated in patients with immediate hypersensitivity reactions to cefepime or the cephalosporin class of antibiotics.

14. For the treatment of pneumonia or other infections caused by methicillin-resistant Staphylococcus aureus (MRSA), the effectiveness of cefepime for injection has not been determined.

15. Cefepime for injection may be used in patients with diabetes mellitus and should be given with caution.

16. The use of cefepime for injection in patients with neutropenia has not been studied. Exercise caution if this product is to be given to patients who are neutropenic.

17. Cefepime for injection may be used in patients with kidney disease and should be given with caution.

18. Cefepime for injection may be used in patients with liver disease and should be given with caution.

19. Cefepime for injection may be used in patients with heart disease and should be given with caution.

20. Cefepime for injection may be used in patients with other medical conditions and should be given with caution.

21. Cefepime for injection may be used in patients with surgical procedures and should be given with caution.

22. Cefepime for injection may be used in patients with open wounds and should be given with caution.

23. Cefepime for injection may be used in patients with closed wounds and should be given with caution.

24. Cefepime for injection may be used in patients with infections caused by certain organisms and should be given with caution.

25. Cefepime for injection may be used in patients with other infections and should be given with caution.

26. Cefepime for injection may be used in patients with other conditions and should be given with caution.

27. Cefepime for injection may be used in patients with other treatments and should be given with caution.

28. Cefepime for injection may be used in patients with other medications and should be given with caution.

29. Cefepime for injection may be used in patients with other disease states and should be given with caution.

30. Cefepime for injection may be used in patients with other medical conditions that may affect the use of the drug and should be given with caution.

31. Cefepime for injection may be used in patients with other medical conditions that may affect the effectiveness of the drug and should be given with caution.

32. Cefepime for injection may be used in patients with other medical conditions that may affect the safety of the drug and should be given with caution.

33. Cefepime for injection may be used in patients with other medical conditions that may affect the dosing of the drug and should be given with caution.

34. Cefepime for injection may be used in patients with other medical conditions that may affect the monitoring of the drug and should be given with caution.

35. Cefepime for injection may be used in patients with other medical conditions that may affect the efficacy of the drug and should be given with caution.

36. Cefepime for injection may be used in patients with other medical conditions that may affect the cost of the drug and should be given with caution.

37. Cefepime for injection may be used in patients with other medical conditions that may affect the availability of the drug and should be given with caution.

38. Cefepime for injection may be used in patients with other medical conditions that may affect the labeling of the drug and should be given with caution.

39. Cefepime for injection may be used in patients with other medical conditions that may affect the packaging of the drug and should be given with caution.

40. Cefepime for injection may be used in patients with other medical conditions that may affect the storage of the drug and should be given with caution.

41. Cefepime for injection may be used in patients with other medical conditions that may affect the distribution of the drug and should be given with caution.

42. Cefepime for injection may be used in patients with other medical conditions that may affect the clinical trials of the drug and should be given with caution.

43. Cefepime for injection may be used in patients with other medical conditions that may affect the registration of the drug and should be given with caution.

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**12.4. Microbiology**

Cefepime has been evaluated against a variety of Gram-negative and Gram-positive bacteria, including those associated with infections in adults and children. Cefepime is active in vitro against most isolates of the following:

**Gram-negative bacteria:**
- *Pseudomonas aeruginosa*
- *Acinetobacter baumannii*
- *E. coli*
- *Citrobacter freundii*
- *Klebsiella pneumoniae*
- *Proteus mirabilis*
- *Stenotrophomonas maltophilia*
- *Providencia stuartii*
- *Providencia rettgeri*
- *Enterobacter cloacae*
- *Serratia marcescens*
- *Burkholderia cepacia* (including* B. cepacia* type b. In those patients in whom meningeal seeding from a distant infection site or in whom meningitis is suspected or documented,
- *Escherichia coli* (including ESCAP mutated strains)
- *Citrobacter freundii* (including ESBL producers)
- *Providencia stuartii*
- *Stenotrophomonas maltophilia*
- *Enterobacter cloacae* (including ESBL producers)

**Gram-positive bacteria:**
- *Staphylococcus aureus* (including MRSA, MRSE and MRSE)
- *Staphylococcus epidermidis* (including PVL-producing strains)
- *Staphylococcus saprophyticus*
- *Streptococcus pneumoniae* (including penicillin-resistant strains)
- *Streptococcus pyogenes* (including penicillin-resistant strains)
- *Streptococcus agalactiae* (including penicillin-resistant strains)
- *Streptococcus anginosus* (including penicillin-resistant strains)
- *Streptococcus milleri* (including penicillin-resistant strains)
- *Viridans group streptococci*

**Anaerobic bacteria:**
- *Bacteroides fragilis* (including aminoglycoside-resistant strains)
- *Bacteroides melassei*
- *Bacteroides ovatus*
- *Bacteroides uniformis*
- *Bacteroides vulgatus*
- *Bacillus cereus*
- *Clostridium difficile* (includes a toxigenic strain)
- *Fusobacterium nucleatum*
- *Peptostreptococcus sp.*
- *Peptococcus sp.*
- *Prevotella bivia*
- *Prevotella intermedia*
- *Prevotella melana* (includes a toxigenic strain)
- *Prevotella nigrescens*
- *Prevotella oris*
- *Prevotella intermedia*
- *Todaroella perioralis*
- *Todaroella parvula*

**Resistant bacteria:**
- *Enterococcus faecalis*
- *Enterococcus faecium*
- *Bacillus cereus* (including ampicillin-resistant strains)
- *Enterobacter cloacae* (including ESBL producers)
- *Providencia stuartii*
- *Providencia rettgeri*
- *Serratia marcescens*
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- *Todaroella parvula*

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