Chula Med J. July - August 2025;69(4) 263 - 267 DOI : 10.56808/2673-060X.5592

Case report

Pediatric fixed drug eruption: A case report of ofloxacin as the culprit

Ambika Nand Jha[a, *], Varsha Ratan Gaikwad[b], Rabia Alam[c], Shivanshu Sharma[a], Ashok Kumar Gupta[a]

[a] *School of Pharmacy, Sharda University, Greater Noida, Uttar Pradesh, India*
[b] *Sandip School of Pharmaceutical Sciences, Sandip University, Nashik, Maharashtra, India*
[c] *PG Resident, Department of Dermatology, School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh, India*

Abstract

Ofloxacin, a second-generation fluoroquinolone, is a relatively rare but documented cause of fixed drug eruption (FDE). FDE is a localized cutaneous hypersensitivity reaction that is marked by recurrent, well-demarcated erythematous patches or macules, which may develop into blisters upon re-exposure to the offending agent. The underlying mechanism is immune-mediated and involves T-cell activation, cytokine release, and keratinocyte apoptosis. A 5-year-old boy weighing 15 kg was prescribed ofloxacin syrup (7.5 mL twice daily) and paracetamol suspension (5 mL twice daily) for suspected enteric fever. Within 2 days, the patient developed several annular erythematous lesions on his hands and back, which were associated with intense itching, thus raising suspicion of a drug-induced hypersensitivity reaction. Because both medications are potential triggers, a thorough clinical evaluation, including detailed history and, if necessary, patch testing, was considered essential to identify the offending agent. The suspected drug was immediately discontinued, and an alternative antibiotic was selected to manage the infection without intensifying the skin reaction. The management involved symptomatic relief with topical corticosteroids and antihistamines. This case highlights the importance of the early recognition and careful evaluation of adverse cutaneous drug reactions in children. Prompt identification and documentation of such events are critical in ensuring patient safety, guiding future therapy, and enhancing pharmacovigilance practices.

Keywords: Annular erythematous lesions, FDE, fixed drug eruption, immune-mediated drug reactions, T-cell activation.

Ofloxacin is a second-generation synthetic fluoroquinolone antibiotic that exerts its bactericidal effects by targeting the bacterial DNA replication machinery. [1] Specifically, it inhibits two essential enzymes—DNA gyrase (topoisomerase II) and topoisomerase IV—that are integral for DNA supercoiling, replication, and transcription. By preventing the proper re-ligation of DNA strands after the introduction of double-strand breaks, ofloxacin interferes with the bacterial DNA integrity, ultimately leading to cell death. [2, 3] This broad-spectrum antibiotic is effective against a wide range of gram-negative and gram-positive pathogens, including *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Streptococcus pneumoniae*. [4] Clinically, ofloxacin is indicated for the treatment of various infections, including uncomplicated and complicated urinary tract infections (UTIs), acute bacterial gastroenteritis, enteric fever (typhoid), and certain sexually transmitted infections, such as gonorrhea and chlamydia. In addition, it is used to treat soft tissue infections and, in some cases, respiratory tract infections. [5] The typical adult oral dosage of ofloxacin varies between 200 and 400 mg twice daily, with the specific dosage and duration depending on the severity and nature of the infection being treated. [6] In the case of UTIs, a lower dose may be sufficient for uncomplicated cases, whereas higher doses or

***Corresponding author: Dr. Ambika Nand Jha**, School of Pharmacy, Sharda University, Greater Noida, Uttar Pradesh, India
E-mail: nandjha99@gmail.com
Received: February 10, 2025
Revised: May 22, 2025
Accepted: June 22, 2025

extended treatment regimens may be required for more severe or complicated infections. [7]

