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Linezolid desensitization in a pediatric patient



Linezolid is an antibacterial agent belonging to the oxazolidinone group that possesses bacteriostatic effects by inhibiting protein synthesis. Linezolid is effective against various gram-positive and gram-negative bacteria, including clinically important resistant microorganisms, such as methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant *Enterococcus*.¹ Hypersensitivity reactions rarely occur during linezolid treatment. In a study of 828 patients who were treated with linezolid, eruption and pruritus were reported in only 1.7% of the patients.²

An 8-year-old girl with neuronal ceroid lipofuscinosis and progressive myoclonic epilepsy was taking multiple antibiotic treatments for septic arthritis and ventilator-associated pneumonia in the intensive care unit. On *Staphylococcus* growth in the blood culture, which was sensitive only to linezolid, the drug was added to the treatment. On day 7 of the treatment, she experienced urticaria on the face, neck, and body, without respiratory, digestive, or cardiovascular symptoms 20 minutes after starting linezolid infusion. The infusion was interrupted, and 1 mg/kg of hydroxyzine was administered. At the subsequent dose (after 8 hours), the patient was premedicated with hydroxyzine and a corticosteroid, and the infusion rate was reduced to half. However, she again experienced generalized urticaria approximately 10 minutes after the initiation of infusion, and the infusion was interrupted. Although she was also taking other drugs, they were not given within 2 hours of the reaction. Because an antihistaminic drug was applied to our patient, linezolid hypersensitivity could not be confirmed. However, administration of linezolid treatment was necessary because of the clinical state of the patient. Moreover, the hypersensitivity reaction persisted despite administration of the antihistaminic drug and reduction in infusion speed; therefore, desensitization was chosen.

There are 2 reported adult cases of linezolid desensitization. Cawley and Lipka³ treated a 41-year-old woman by oral desensitization using an intravenous form of the drug. Bagwell et al⁴ desensitized a 24-year-old woman using the intravenous form. In both cases, the patients were able to successfully take the drug without any reaction.

In our case, the linezolid desensitization protocol applied by Bagwell et al was used with modifications (Table 1). The amount of the drug she would take was 10 mg/kg per dose every 8 hours, and the patient weighed 26 kg. Three different solutions containing 0.02-, 0.2-, and 2-mg/mL concentrations of linezolid were prepared (preparation forms of the solutions are given in Table 1). The desensitization protocol was completed in a total of 13 steps (2 doses from the first, 4 doses from the second, and 7 doses from the third) and within 4 hours 15 minutes (Table 1). After desensitization, the patient was able to take her linezolid treatment without reaction. In addition, the use of other drugs was continued after linezolid desensitization, and there were no reactions. We decided to perform skin tests under suitable conditions; however, they could not be performed because the patient

Table 1
Linezolid Intravenous Desensitization Protocol

Step	Solution ^a	Rate, mL/h	Infusion duration, min	Monitoring duration, min	Volume infused per step, mL	Dose administered with this step, mg	Cumulative dose, mg
1	I	18	5	10	1.5	0.03	0.03
2	I	42	5	10	3.5	0.07	0.1
3	II	9	5	10	0.75	0.15	0.25
4	II	18	5	10	1.5	0.3	0.55
5	II	36	5	10	3	0.6	1.15
6	II	72	5	10	6	1.2	2.35
7	III	13.8	5	10	1.2	2.3	4.65
8	III	28.2	5	10	2.3	4.7	9.35
9	III	56.4	5	10	4.7	9.4	18.75
10	III	112.5	5	10	9.4	18.75	37.5
11	III	225	5	10	18.8	37.5	75
12	III	150	15	30	37.5	75	150
13	III	220	15	30	55	110	260

Abbreviation: min, minutes.

^aSolution I is 2 mg of drug + 100 mL of 5% dextrose with water (D5W) (concentration, 0.02 mg/mL). Solution II is 20 mg of drug + 100 mL of D5W (concentration, 0.2 mg/mL). Solution III is 600 mg of drug + 300 mL of D5W (concentration, 2 mg/mL).

stopped participation in the study owing to respiratory insufficiency.

To the best of our knowledge, this is the first case in the literature to describe a successful desensitization protocol with linezolid in a pediatric patient.

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