Case Report

Case Report on Piperacillin - Tazobactam Induced Hypersensitivity Reaction

K. Sindhuja[1*], Syeda Juveriya Amreen[1], Syeda Tazheen Fatima[1], Ramya Bala Prabha. G[2], Rama Rao. T[3].

[1*]Department of Pharm D, CMR College of Pharmacy, Kandlakoya, Hyderabad, India.

[2]Associate Professor of Pharm D, CMR College of Pharmacy, Kandlakoya, Hyderabad, India.

[3]Professor and Principal, CMR College of Pharmacy, Kandlakoya, Hyderabad, India.

***Corresponding author's E-mail:** juveriyaamreen.2995@gmail.com

Received: 20-01-2022; **Revised:** 23-03-2022; **Accepted:** 30-03-2022; **Published on:** 15-04-2022.

ABSTRACT

Piperacillin is a semisynthetic ureidopenicillin having antibacterial action against Gram-positive and Gram-negative aerobic and anaerobic bacteria of both the Gram positive and Gram-negative types. Despite this, the clinical utility of piperacillin has been weakened in recent years as a result of an increase in the incidence of -lactamase generating bacteria that are resistant to the antibiotic. Our patient was of 50 year old, got admitted to the general medicine ward with complaints of Breathlessness (4-5 times), loss of appetite, altered sensorium since 2 days, loose motions at a frequency of 6 to 7 times on the day prior to admission, productive cough since 3 days. On evaluation of lab data and existing medical history and presenting symptoms, the patient was diagnosed with Acute exacerbation of bronchial asthma associated with necrosis and hypertension. On Day 1 of admission, patient was started on Injection piperacillin+Tazobactum 4.5g-IV-TID, the patient reported appearance of rashes over the chest area continued for 5 days. Patient was prescribed with anti-rash and anti-itching medication for ADR management. It is critical to use a multidisciplinary approach when treating patients whose health has been harmed by a medicine, as well as to identify and stop using the offending prescription.

Keywords: Piperacillin-tazobactam, cutaneous reactions, hypersensitivity.

QUICK RESPONSE CODE →

DOI: 10.47583/ijpsrr.2022.v73i02.015

DOI link: http://dx.doi.org/10.47583/ijpsrr.2022.v73i02.015

INTRODUCTION

Piperacillin is a semisynthetic ureidopenicillin having antibacterial action against Gram positive and Gram-negative aerobic and anaerobic bacteria of both the Gram positive and Gram negative types[1,2]. Despite this, the clinical utility of piperacillin has been weakened in recent years as a result of an increase in the incidence of -lactamase generating bacteria that are resistant to the antibiotic[3]. Tazobactam, a triazolymethyl penicillanic acid sulfone derivative, is a -lactamase inhibitor that prevents piperacillin from being destroyed by -lactamase enzymes. Tazobactam is used to treat bacterial infections[4]. If tazobactam is used in conjunction with piperacillin, it broadens the antibacterial range of the latter medication to encompass a greater number of -lactamase-producing organisms, such as staphylococci, many Enterobacteraceae, Haemophilus influenzae, and Bacteroides spp [5,6].

Piperacillin, like other -lactam antibacterial medicines, works by forming a complex with penicillin-binding proteins (PBPs) found in the bacterial cell wall and killing the bacterium. This results in the suppression of bacterial septum and cell wall formation, as well as the final destruction of the bacteria[7,8].

Adverse effects

Individuals who are prone to drug hypersensitivity syndrome (DHS) may experience an uncommon but significant and potentially life-threatening reaction to commonly prescribed medications[9,10]. The condition is characterized by a trio of symptoms, including fever, skin eruption, and internal organ involvement. The primary stay of treatment for DHS is the early identification and cessation of the offending substance, along with symptomatic treatment of harmful consequences when they occur.

CASE REPORT

Our patient was of 50 year old, got admitted to the general medicine ward with complaints of Breathlessness (4-5 times), loss of appetite, altered sensorium since 2 days, loose motions at a frequency of 6 to 7 times on the day prior to admission, productive cough since 3 days.

Medication history

Patient was reported to have a medical history of pulmonary tuberculosis in the past, which was 7 to 8 years back, she was a known case of bronchial asthma and hypertension since 3 years.

Patient was also known for therapeutic non-compliance since 3 years. She was non-smoker, non-alcoholic with mixed diet.

Examination

On examination the patient was afebrile, seems to be drowsy and non-responding, BP- 100/50 mmHg, Per abdominal examination – Soft and palpable, PR- 90 bpm, SPO2- 99, Basal crepts present during breathing. Bronchial artery embolization (BAE) +, Pupils – not responding to light focus.

Lab investigations reported on 29-DEC-2021, Blood urea – 57.36 mg%, Serum creatinine – 1.89 mg%, serum protein – 7.99 gm %, albumin- 3.78, Na+ - 140 mEq/L, K+ - 6.5 mEq/L, CL^- : 102 mEq/L. On 03-Jan-2022, blood urea – 34 mg%, serum creatinine- 0.5 mg%, albumin – 3.0 gm%, alkaline phosphate – 48 KAU/100 ml, Na+ - 138 mEq/L, K+ : 4.3 mEq/L, Chlorides- 95 mEq/L.

DISCUSSION

On evaluation of lab data and existing medical history and presenting symptoms, the patient was diagnosed with Acute exacerbation of bronchial asthma associated with necrosis and hypertension.

Therapeutic approach

The patient was started on Injection piperacillin + Tazobactum 4.5g-IV-TID, indicated for respiratory infections, Injection hydrocortisone 100mg, IV-TID, indicated for inflammatory and allergic condition management, injection pantoprazole 40 mg, IV-OD, Nebulized with budesonide, BD and levosalbutamol 1.25 mg + Ipratropium 500mcg TID. IVF- 2 pints of Normal saline @ 75 cc/hr.