Despite its efficacy, ofloxacin is associated with a range of adverse effects, some of which may be severe. Common side effects include gastrointestinal disturbances such as nausea, vomiting, diarrhea, and abdominal pain. [8] Moreover, central nervous system effects, including dizziness, headache, confusion, and seizures, may occur, and dermatologic reactions, such as rashes and photosensitivity (increased susceptibility to sunburn), are also frequently noted. [9] Serious, albeit less common, adverse reactions include nephrotoxicity, particularly in patients with pre-existing renal impairment, and hematologic toxicities such as agranulocytosis, thrombocytopenia, and eosinophilia. [10] Furthermore, ofloxacin has been associated with musculoskeletal complications, particularly tendinopathy and tendon rupture, with the Achilles tendon being most frequently affected. These adverse effects are more likely to occur in elderly patients, those receiving concurrent corticosteroid therapy, or those with underlying connective tissue disorders. [11] The risk of tendon injury is also amplified by the concomitant use of other fluoroquinolones and corticosteroids. Moreover, ofloxacin carries a risk of prolonging the QT interval on the electrocardiogram, which can predispose patients to arrhythmias, including torsades de pointes, particularly in individuals with electrolyte disturbances (e.g., hypokalemia or hypomagnesemia) or those on other QT-prolonging drugs. Therefore, caution is advised in patients with known cardiovascular conditions, including those with a history of arrhythmia or receiving other medications that affect cardiac conduction. Ofloxacin may interact with various agents, including antacids or supplements containing magnesium, aluminum, or calcium, which may impair its absorption. In addition, drugs that inhibit cytochrome P450 (CYP) enzymes, especially CYP1A2, may increase the plasma concentrations of ofloxacin, thereby raising the risk of toxicity. [12] A visual summary of the patient's clinical course is present in **Figure 1.**

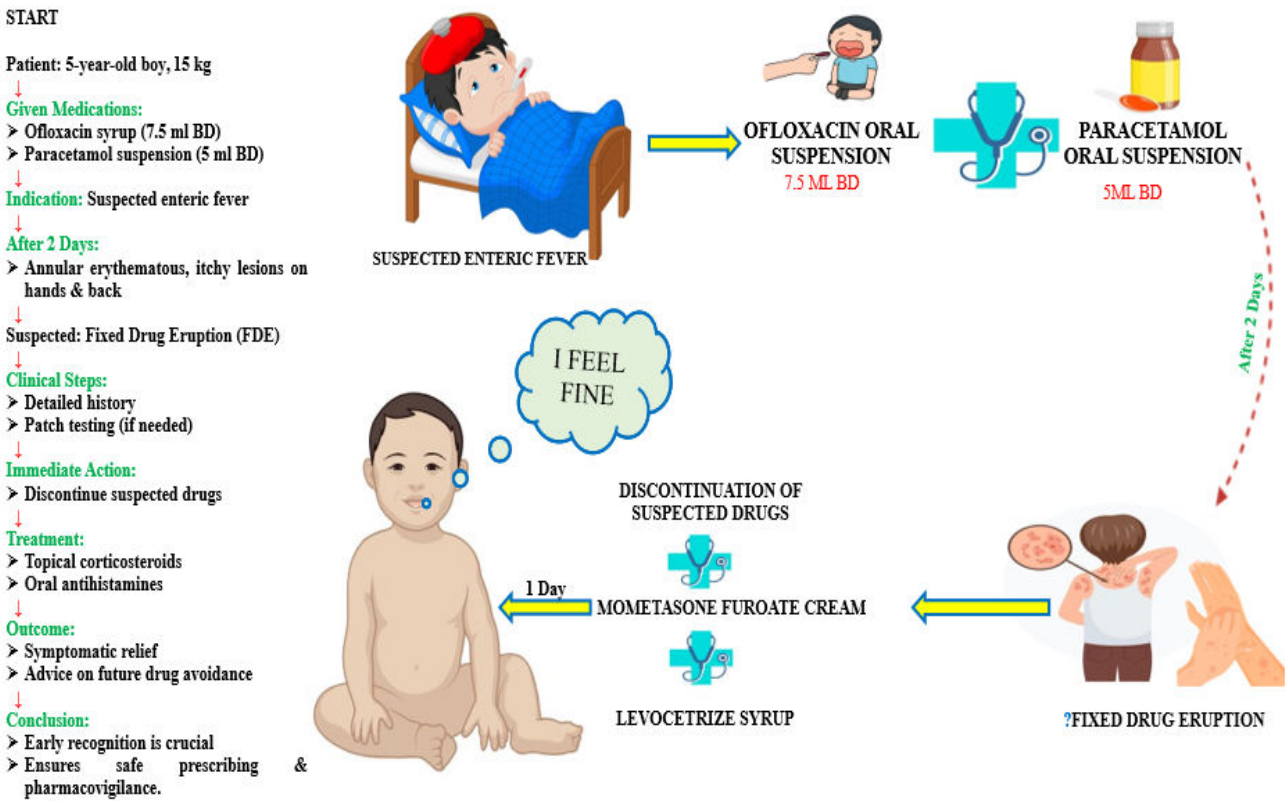

Figure 1. Clinical course of a 5-year-old boy with suspected fixed drug eruption (FDE) following treatment for enteric fever. The patient developed erythematous, itchy lesions two days after starting ofloxacin and paracetamol. Immediate discontinuation of the suspected drugs and treatment with topical corticosteroids and oral antihistamines led to symptomatic relief within one day. This case highlights the importance of early recognition and prompt management of adverse drug reactions in pediatric patients.

