Case Presentation on Teicoplanin Induced Thrombocytopenia

Suman Panda[*]

Department of Biotechnology, Utkal University, Bhubaneswar, Odisha, India

ABSTRACT

Teicoplanin is a glycopeptide antibiotic which inhibits peptidoglycan polymerization in gram-positive bacteria resulting in their cell death. Thrombocytopenia is a blood disorder in which platelet count falls below 100,000 cells/µl. Bleeding occurs when platelet falls below 20,000 cells/µl. In this case series, three patients with different clinical scenarios are explained who developed thrombocytopenia associated with teicoplanin administration during their course of medication. They were identified, assessed and reported for the ADR with the help of Naranjo ADR probability scale. As far as to our knowledge teicoplanin induced thrombocytopenia is not much studied and reported. In a clinical pharmacist point of view, this is a serious life-threatening condition that has to be carefully monitored while on treatment with these types of higher antibiotics.

Keywords: Teicoplanin; Drug induced thrombocytopenia; ADR; Naranjo scale; Haemolytic anaemia

Abbreviations: ADR: Adverse Drug Reaction; AML: Acute Myeloid Leukemia; GP: Glycoprotein; HiDAC: High Dose Ara-C; Inj: Injection; IV: Intravenous; PTCA: Percutaneous Transluminal Coronary Angioplasty

INTRODUCTION

Teicoplanin is the glycopeptide antibiotic that inhibits the growth of susceptible gram-positive bacteria by disrupting the cell wall biosynthesis at a site different from that suffering from beta-lactam antibiotics. Peptidoglycan synthesis is blocked by specific binding to D-Ala-D-alanine residues. Teicoplanin is mostly indicated for infections due to gram-positive organisms. It has a similar structure resembles the vancomycin due to which the cross-reactivity between teicoplanin and vancomycin may occur [1]. According to World Health Organization (WHO), adverse drug reaction is the response to a drug that is noxious and unintended and occurs at doses normally used in man for prophylaxis, diagnosis, or therapy of the disease or for notification of physiological function [2]. This can be identified, assessed, reported and monitored using the Naranjo ADR probability scale.

Various clinical studies have shown that teicoplanin has been reported with haemolytic anaemia but few studies have also reported the teicoplanin induced immune thrombocytopenia [3,4]. Most drugs induce immune thrombocytopenia with haptenization of Glycoproteins (GP) which is the most common mechanism [5]. In this case presentation, three cases were described in which all the cases represented a decrease in platelet count upon the administration of the teicoplanin drug. It was noticed that on stopping the drug administration, the platelet count started increasing and got normalized. Naranjo ADR probability scale was used to identify and understand the causatives of the reaction. Using the scale, it was understood that teicoplanin induces thrombocytopenia. Studies have shown that the teicoplanin-dependent antibody often identifies the epitopes on GPIIb/IIIa or GPIb/V/IX which acts as a major targeted antigen [5].

CASE PRESENTATION

We present three cases admitted for different clinical scenarios who were treated with Teicoplanin and resulted in the development of drug-induced thrombocytopenia which was interpreted using platelets variation as shown in Table 1.

Case 1

A 76-year-old female patient was admitted to the oncology inpatient department with chief complaints of breathlessness and severe cough. She was a known case of breast cancer undergoing 4th cycle of docetaxel. Laboratory investigations

Table 1: Comparison of the platelet count (*After the stopping of the administration of drug).

Case	Day 1 (109/l)	Day 2 (109/l)	Day 3 (109/l)	Day 4 (109/l)	Day 5 (109/l)
1	350	65	50	200 *	-
2	160	95	70	130*	155*
3	210	45	34	120*	-

showed severe neutropenia for which the antibiotic inj. Teicoplanin 400 mg IV was initiated. It was noticed that the platelet level got reduced from 3,50,000 platelets/μl to 50,000 platelets/μl (350-50 x 109/L) upon the routine blood examination. The clinical pharmacist reviewed the case and identified that the teicoplanin inducing thrombocytopenia. It was advised to stop the drug immediately which showed improvement in the platelet count. It confirmed the teicoplanin induced thrombocytopenia.

Case 2

An 85-year-old male patient was admitted to the cardiology inpatient department for the complaints of coronary artery disease. He has to undergo the PTCA surgery on 2nd day of his admission. The patient was taken for surgery after completing the uneventful surgical prophylaxis procedure. After the surgery, Patient was started with inj. Teicoplanin 400 mg twice a day. It was observed that the platelet level of patient reduced gradually from 1,60,000 platelets/μl consequently to 70,000 platelets/μl leading to thrombocytopenia. The clinical pharmacy team investigated and identified that the offending drug was teicoplanin. Immediately the drug was stopped which resulted in returning of platelet count to normal in a few days. Thus, this is also the report of a teicoplanin induced thrombocytopenia.

Case 3

A 26-year-old male patient was admitted to the oncology inpatient department with chief complaints of weakness. He was a known case of Acute Myeloid Leukaemia (AML) for the past two years. He was admitted for the 3rd cycle of cytarabine drug under the HiDAC chemotherapy regimen. All his vital were found to be normal. The patient was administered with anticancer drugs, granulocyte colony-stimulating factor, and antiemetics. He was also on the antibiotics such as amikacin and cefepime. Teicoplanin was also added to his regimen to increase the spectrum of activity. The next day it was noticed in his routine haematological investigation that his platelet count was dropped from 2,10,000 to 34,000 platelets/μl. The physician referred the case to obtain the clinical pharmacist's suggestion on the event. The case was reviewed and assessed using the ADR probability scale. It was then identified that the causative agent behind this thrombocytopenic reaction was teicoplanin. Immediately the drug was stopped. Upon the next routine blood examination, it was revealed that platelet count started

increasing and returned to normal, confirms the teicoplanin induced thrombocytopenia.

RESULTS AND DISCUSSION

It has been noted from the past years that teicoplanin is widely used over vancomycin because of its fewer ADRs like nephrotoxicity and red man syndrome [6]. Certain studies have revealed that teicoplanin can induce thrombocytopenia [4]. According to Rizvi et al Teicoplanin has an action upon GPIIb/IIIa receptors which may interrupt the platelet aggregation. The drug has structural resemblance with vancomycin, hence there is a chance of cross-reactivity [5] one of which is reported here. Stephen et al. studies explain the presence of teicoplanin-dependent antibodies in patients with thrombocytopenia with specific GPIIb/IIIa as a target antigen [7]. From these case reports, due to the significant clinical recovery after the withdrawal of the drug, it was identified that thrombocytopenia was induced because of the drug teicoplanin. Victim drug confirmed to be teicoplanin since thrombocytopenia reverted once the drug was stopped.

SUMMARY

In this case series, three patients with different clinical scenarios were on the teicoplanin antibiotic regimen, developed thrombocytopenia which was assessed and identified using Naranjo ADR scale as an adverse reaction attributed to and caused by teicoplanin due to which the drug was stopped as per the clinical pharmacist and physician's suggestion.

CONCLUSION

This case series confirms that the drug teicoplanin induces thrombocytopenia by affecting the platelet aggregation mechanism. More prospective studies are required to consolidate the drug action. Clinical pharmacists should carefully monitor the haematological parameters while a patient is on teicoplanin otherwise which could be life-threatening.

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