ADR

On Day 1 of admission, patient was started on Injection piperacillin+Tazobactum 4.5g-IV-TID, the patient reported appearance of rashes over the chest area continued for 5 days, as shown in Figure 1. Patient was prescribed with anti-rash and anti-itching medication for ADR management.

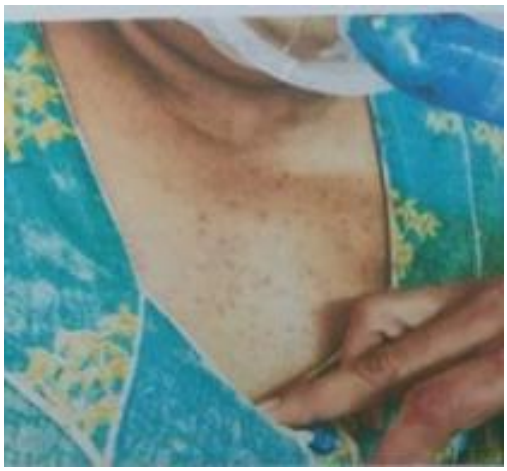

Figure 1: Rashes over chest area

Management of ADR

The treatment of DHS relies on the early withdrawal of the offending substance. When the lungs, heart, liver, or kidneys are in danger of failing, corticosteroids (0.5–1.0 mg/kg/d) must be incorporated into the treatment plan. Nephritis and skin eruption might recur if systemic corticosteroids are abruptly discontinued. Milder instances of DHS have benefited from topical steroid treatment to alleviate the cutaneous symptoms. Some long-term DHS patients have been treated with interferon- 37 but no studies have been done to confirm its function in therapy.

Table 1: Probability Assessment by Naranjo's Scale

S.NO.	Questions	Yes	No	Don't know	Score
1	Are there previous conclusion reports on this reaction?	+1	0	0	0
2	Did the adverse reaction 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 reaction re-appear when the drug was re-administered?	+2	-1	0	0
5.	Are there alternative causes that could on their own have caused the reaction?	-1	+2	0	+2
6.	Did the reaction re-appear when a placebo was given?	-1	+1	0	+1
7.	Was the drug detected in the 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 was less severe when the dose was decreased?	+1	0	0	0
9.	Did the patient have a similar reaction to the same or similar exposure?	+1	0	0	0
10.	Was the adverse event confirmed by any objective evidence?	+1	0	0	0
Total Score					6

In our patient ADR was managed by immediate withdrawal of suspect drug PIPERACILLIN-TAZOBACTUM. Antibiotic therapy was continued by another alternative drug available.

Probability Assessment of ADR

Probability refers to the likelihood that a suspect is responsible for an occurrence. The chance that Ceftriaxone would induce Rash was determined in this case using the FDA-approved Naranjo's scale. The likelihood of ceftriaxone-Rash was determined to be "6 Points" out of a possible maximum of 9. The data in Table 1 are accurate representations of the scores and observations.

Severity of ADR

The Modified Hartwig and Siegel Severity Scale was used to assess the severity of this ADR, which suggests that the ADR was well controlled by delaying or discontinuing the suspect substance, as well as providing an antidote or other therapy. Furthermore, because the ADR was not present and was recovered with Sequelae, there was no prolonged hospitalisation, complication, or irreparable issues, which would have been the result of ADR.

CONCLUSION

At the same time, DHS is an iatrogenic condition that affects many organs simultaneously. For the most part, researchers don't know what causes drug hypersensitivity. Toxic drug metabolites can build up in the body due to a combination of factors such as the drug-drug interaction, susceptible individuals with impaired detoxification abilities, immunologic variables, and viral infection. It is critical to use a multidisciplinary approach when treating patients whose health has been harmed by a medicine, as well as to identify and stop using the offending prescription.

REFERENCES

1. Carpenter C. Allopurinol hypersensitivity syndrome. Tenn Med. 1997;90:151-152.
2. Arellano F, Sacristan JA. Allopurinol hypersensitivity syndrome: a review. Ann Pharmacother. 1993;27:337-343.
3. Lanzafame M, Rovere P, De Checchi G, et al. Hypersensitivity syndrome (DRESS) and meningoencephalitis associated with nevirapine therapy. Scand J Infect Dis. 2001;33:475-476.
4. Huang YL, Hong HS, Wang ZW, et al. Fatal sodium valproate-induced hypersensitivity syndrome with lichenoid dermatitis and fulminant hepatitis. J Am Acad Dermatol. 2003;49:316-319.
5. Shear N, Spielberg S, Grant DM, et al. Differences in metabolism of sulfonamides predisposing to idiosyncratic toxicity. Ann Intern Med. 1986;105:179-184.
6. Messenheimer J, Mullens EL, Giorgi L, et al. Safety review of adult clinical trial experience with lamotrigine. Drug Saf. 1998;18:281-296.
7. Shapiro LE, Shear NH. Mechanisms of drug reactions: the metabolic track. Semin Cutan Med Surg. 1996;15: 217-227.
8. Ohtani T, Hiroi A, Sakurane M, et al. Slow acetylator genotypes as a possible risk factor for infectious mononucleosis-like syndrome induced by sulfapyridine. Br J Dermatol. 2003;148:1035-1039.
9. Knowles S, Shapiro L, Sheir NH. Should celecoxib be contraindicated in patients who are allergic to sulfonamides. revisiting the meaning of ‘sulfa’ allergy. Drug Saf. 2001;24:239-247.
10. Descamps V, Valence A, Edlinger C, et al. Association of human herpesvirus 6 infection with drug reaction with eosinophilia and systemic symptoms. Arch Dermatol. 2001;137:301-304.

Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.