Clinical presentation of the case

Patient information

A 5-year-old male presented to the pediatrics outpatient department (OPD) with a fever with chills, malaise, weakness, poor appetite, abdominal discomfort, and nausea that had lasted for 2 days. The physician diagnosed the patient with enteric fever and prescribed Ofloxacin syrup 7.5 mL twice daily and paracetamol suspension 5 mL twice daily, along with nutritional supplements and an oral rehydration solution to prevent dehydration. Two days later, the patient revisited the OPD with the onset of multiple annular erythematous lesions, primarily localized to the hands and back, accompanied by pruritus. Upon further history taking, the parents reported a UTI episode six months earlier, for which an unspecified medication was administered. During the previous treatment, the patient experienced intense pruritus, pain, and a burning sensation on the back, though these symptoms were resolved, and the exact medication involved could not be recalled.

Clinical findings

Upon clinical examination, the patient's pulse rate was 85 beats per minute, respiratory rate was 17 breaths per minute, and blood pressure was 115/86 mmHg. The patient was well-oriented and alert, with no neurological symptoms. Cardiovascular examination revealed normal heart sounds, with S1 and S2 present, and no murmurs or abnormalities were noted.

Diagnostic assessment

The patient presented with annular erythematous lesions on the hands and back, accompanied by pruritus, following ofloxacin administration. Given the patient's history of a previous drug reaction (medication not identified) and the temporal association between ofloxacin use and lesion onset, fixed drug eruption (FDE) was strongly suspected. FDE typically occurs upon reexposure to a sensitizing drug, and in this case, ofloxacin was the likely trigger. The immediate discontinuation of the drug is essential to prevent further reaction, and the management thereof includes symptomatic relief.

Therapeutic intervention

The suspected offending drug was immediately discontinued following a comprehensive medical history and clinical assessment. The patient was then started on 100 mg of oral cefixime twice daily, levocetirizine for symptomatic relief of allergic symptoms, intravenous fluids for adequate hydration, and topical betamethasone butyrate propionate ointment to address the dermatologic manifestation. The patient experienced a marked reduction in pruritus within 24 h of discontinuing the suspected medication, and by the third day, signs of clinical improvement were evident.

The patient was closely monitored in a controlled clinical environment under the supervision of healthcare professionals. Causality assessment based on the Naranjo Scale indicated that the adverse drug reaction was "probable." The patient was provided with a thorough explanation of the treatment plan, and written informed consent was obtained. In addition, the patient was advised to inform any healthcare provider about a history of sensitivity to ofloxacin in the future to prevent similar reactions.

Follow-up and outcomes

The patient adhered to the prescribed treatment plan, which resulted in a favorable response. A significant reduction in pruritus was observed within 24 h, and the patient's overall condition had improved substantially by 72 h, with healing of the lesions and reduction in inflammation. However, mild residual annular erythematous lesions persisted at the affected sites. The patient was advised to avoid reexposure to ofloxacin and similar drugs to prevent recurrence of the adverse reaction. Continuous monitoring was recommended to ensure full recovery and prevent complications.

Table 1 provides a detailed timeline outlining the significant events from the day of admission to discharge to better understand the clinical course and management of the patient. This timeline encapsulates the patient's presentation, identification of the adverse drug reaction, and therapeutic interventions implemented to address the suspected FDE induced by ofloxacin. The timeline reflects the patient's clinical progression, including initial symptoms, diagnostic reasoning, treatment adjustments, and outcomes, which highlight the overall resolution of the reaction and its successful management.

Table 1. Clinical timeline – key events from admission to discharge.

