



## Case Report on Ceftizoxime Induced Anaphylactic Reaction

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### ABSTRACT :

Ceftizoxime, a third-generation cephalosporin, exhibits broad-spectrum antibacterial activity and is commonly used to treat various infections including pneumonia, urinary tract infections, and gynaecological infections. Despite its favourable safety profile, hypersensitivity and anaphylactic reactions can occur. This report presents a case of a 75-year-old male who developed facial swelling and lip edema shortly after ceftizoxime for a suspected respiratory infection. The reaction was classified as a Type I hypersensitivity, with a Naranjo ADR Probability Scale score of 7, indicating a probable association with the drug. Immediate discontinuation of the antibiotic and initiation of antihistamines and corticosteroids led to symptom resolution within 48 hours. This case highlights the importance of allergy assessment prior to cephalosporin use and the need for continued pharmacovigilance reporting to ensure drug safety.

**Keywords :** Ceftizoxime, Cephalosporin, Edema, Naranjo ADR Probability Scale.

### INTRODUCTION :

Ceftizoxime is a 'third generation' cephalosporin administered intravenously or intramuscularly. Like other third generation cephalosporins it is particularly active against Enterobacteriaceae (including  $\beta$ -lactamase-positive strains), and is resistant to hydrolysis by  $\beta$ -lactamases<sup>[1]</sup>. Ceftizoxime is an aminothiazolyl syn-methoxyimino cephalosporin which has a wide spectrum of antibacterial activity in vitro, including Gram- positive and Gram-negative aerobic and some anaerobic bacteria<sup>[1,2]</sup>. Similarly, favourable clinical results have been obtained in patients treated with ceftizoxime for infections caused by mixed aerobic/anaerobic organisms<sup>[1]</sup>.

Ceftizoxime (usual dosage 2 to 4g daily administered intravenously or intramuscularly at 8- to 12-hourly intervals) is clinically and bacteriologically effective in a wide variety of infections caused by Gram-negative and Gram-positive bacteria. Ceftizoxime appears to be similar in efficacy to several other cephalosporins in lower respiratory tract infections in elderly and/or debilitated patients, and in chronic and/or complicated urinary tract infections. Ceftizoxime is also effective clinically and bacteriologically in skin, soft tissue, bone and joint infections, septicaemia/bacteraemia, meningitis and neonatal infections<sup>[1]</sup>. Ceftizoxime has shown an excellent profile against surgical infecting organisms<sup>[3]</sup>.

Ceftizoxime is not hydrolyzed by common plasmid and chromosomal beta lactamases. Serum levels of ceftizoxime after IM and IV injection are similar to those of cefotaxime and moxalactam. The half-life is 1.6 to 1.9 hours in normal individuals. The compound is not metabolized and is cleared from the body by glomerular filtration. Ceftizoxime enters most body fluids, including the cerebrospinal fluid, to produce therapeutic concentrations against clinically important bacteria<sup>[1]</sup>. Ceftizoxime accumulates in the presence of renal failure, but it is removed from the body by hemodialysis and peritoneal dialysis<sup>[4]</sup>.

The rate of anaphylaxis associated with parenteral cephalosporin exposure has been assumed to be greater than that associated with oral use, but this has never been comprehensively demonstrated in a large, diverse population. The relative frequencies of serious cephalosporin-associated ADRs are poorly understood. Many physicians still fear cephalosporin-associated anaphylaxis in individuals with a history of penicillin "allergy"<sup>[5]</sup>. Cephalosporins can cause IgE-mediated allergic reactions, which are characterized by urticaria, angioedema, bronchospasm, and anaphylactic shock, typically within 1 hour<sup>[6]</sup>.

Ceftizoxime is generally well tolerated, with a side-effect profile reflective of other cephalosporins<sup>[7]</sup>. Firstly, common side effects associated with Ceftizoxime include gastrointestinal disturbances such as diarrhea, nausea, vomiting, and abdominal pain. These symptoms are usually mild and tend to resolve on their own as the body adjusts to the medication. Another frequent side effect is hypersensitivity or allergic reactions. These can range from mild skin rashes and itching to more severe reactions such as urticaria



(hives), angioedema (swelling of the deeper layers of the skin), and anaphylaxis—a severe, potentially life-threatening allergic reaction that requires immediate medical intervention. Patients with a known allergy to cephalosporins or penicillins should inform their healthcare provider before starting treatment with Ceftriaxone<sup>[8]</sup>.

The objective of the report is to highlight the importance of recognizing and managing anaphylactic reactions to ceftriaxone, emphasizing the need for test dosing and vigilant monitoring to prevent adverse reactions, as demonstrated by a patient case.

## **CASE REPORT**

### **Patient Presentation:**

A 75-year-old male patient had cystitis surgery. After few hours of surgery the drug was administered and he developed lip edema and tongue swelling within hours of receiving a third- generation cephalosporin which was prescribed for a suspected respiratory tract infection.

### **Diagnostic Work-up:**

The patient's symptoms were assessed and based on the Naranjo ADR probability scale (score=7), the reaction was categorized as a probable adverse reaction to the drug. The severity of the reaction was classified as major, specifically a hypersensitivity reaction.

