Successful treatment of multidrug-resistant *Escherichia coli* bacteremia with tigecycline in an acute myeloid leukemia child

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SUMMARY: Özdemir H, Çiftçi E, Karbuz A, Oktay G, Aysev D, Yavuz G, İnce E. Successful treatment of multidrug-resistant *Escherichia coli* bacteremia with tigecycline in an acute myeloid leukemia child. Turk J Pediatr 2012; 54: 59-60.

The multidrug-resistant bacterial infections cause high mortality in immunocompromised patients because of the limited antibacterial choices. Tigecycline, first member of the glycylcyclines, has *in vitro* activity against a wide variety of organisms, including multidrug-resistant pathogens; however, it has not yet been approved for use in children. Herein, we report a nine-year-old girl with acute myeloid leukemia who was treated successfully with tigecycline due to multidrug-resistant *Escherichia coli* bacteremia.

Key words: child, Escherichia coli, leukemia, tigecycline.

The frequency of multidrug-resistant (MDR) bacterial infections has been increasing in recent years, and these infections cause high mortality in immunocompromised patients[1]. Tigecycline, first member of the glycylcyclines, has *in vitro* activity against a wide variety of organisms, including MDR pathogens. However, it has not yet been approved for use in children[2]. Herein, we report a child with acute myeloid leukemia (AML) who was treated successfully with tigecycline due to MDR *Escherichia coli* bacteremia.

Case Report

A nine-year-old girl developed a temperature of 39.2°C while she was receiving intensive chemotherapy for AML. The origin of fever could not be determined with physical and laboratory examinations. Initial whole blood count revealed a hemoglobin level of 10 g/dl, a white blood count of 100/mm^3, a neutrophil count of 0/mm3, and a platelet count of 26,000/mm^3. Erythrocyte sedimentation rate was 86 mm/h and C-reactive protein was 8.6 mg/dl. We started cefepime and amikacin as the first-line antibiotic therapy. Because of persisting fever, we added teicoplanin and liposomal amphotericin B on the 3rd day and 5th day of the fever, respectively. On the 5th day of the fever, we also changed cefepime to meropenem. At this time, the thorax, abdomen and sino-orbital computed tomographies were normal. On the 7th day of fever, *E. coli* was reported from peripheral and catheter blood cultures, and was only susceptible to colistin and tigecycline. These peripheral and catheter blood cultures were obtained on the 5th day of fever before adding liposomal amphotericin B. We then added colistin and granulocyte colony-stimulating factor, and removed the central venous catheter. The culture of the central venous catheter was negative. However, the fever did not resolve despite the five-day colistin treatment and catheter removal. We thus gave tigecycline at an initial dose of 1.5 mg/kg followed by 1 mg/kg every 12 hours. Her fever resolved within 36 hours after the initiation of tigecycline, and we stopped teicoplanin, meropenem and liposomal amphotericin B. Multiple subsequent blood cultures were negative. We continued tigecycline and colistin therapy for 10 days without any serious side effects. She recovered clinically and remained afebrile after treatment.

Discussion

The rapid emergence of bacterial resistance has occurred in the past two decades. Among

Gram-positive pathogens, oxacillin-resistant and vancomycin-resistant *Staphylococcus aureus* strains are on the rise. On the other hand, among Gram-negative pathogens, β-1actamase and carbapenemase productions remain the most important contributing factors in drug resistance[3]. Thus, colistin and tigecycline are the only choices for MDR Gram-negative bacteria.

Tigecycline is a new antimicrobial agent with a broad spectrum of antimicrobial activity that has *in vitro* activity against many tetracycline-sensitive and resistant Gram-positive as well as Gram-negative pathogens. It is a structural analogue of tetracycline designed to avoid resistance mediated by efflux and ribosomal protection. Tigecycline is currently approved for patients ≥18 years old with complicated skin, skin structure and intraabdominal infections based on large, randomized, double-blind studies in hospitalized patients[4,5]. However, in a few reports, it was generally safe and well tolerated for use in the patients with community-acquired pneumonia and secondary bacteremia[2,6].

Tigecycline is not approved for the pediatric population and has been reported in the literature only twice. One of these children had meningitis and bacteremia due to vancomycin-resistant *Enterococcus faecium* and the other had central venous catheter infection due to MDR *Corynebacterium jeikeium*[4,7]. Tigecycline was used with the combination of intravenous and intraventricular daptomycin in the first case, but it was used alone in the second case. In the present patient, the causative agent was susceptible *in vitro* to the colistin and tigecycline, but her fever did not resolve despite the five-day colistin treatment and catheter removal. As a result, our treatment with the combination of colistin and tigecycline could be considered as monotherapy with tigecycline.

In conclusion, tigecycline can be given for life-threatening infections in highly selective children who have no better alternative antimicrobial options.

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