Day	Clinical event
Day 1	Initial presentation: 5-year-old male presented to paediatric OPD with 2-day history of fever, chills, malaise, poor appetite, abdominal discomfort, and nausea. Diagnosed with enteric fever. Prescribed Ofloxacin syrup (7.5 ml BD), Paracetamol suspension (5 ml BD), ORS, and nutritional supplements.
Day 3	Adverse Drug Reaction: Returned with multiple pruritic, annular erythematous lesions on hands and back. Lesions developed after 2 days of Ofloxacin use. Clinical suspicion of fixed drug eruption (FDE) based on temporal association and previous history of drug reaction.
Day 3 (same day)	Immediate Management: Discontinued Ofloxacin. Initiated Cefixime 100 mg BD, Levocetirizine, topical Betamethasone Butyrate Propionate, and IV fluids. Informed consent obtained; patient monitored under clinical supervision.
Day 4	Clinical response: Marked reduction in pruritus and early improvement in skin lesions noted within 24 hours of drug discontinuation. No new lesions observed.
Day 6	Ongoing recovery: Significant improvement in dermatologic findings. Lesions healing with residual erythema. Systemic symptoms resolved. Patient stable and responsive to revised therapy.
Discharge	Final outcome and counselling: Discharged in stable condition. Advised to avoid Ofloxacin and related antibiotics in the future. Provided drug allergy documentation. Naranjo Scale assessment indicated a "probable" drug reaction. Follow-up arranged for continued observation.

Discussion

FDE was first described by Brocq in 1894 and is a type of cutaneous delayed hypersensitivity reaction. [11] It is characterized by the recurrent appearance of skin lesions at the same anatomical sites upon subsequent exposure to the offending drug. Although the exact pathophysiological mechanisms of FDE remain incompletely elucidated, it is generally believed to involve a Type IVc delayed-type hypersensitivity response, predominantly mediated by $CD8^+$ cytotoxic T lymphocytes. [13, 14] The drug acts as a hapten in this immune response, binding to basal keratinocytes and initiating an inflammatory cascade. This cascade involves the activation of T lymphocytes and mast cells as well as the production of cytokines and antibodies, which contribute to epidermal damage, particularly in the basal layer. [15, 16] Activated $CD8^+$ T cells secrete interferon-gamma and release cytotoxic granules containing perforin and granzyme, which results in keratinocyte apoptosis and subsequent tissue injury. [17, 18] According to a systematic review, antibiotics account for 28.0% of adverse drug reactions (ADRs). Specifically, the incidence of ADRs attributed to ofloxacin is estimated to be 4.3%. [18, 19] FDE is generally not fatal; however, it can lead to significant cosmetic issues, particularly when lesions reappear at previously affected sites, often resulting in enduring hyperpigmentation as a residual consequence. [20-22] Moreover, FDE can occur across all age groups, irrespective of gender (Jhaj R, *et al*., 2018; Patel TK, *et al.,* 2014). [23, 24] For example, cases have been reported in a 1.5-year-old child and an 87-year-old elderly patient (Bhavanam D, *et al.,* 2021). [25, 26] In the present case, there was a clear temporal relationship between the administration of ofloxacin and the onset of pruritus and a burning sensation on the arms and back. The symptoms improved significantly following drug discontinuation, thus supporting the diagnosis of a drug-induced reaction.

Conclusion

This case highlights the significance of recognizing and managing FDE in pediatric patients, with ofloxacin identified as the likely culprit. FDE is a cutaneous immune-mediated reaction that requires the offending drug to be promptly discontinued to prevent further complications. The pathophysiology involves T-cell activation and cytokine release, leading to keratinocyte apoptosis. Early intervention with symptomatic relief, such as corticosteroids and antihistamines, ensures a favorable clinical outcome for the patient. This case emphasizes the importance of thoroughly documenting ADRs to enhance patient safety and inform future therapeutic decisions. Monitoring for recurrence and avoiding reexposure to the causative agent are crucial for long-term management.

Acknowledgments

The authors express their sincere gratitude to the patient for their invaluable cooperation and support during the data collection process. Their willingness to contribute to this study was essential for its completion.

Conflict of interest

The authors declare no conflicts of interest related to the study.

Data sharing statement

Data generated or analyzed for the present report is included in this published article. Further details are available from the corresponding author on reasonable request after deidentification of the patient whose data are included in the report.

