	CEFERO 500 (Cefuroxime Axetil Tablets USP 500 mg)
	Module 1: Administrative Information and Prescribing Information

1.6 Product Information

1.6.1 Prescribing Information (Summary of Product Characteristics)

1. Name of the Medicinal Product

- 1.1 Trade Name** : CEFERO 500 (Cefuroxime Axetil Tablets USP 500 mg)
1.2 Strength : 500 mg
1.3 Pharmaceutical Form : Film Coated Tablets

2. Qualitative and Quantitative Composition

S. No	Name of Material	Quantity/ Tablets (mg)
Active Substance		
1	Cefuroxime Axetil USP Eq. to Cefuroxime*	625.00 \approx 500.00
Inactive Substance		
2	Citric Acid Monohydrate	20.00
3	Sodium Lauryl Sulphate	20.00
4	Magnesium Stearate	17.00
5	Purified Talc	24.50
6	Sodium Carbonate	20.00
7	Mannitol	46.00
8	Crospovidone	134.00
9	Croscarmellose Sodium	74.00
10	Colloidal Anhydrous Silica	4.00
11	Microcrystalline Cellulose	20.00
12	Propylene Glycol	2.00
13	Titanium Dioxide	4.00
14	Hypromellose	8.00
15	Erythrosine Lake	1.50
16	Isopropyl Alcohol**	Q. S.
17	Dichloromethane**	Q. S.
Total		1020.00 mg

Remark:

*625.00 mg of Cefuroxime Axetil Eq. to 500.00 mg of Cefuroxime.

**Gets evaporated during manufacturing process and does not remain in the final product except traces.

3. Pharmaceutical Form

Film coated Tablet

Pink colored, caplet shaped film coated tablet having breakline on one side and plain on other side.

4. Clinical Particulars

4.1 Therapeutic indications

Cefuroxime is indicated for the treatment of the infections listed below in adults and children from the age of 3 months.

- Acute streptococcal tonsillitis and pharyngitis.
- Acute bacterial sinusitis.
- Acute otitis media.
- Acute exacerbations of chronic bronchitis.
- Cystitis.
- Pyelonephritis.
- Uncomplicated skin and soft tissue infections.
- Treatment of early Lyme disease.

4.2 Posology and method of administration

Posology

The usual course of therapy is seven days (may range from five to ten days).

For Adults and children (≥ 40 kg)

- Acute tonsillitis and pharyngitis, acute bacterial sinusitis- 250 mg twice daily.
- Acute otitis media- 500 mg twice daily.
- Acute exacerbations of chronic bronchitis- 500 mg twice daily.
- Cystitis- 250 mg twice daily.
- Pyelonephritis- 250 mg twice daily.
- Uncomplicated skin and soft tissue infections- 250 mg twice daily.
- Lyme disease- 500 mg twice daily for 14 days (range of 10 to 21 days).

For Children (< 40 kg)

- Acute tonsillitis and pharyngitis, acute bacterial sinusitis- 10 mg/kg twice daily to a maximum of 125 mg twice daily.
- Children aged two years or older with otitis media or, where appropriate, with more severe infections- 15 mg/kg twice daily to a maximum of 250 mg twice daily.
- Cystitis- 15 mg/kg twice daily to a maximum of 250 mg twice daily.
- Pyelonephritis- 15 mg/kg twice daily to a maximum of 250 mg twice daily for 10 to 14 days.
- Uncomplicated skin and soft tissue infections- 15 mg/kg twice daily to a maximum of 250 mg twice daily.
- Lyme disease- 15 mg/kg twice daily to a maximum of 250 mg twice daily for 14 days (10 to 21 days).

Renal impairment

The safety and efficacy of cefuroxime axetil in patients with renal failure have not been established.

Cefuroxime is primarily excreted by the kidney. In patients with markedly impaired renal function it is recommended that the dosage of cefuroxime should be reduced to compensate for its slower excretion. Cefuroxime is effectively removed by dialysis.

- ≥ 30 ml/min/ 1.73 m^2 ($T_{1/2}$ 1.4–2.4 hrs.)- No dose adjustment necessary (standard dose of 125 mg to 500 mg given twice daily).
- 10-29 ml/min/ 1.73 m^2 ($T_{1/2}$ 4.6 hrs.)- Standard individual dose given every 24 hours.
- <10 ml/min/ 1.73 m^2 ($T_{1/2}$ 16.8 hrs.)- Standard individual dose given every 48 hours.
- During haemodialysis ($T_{1/2}$ 16.8 hrs.)- A single additional standard individual dose should be given at the end of each dialysis.

Hepatic impairment

There are no data available for patients with hepatic impairment. Since cefuroxime is primarily eliminated by the kidney, the presence of hepatic dysfunction is expected to have no effect on the pharmacokinetics of cefuroxime.

Method of administration

Oral use

Should be taken after food for optimum absorption.

Should not be crushed and are therefore unsuitable for treatment of patients who cannot swallow tablets.

4.3 Contraindication

Hypersensitivity to cefuroxime or to any of the excipients used in formulation.

Patients with known hypersensitivity to cephalosporin antibiotics.

