



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Case Study

Vancomycin-Induced Hypersensitivity Reaction: A Case Report

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ARTICLE INFO

Published: 28 Aug 2026

Keywords:

Kerosene ingestion;
Aspiration pneumonia;
Vancomycin;
Hypersensitivity reaction;
Adverse drug reaction;
Clinical pharmacist

DOI:

10.5281/zenodo.22144386

ABSTRACT

Accidental kerosene ingestion is a common cause of hydrocarbon poisoning in young children and may result in aspiration pneumonia requiring prompt medical management. We report the case of a 2-year-old male child who presented with fever, cough, and respiratory distress following accidental kerosene ingestion. Clinical evaluation and investigations were suggestive of aspiration pneumonia, and the patient was managed with supportive care, oxygen therapy, and intravenous antimicrobial therapy. During treatment, the patient developed a hypersensitivity reaction following intravenous administration of vancomycin. Vancomycin was immediately discontinued, appropriate supportive management was initiated, and alternative antimicrobial therapy was administered. The patient showed gradual clinical improvement and subsequently recovered completely. Causality assessment using the Naranjo Adverse Drug Reaction Probability Scale indicated a probable association between vancomycin administration and the suspected adverse drug reaction. The patient was discharged in a stable condition. This case highlights the importance of early recognition and appropriate management of aspiration pneumonia following kerosene ingestion, vigilant monitoring for vancomycin-associated hypersensitivity reactions, and the role of clinical pharmacists in adverse drug reaction identification, causality assessment, pharmacovigilance reporting, and optimization of antimicrobial therapy to promote patient safety and improve treatment outcomes

INTRODUCTION

Vancomycin is a glycopeptide antibiotic widely used for the treatment of serious Gram-positive bacterial infections, particularly those caused by

methicillin-resistant *Staphylococcus aureus* (MRSA). It was first approved for clinical use in the United States in 1958 and subsequently became an important therapeutic option for the

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



management of serious resistant Gram-positive infections. Despite its clinical efficacy, vancomycin is associated with several adverse drug reactions, including hypersensitivity and infusion-related reactions. The first published report of an anaphylactoid reaction associated with vancomycin was described by Herbert J. Rothenberg in 1959. The reported reaction occurred following intravenous administration and included manifestations such as urticaria, erythema, pruritus, dyspnea, and hypotension.

Vancomycin-associated infusion reactions are now commonly referred to as **vancomycin infusion reaction (VIR)**, a term preferred over the historically used term “Red Man Syndrome.” VIR is primarily associated with direct mast-cell activation and histamine release, particularly when vancomycin is infused rapidly. In contrast, true allergic reactions, including anaphylaxis, may involve IgE-mediated mechanisms, while delayed hypersensitivity reactions may involve T-cell-mediated immune mechanisms. Other clinically important hypersensitivity reactions associated with vancomycin include urticaria, anaphylaxis, DRESS, Stevens–Johnson syndrome (SJS), and toxic epidermal necrolysis (TEN). Early recognition of suspected vancomycin-associated reactions, prompt discontinuation when clinically indicated, appropriate supportive management, and timely initiation of alternative antimicrobial therapy are essential to minimize complications and improve patient outcomes.

Case presentation:

A 2-year-old male child presented to the emergency department of Government Medical College Hospital, Nagapattinam, with a history of accidental kerosene ingestion (approximately 2–3 mL). He presented with fever and difficulty breathing since the previous night, with no history of vomiting or loose stools. His past surgical history included left pyeloplasty performed 8

months earlier for left pelvi-ureteric junction (PUJ) obstruction, with subsequent removal of the double-J (DJ) stent. There was no documented history of drug allergy or previous hypersensitivity reactions..

Laboratory investigations:

Hemoglobin	9.1 g/dL
White blood cell count	$6.02 \times 10^3/\mu\text{L}$
Red blood cell count	$3.62 \times 10^6/\mu\text{L}$
Platelet count	$72 \times 10^3/\mu\text{L}$
Packed cell volume:	36.2%
Random blood sugar:	108 mg/dL
Blood urea	22 mg/dL
Serum creatinine	0.62 mg/dL
Total bilirubin	0.72 mg/dL
AST	21 U/L
ALT	24 U/L
Sodium	137 mEq/L
Potassium	3.8 mEq/L
Chloride	107 mEq/L
C-reactive protein	Positive

Blood culture and urine culture showed no growth. Serological tests for malaria, dengue, and Widal were negative, while scrub typhus IgM was positive. Urine analysis revealed 2–4 pus cells/high-power field, with no albumin or sugar. Echocardiography showed normal cardiac findings.

Diagnosis:

During hospitalization, the patient was administered a 100 mg test dose of intravenous vancomycin at 8:00 AM. Within approximately 30 minutes of administration, an erythematous rash developed around the intravenous injection site, raising suspicion of a vancomycin-associated hypersensitivity reaction. Vancomycin was immediately discontinued, and appropriate supportive management was provided. The rash gradually resolved and had completely subsided by approximately 10:00 AM. Following



discontinuation of vancomycin, antimicrobial therapy was changed to intravenous piperacillin–tazobactam. The patient subsequently showed clinical improvement without recurrence of the rash.