References

1. Satoskar R, Rege N, Bhandarkar S. *Pharmacology and pharmacotherapeutics:* pharmacology and pharmacotherapeutics. 26th ed. New Delhi, India: Elsevier; 2020.
2. Hooper DC, Jacoby GA. Mechanisms of drug resistance in the fluoroquinolones. *Drug Resist Updat* 2016;29: 13–25.
3. Gerber B, Mackenzie D, McIntyre M, Macdonald L, Becker S, LeBlanc A. Ofloxacin: A broad-spectrum fluoroquinolone for treating gram-negative and gram-positive bacterial infections. *Drugs Ther Perspect* 2017;33:151 9.
4. Devereux L, Scott J, Gubbins P, Wilkins R. The pharmacokinetics and pharmacodynamics of ofloxacin. *Int J Antimicrob Agents* 1999;12:105–9.
5. Mendes RE, Castanheira M, Deshpande LM, Bell JM, Jones RN. Prevalence and mechanisms of resistance to ofloxacin in *Pseudomonas aeruginosa:* Implications for therapy. *Antimicrob Agents Chemother* 2007;51:857–61.
6. Stojanovic J, Vasiljevic Z, Jeremic D. Nephrotoxicity and hematologic toxicity associated with fluoroquinolones: A systematic review. *Pharmacol Ther* 2022;48:258–66.
7. Varma AR, Arora SP, Naqvi WM. Case report: Ofloxacin-induced fixed drug eruption. *F1000Research* 2024;13:181.
8. Ramani YR, Mishra SK, Rath B, Rath SS. Ofloxacin induced cutaneous reactions in children. *J Clin Diagn Res* 2015;9:FD01–2.
9. Sarkar MK, Dey S. A fixed-dose combination of ofloxacin-ornidazole induced fixed drug eruption: A case report. *Cureus* 2023;15:e35630.
10. Rang HP, Dale MM, Ritter JM, Moore PK. Harmful effects of drugs*: Pharmacology. Pharmacology.* 5th ed. Churchill Livingstone ;2003.
11. Kamal AFF, Vardhamane SH, Saba A. A case report of ofloxacin induced fixed drug eruptions and hypersensitivity reaction. *Int J Basic Clin Pharmacol* 2017;6:1825–7.
12. Torrent Rodríguez A, Font I Barceló A, Barrantes González M, Echeverria Esnal D, Soy Muner D, Martínez JA, et al. Clinically important pharmacokinetic drug-drug interactions with antibacterial agents. *Rev Esp Quimioter* 2024;37:299–322.
13. Ghosh S, Chatterjee M, Majumdar S. Fixed drug eruption: Clinical presentation and review of the literature. *J Dermatol* 2013;40:859–65.
14. Finkelstein Y, McMahon M, Jacob S. Fixed drug eruption: Clinical and histopathological findings. *Dermatol Online J* 2006;1216–25.
15. Agrawal M, Tiwari M. Fixed drug eruption and its pathophysiology: A review of clinical and molecular features. *Int J Dermatol* 2020;59:6–13.
16. Doyon L, Ahmed B, Abdallah M. Fixed drug eruption: A comprehensive review of drug-induced cutaneous lesions. *Dermatol Ther* 2017;30:19–23.
17. Jha AK, Kumar S, Singh S. Role of CD8+ T cells in the pathogenesis of Fixed Drug Eruption. *Arch Dermatol Res* 2012;304:373–6.
18. Kawada A, Hiruma M, Noguchi H, Banba K, Ishibashi A, Banba H, et al. Fixed drug eruption induced by ofloxacin. *Contact Dermatitis* 1996;34:427.
19. Manchukonda RS, Ramakrishna M. Ofloxacin/ ornidazole induced fixed drug eruptions: A case report. *Int J Basic Clin Pharmacol* 2016;5:534–8.
20. Scherer K, Bircher AJ. Hypersensitivity reactions to fluoroquinolones. *Curr Allergy Asthma Rep* 2005;5: 15–21.
21. Shiohara T. Fixed drug eruption: Pathogenesis and diagnostic tests. *Curr Opin Allergy Clin Immunol* 2009;9:316–21.
22. Rerkpattanapipat T, Chiriac AM, Demoly P. Drug provocation tests in hypersensitivity drug reactions. *Curr Opin Allergy Clin Immunol* 2011;11:299–304.
23. Jhaj R, Chaudhary D, Asati D, Sadasivam B. Fixed-drug eruptions: What can we learn from a case series? *Indian J Dermatol* 2018;63:332–7.
24. Patel TK, Thakkar SH, Sharma D. Cutaneous adverse drug reactions in Indian population: A systematic review. *Indian Dermatol Online J* 2014;5 Suppl 2: S76–86.
25. Divya B, Thankachan L. A case presentation on ofloxacin induced dermal hypersensitivity reaction. *Int J Pharm Pharm Sci* 2022;14:53–6.
26. Ramineni HB, Eluri P, Vipparla K, Suryadevara V. Ofloxacin induced hypersensitivity reaction. *Int J Res Med Sci* 2015;3:349–51.