History of severe hypersensitivity (e.g. anaphylactic reaction) to any other type of betalactam antibacterial agent (penicillins, monobactams and carbapenems).

4.4 Special warnings and special precautions for use*Hypersensitivity reactions*

Special care is indicated in patients who have experienced an allergic reaction to penicillins or other beta-lactam antibiotics because there is a risk of cross-sensitivity. As with all beta-lactam antibacterial agents, serious and occasionally fatal hypersensitivity reactions have been reported. In case of severe hypersensitivity reactions, treatment with cefuroxime must be discontinued immediately and adequate emergency measures must be initiated.

Before beginning treatment, it should be established whether the patient has a history of severe hypersensitivity reactions to cefuroxime, to other cephalosporins or to any other type of beta-lactam agent. Caution should be used if cefuroxime is given to patients with a history of non-severe hypersensitivity to other beta-lactam agents.

Jarisch-Herxheimer reaction

The Jarisch-Herxheimer reaction has been seen following cefuroxime axetil treatment of Lyme disease. It results directly from the bactericidal activity of cefuroxime axetil on the causative bacteria of Lyme disease, the spirochaete *Borrelia burgdorferi*. Patients should be reassured that this is a common and usually self-limiting consequence of antibiotic treatment of Lyme disease.

Overgrowth of non-susceptible microorganisms

As with other antibiotics, use of cefuroxime axetil may result in the overgrowth of *Candida*. Prolonged use may also result in the overgrowth of other non-susceptible microorganisms (e.g. enterococci and *Clostridium difficile*), which may require interruption of treatment.

Antibacterial agent-associated pseudomembranous colitis have been reported with nearly all antibacterial agents, including cefuroxime and may range in severity from mild to life threatening. This diagnosis should be considered in patients with diarrhoea during or subsequent to the administration of cefuroxime. Discontinuation of therapy with cefuroxime and the administration of specific treatment for *Clostridium difficile* should be considered. Medicinal products that inhibit peristalsis should not be given.

Interference with diagnostic tests

The development of a positive Coomb's Test associated with the use of cefuroxime may interfere with cross matching of blood.

4.5 Interaction with other medicinal products and other forms of interaction

Drugs which reduce gastric acidity may result in a lower bioavailability of cefuroxime axetil compared with that of the fasting state and tend to cancel the effect of enhanced absorption after food.

Cefuroxime axetil may affect the gut flora, leading to lower oestrogen reabsorption and reduced efficacy of combined oral contraceptives.


Cefuroxime is excreted by glomerular filtration and tubular secretion. Concomitant use of probenecid is not recommended. Concurrent administration of probenecid significantly increases the peak concentration, area under the serum concentration time curve and elimination half-life of cefuroxime.

4.6 Pregnancy and lactation*Pregnancy*

The Studies have shown no harmful effects on pregnancy, embryonal or foetal development, parturition or postnatal development. Cefuroxime should be prescribed to pregnant women only if the benefit outweighs the risk.

Breastfeeding

Cefuroxime is excreted in human milk in small quantities. Adverse effects at therapeutic doses are not expected, although a risk of diarrhoea and fungus infection of the mucous membranes cannot be excluded. Breastfeeding might have to be discontinued due to these effects. The

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possibility of sensitisation should be taken into account. Cefuroxime should only be used during breastfeeding after benefit/risk assessment by the physician in charge.

4.7 Effects on ability to drive and use machines

As this medicine may cause dizziness, patients should be warned to be cautious when driving or operating machinery.

4.8 Undesirable effects

Adverse reactions have been ranked under headings of frequency using the following convention: very common ($\geq 1/10$); common ($\geq 1/100$ to $< 1/10$); uncommon ($\geq 1/1,000$ to $< 1/100$); rare ($\geq 1/10,000$ to $< 1/1,000$); very rare ($< 1/10,000$), not known (cannot be estimated from the available data).

Common: *Candida* overgrowth, eosinophilia, headache, dizziness, diarrhoea, nausea, abdominal pain, transient increases of hepatic enzyme levels.

Uncommon: positive Coomb's test, thrombocytopenia, leukopenia (sometimes profound), vomiting, skin rashes.

Not known: *Clostridium difficile* overgrowth, haemolytic anaemia, drug fever, serum sickness, anaphylaxis, Jarisch-Herxheimer reaction, pseudomembranous colitis, jaundice (predominantly cholestatic), hepatitis, urticaria, pruritus, erythema multiforme, Stevens-Johnson syndrome, toxic epidermal necrolysis (exanthematic necrolysis), angioneurotic oedema.

4.9 Overdose

Overdose can lead to neurological sequelae including encephalopathy, convulsions and coma. Symptoms of overdose can occur if the dose is not reduced appropriately in patients with renal impairment.

Serum levels of cefuroxime can be reduced by haemodialysis and peritoneal dialysis.

5. Pharmacological Properties

5.1 Pharmacodynamics properties

Pharmacotherapeutic group: Antibacterials for systemic use, second-generation cephalosporins; ATC Code: J01DC02

Mechanism of action: Cefuroxime axetil undergoes hydrolysis by esterase enzymes to the active antibiotic, cefuroxime.