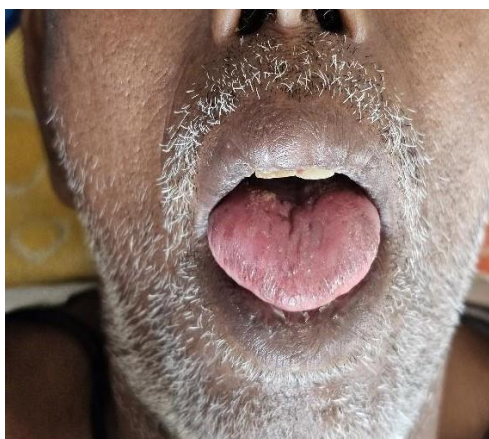
### **Treatment:**

The suspected antibiotic was immediately discontinued. Emergency treatment included administration of Inj. Pheniramine maleate and Inj. Hydrocortisone for reducing swelling.

Supportive care involved Tab. Trypsin-Chymotrypsin, Tab. Aceclofenac, Paracetamol, Serrapeptidase and Tab. Montelukast.

### **Outcome:**

The patient's symptoms significantly improved over the next 48 hours following cessation of the antibiotic and initiation of antiallergic treatment. No long-term sequelae were observed, and the patient was advised to avoid beta-lactam antibiotics in the future.



**Figure 1: Swelling of lips & tongue**

**Table 1: Naranjo's Causality Assessment Score**

NARANJO SCALE				
Question	Yes	No	Do Not Know	Score
1. Are there previous conclusive reports on this reaction?	+1	0	0	+1
2. Did the adverse event appear after the suspected drug was administered?	+2	-1	0	+2
3. Did the adverse reaction improve when the drug was discontinued or a specific antagonist was administered?	+1	0	0	+1
4. Did the adverse event reappear when the drug was re-administered?	+2	-1	0	0
5. Are there alternative causes (other than the drug) that could on their own have caused the reaction?	-1	+2	0	+2
6. Did the reaction reappear when a placebo was given?	-1	+1	0	0
7. Was the drug detected in blood (or other fluids) in concentrations known to be toxic?	+1	0	0	0
8. Was the reaction more severe when the dose was increased or less severe when the dose was decreased?	+1	0	0	0
9. Did the patient have a similar reaction to the same or similar drugs in any previous exposure?	+1	0	0	0
10. Was the adverse event confirmed by any objective evidence?	+1	0	0	+1
<b>TOTAL SCORE:</b>				<b>07</b>

## Discussion

Adverse drug reactions (ADRs) continue to pose a significant clinical challenge, contributing notably to hospital admissions and increased healthcare burdens globally. There have been a number of studies, involving as many as tens of thousands of individuals with the incidence of antibiotic associated ADRs [4].

Ceftizoxime is an effective antibiotic for treating various bacterial infections, it is not without its potential side effects [8]. The use, and specifically overuse, of cephalosporins has been associated with adverse drug reactions (ADRs), ranging from rashes and diarrhoea to anaphylaxis [4].

Cephalosporin-induced hypersensitivity reactions, such as tongue swelling and lip edema, are often immune-mediated and typically categorized under Type I hypersensitivity reactions. Third-generation cephalosporins, though widely prescribed for their broad-spectrum activity, have been associated with allergic responses in susceptible individuals. These antibiotics may act as haptens, binding to host proteins and initiating an immune cascade involving the release of immunoglobulin E (IgE) antibodies [9].

Upon re-exposure or in sensitized individuals, these IgE antibodies bind to mast cells and basophils, leading to the release of pro-inflammatory mediators such as histamine, leukotrienes, and cytokines. The release of these substances results in increased vascular permeability and vasodilation, which clinically manifests as urticaria, angioedema, and facial puffiness. Involvement of the soft tissues of the face can lead to pronounced swelling, particularly around the lips and eyes, as observed in the reported case. While most reactions to cephalosporins are mild to moderate, severe manifestations are also reported, underscoring the need for timely identification and intervention [9].

The public would be better served by warnings that the use of cephalosporins, particularly third or higher generation parenteral cephalosporins, is associated with an increased risk [4]. Patients should be closely monitored for any adverse reactions, and healthcare providers should be vigilant in adjusting treatment protocols as necessary to ensure patient safety [8].

The use of pharmacovigilance systems such as Vigiflow plays a pivotal role in tracking, evaluating, and managing ADRs. This structured documentation not only supports clinical decision-making but also contributes to broader safety profiling and drug regulation initiatives globally.

## Conclusion :

Ceftizoxime, a third-generation cephalosporin, demonstrates potent and broad-spectrum antibacterial activity, including efficacy against  $\beta$ -lactamase-producing organisms. Its pharmacokinetic properties—such as stability against hydrolysis, good tissue penetration, and predictable elimination—support its use in a wide range of infections including respiratory, urinary, musculoskeletal, and gynecological infections. Clinical studies and surveillance reports affirm its safety profile, with minimal serious adverse effects reported. However, continuous monitoring through pharmacovigilance systems is essential to ensure sustained efficacy and detect rare or long-term adverse reactions. As antibiotic resistance continues to evolve, agents like ceftizoxime



remain crucial in the antimicrobial arsenal, provided they are used judiciously and under proper clinical oversight.

**Consent :**

Patient consent was taken to publish the case.

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**Conflict of interest :**

The authors declare that there is no conflict of interest.

**Abbreviations :**

ADR - Adverse Drug Reaction  
IM - Intramuscular  
IV - Intravenous  
Tab - Tablet

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