Course in the Hospital:

The patient was admitted for supportive management of accidental kerosene ingestion with aspiration pneumonia. Initial treatment included oxygen supplementation, intravenous fluids, nebulization, and empirical intravenous ceftriaxone. As respiratory symptoms persisted, ceftriaxone was discontinued, and a 100 mg test dose of intravenous vancomycin was administered as an alternative antimicrobial.

Shortly after vancomycin administration, the patient developed a localized erythematous rash around the intravenous injection site, consistent with a suspected vancomycin-induced hypersensitivity reaction. Vancomycin was immediately discontinued, and the reaction resolved within approximately 2 hours following drug withdrawal. The patient was subsequently switched to intravenous piperacillin–tazobactam, which was well tolerated without recurrence of adverse reactions. The patient's respiratory symptoms gradually improved with continued supportive care and antimicrobial therapy, and he was discharged in a stable condition with advice for follow-up.

DISCUSSION

Accidental kerosene ingestion is one of the most common causes of hydrocarbon poisoning in children younger than five years and is an important cause of aspiration pneumonitis and aspiration pneumonia. Owing to its low viscosity, low surface tension, and high volatility, kerosene is easily aspirated into the lower respiratory tract, producing direct chemical injury to the alveoli and

pulmonary parenchyma.[1] In the present case, the patient developed fever, cough, respiratory distress, and radiological findings suggestive of aspiration pneumonia following accidental kerosene ingestion, which is consistent with previous reports.[1]

Management of hydrocarbon aspiration is primarily supportive and includes oxygen supplementation, respiratory monitoring, maintenance of adequate hydration, and observation for respiratory deterioration. Gastric lavage and induction of emesis are generally avoided because they increase the risk of aspiration. Antibiotic therapy is not routinely recommended for uncomplicated chemical pneumonitis; however, it may be indicated in patients with persistent fever, elevated inflammatory markers, or clinical evidence suggestive of secondary bacterial infection.[1] In our patient, intravenous antimicrobial therapy was initiated because of persistent clinical features consistent with aspiration pneumonia.

Vancomycin is an important glycopeptide antibiotic used for the treatment of serious Gram-positive bacterial infections, particularly methicillin-resistant *Staphylococcus aureus* (MRSA). Despite its therapeutic effectiveness, vancomycin is associated with infusion-related hypersensitivity reactions and true IgE-mediated allergic reactions.[2,3] Vancomycin infusion reaction is a rate-dependent, non-IgE-mediated reaction caused by direct histamine release from mast cells and basophils and typically presents with flushing, erythema, pruritus, hypotension, and, in severe cases, respiratory distress or shock.[2] Prompt recognition of these reactions, discontinuation of the infusion, administration of antihistamines when indicated, and restarting the infusion at a slower rate or selecting an alternative antibiotic are recommended management strategies.[2,3]



Clinical pharmacists play an important role in the early detection and management of adverse drug reactions through medication review, causality assessment using validated tools such as the Naranjo Adverse Drug Reaction Probability Scale, documentation of drug allergy, pharmacovigilance reporting, and recommending safer therapeutic alternatives.[4] These interventions contribute to improved patient safety and help prevent recurrent exposure to the suspected drug.

The present case emphasizes the importance of careful monitoring of pediatric patients receiving intravenous antibiotics following aspiration pneumonia secondary to kerosene ingestion. Early recognition of vancomycin-associated hypersensitivity and timely intervention contributed to favourable clinical recovery and prevented further complications. Similar observations have been reported in previous studies highlighting the importance of multidisciplinary management and vigilant monitoring during vancomycin therapy.[2,5]

CONCLUSION

This case highlights the importance of early recognition and appropriate management of aspiration pneumonia following accidental kerosene ingestion in children. Although supportive care remains the cornerstone of treatment, careful clinical assessment is essential to identify patients who require antimicrobial therapy for suspected secondary bacterial infection. The occurrence of vancomycin-associated hypersensitivity in our patient emphasizes the need for close monitoring during intravenous antibiotic administration, particularly in the pediatric population. Prompt discontinuation of the suspected drug, appropriate supportive management, and timely selection of an alternative antimicrobial resulted in favorable clinical recovery. Furthermore, this case underscores the valuable role of clinical pharmacists in the early

detection of adverse drug reactions, causality assessment, pharmacovigilance reporting, and prevention of future drug re-exposure, ultimately improving medication safety and patient outcomes.

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HOW TO CITE: Siddharthan. J, Madheshwhararaj K, Nithishya P, Vancomycin-Induced Hypersensitivity Reaction: A Case Report, *Int. J. of Pharm. Sci.*, 2026, Vol 4, Issue 8, 4674-4677, <https://doi.org/10.5281/zenodo.22144386>