Cefuroxime inhibits bacterial cell wall synthesis following attachment to penicillin binding proteins (PBPs). This results in the interruption of cell wall (peptidoglycan) biosynthesis, which leads to bacterial cell lysis and death.

Mechanism of resistance

Bacterial resistance to cefuroxime may be due to one or more of the following mechanisms:

- Hydrolysis by beta-lactamases; including (but not limited to) by extended-spectrum beta-lactamases (ESBLs), and AmpC enzymes that may be induced or stably derepressed in certain aerobic Gram-negative bacteria species;

- Reduced affinity of penicillin-binding proteins for cefuroxime;
- Outer membrane impermeability, which restricts access of cefuroxime to penicillin binding proteins in Gram-negative bacteria;
- Bacterial efflux pumps.

Organisms that have acquired resistance to other injectable cephalosporins are expected to be resistant to cefuroxime.

Depending on the mechanism of resistance, organisms with acquired resistance to penicillins may demonstrate reduced susceptibility or resistance to cefuroxime.

5.2 Pharmacokinetic Properties

Absorption

After oral administration cefuroxime axetil is absorbed from the gastrointestinal tract and rapidly hydrolysed in the intestinal mucosa and blood to release cefuroxime into the circulation. Optimum absorption occurs when it is administered shortly after a meal.

Distribution

Protein binding has been stated as 33 to 50% depending on the methodology used. Concentrations of cefuroxime in excess of the minimum inhibitory levels for common pathogens can be achieved in the tonsilla, sinus tissues, bronchial mucosa, bone, pleural fluid, joint fluid, synovial fluid, interstitial fluid, bile, sputum and aqueous humor. Cefuroxime passes the blood-brain barrier when the meninges are inflamed.

Biotransformation

Cefuroxime is not metabolised.

Elimination

The serum half-life is between 1 and 1.5 hours. Cefuroxime is excreted by glomerular filtration and tubular secretion. The renal clearance is in the region of 125 to 148 ml/min/1.73 m².

Special patient populations

Gender

No differences in the pharmacokinetics of cefuroxime were observed between males and females.

Elderly

No special precaution is necessary in the elderly patients with normal renal function at dosages up to the normal maximum of 1 g per day. Elderly patients are more likely to have decreased renal function; therefore, the dose should be adjusted in accordance with the renal function in the elderly.

Paediatrics

In older infants (aged >3 months) and in children, the pharmacokinetics of cefuroxime are similar to that observed in adults.

Renal impairment

The safety and efficacy of cefuroxime axetil in patients with renal failure have not been established.

Cefuroxime is primarily excreted by the kidney. Therefore, as with all such antibiotics, in patients with markedly impaired renal function (i.e. $Cl_{cr} < 30$ ml/minute) it is recommended that the dosage of cefuroxime should be reduced to compensate for its slower excretion. Cefuroxime is effectively removed by dialysis.

Hepatic impairment

Since cefuroxime is primarily eliminated by the kidney, the presence of hepatic dysfunction is expected to have no effect on the pharmacokinetics of cefuroxime.

Pharmacokinetic/Pharmacodynamic relationship

For cephalosporins, the most important pharmacokinetic-Pharmacodynamic index correlating with *in vivo* efficacy has been shown to be the percentage of the dosing interval (%T) that the unbound concentration remains above the minimum inhibitory concentration (MIC) of cefuroxime for individual target species (i.e. %T>MIC).

5.3 Preclinical safety data

Non-clinical data reveal no special hazard for humans based on studies of safety pharmacology, repeated dose toxicity, genotoxicity and toxicity to reproduction and development. No carcinogenicity studies have been performed; however, there is no evidence to suggest carcinogenic potential.

6. Pharmaceutical Particulars

6.1 List of excipients


Citric Acid Monohydrate
Sodium Lauryl Sulphate
Magnesium Stearate
Purified Talc
Sodium Carbonate
Mannitol
Crospovidone
Croscarmellose Sodium
Colloidal Anhydrous Silica
Microcrystalline Cellulose
Propylene Glycol
Titanium Dioxide
Hypromellose
Erythrosine Lake

6.2 Incompatibilities

None

6.3 Shelf life

2 years from the date of manufacture

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6.4 Special precautions for storage

Store at temperature not exceeding 30°C, protect from light and moisture.

6.5 Nature and contents of container

1 × 10 Film coated tablets in Alu-Alu Blister Pack.

6.6 Special precautions for disposal and other handling

Any unused product or waste material should be disposed of in accordance with local requirements.

7. MARKETING AUTHORIZATION HOLDER

ZIM Laboratories Limited

B-21/22, MIDC Area,
Kalmeshwar, Nagpur 441501
Maharashtra State,
India.

8. NUMBER(S) IN THE NATIONAL REGISTER OF FINISHED PHARMACEUTICAL PRODUCTS

NA

9. DATE OF FIRST AUTHORIZATION/RENEWAL OF THE AUTHORIZATION

NA

10. DATE OF REVISION OF THE TEXT

1 June 2019