

# Comparison of *in vitro* activities of linezolid and contezolid against clinical *Nocardia* isolates

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## Background

*Nocardia* is nearly 100% susceptible to linezolid which is one of the first-line agents for all clinical species and isolates reported in the literature. However, adverse reactions related to myelosuppression and monoamine oxidase inhibition have limited linezolid use to some extent. Conteozolid, a new oxazolidinone antibiotic that has decreased toxicity compared to linezolid, was launched in China in June 2021. In this study, the *in vitro* activities of linezolid and contezolid are compared against *Nocardia*.

## Methods

Ninety-four clinical *Nocardia* isolates from Beijing Chao-Yang Hospital were identified by multilocus sequence analysis (MLSA), and the *in vitro* activities of linezolid and contezolid were evaluated using the broth microdilution (BMD) method. A Wilcoxon Signed Rank Test was performed to determine if linezolid and contezolid are significantly different from each other against clinical *Nocardia* isolates.

## Results

Pulmonary nocardiosis (91.5%) was the most common clinical presentation of *Nocardia* infection. *N. cyriacigeorgica* (n=34; 36.2%) and *N. farcinica* (n=15; 16.0%) were the most frequently encountered *Nocardia* species, followed by *N. abscessus* (n=9; 9.6%), *N. otitidiscaviarum* (n=9; 9.6%), Novel species I (n=6; 6.4%), *N. asteroides* (n=4; 4.3%), *N. brasiliensis* (n=4; 4.3%), *N. asiatica* (n=3; 3.2%), *N. puris* (n=3; 3.2%), *N. wallacei* (n=3; 3.2%), *N. nova* (n=2; 2.1%), and Novel species II (n=2; 2.1%). The MIC (minimum inhibitory concentration) ranges of all clinical *Nocardia* isolates for linezolid and contezolid were 0.5-8 µg/mL. The MIC<sub>50</sub>/MIC<sub>90</sub> values for all isolates of *Nocardia* for linezolid vs contezolid was 2/4 µg/mL vs 2/4 µg/mL, and for *N. cyriacigeorgica*, *N. farcinica*, *N. abscessus*, and *N. otitidiscaviarum* were 4/4 µg/mL vs 2/4 µg/mL, 4/4 µg/mL vs 2/4 µg/mL, 2/4 µg/mL vs 2/2 µg/mL, and 4/4 µg/mL vs 2/4 µg/mL, respectively. After a Wilcoxon Signed Rank Test analysis, the *P* values of all *Nocardia* isolates was <0.001, and for *N. cyriacigeorgica*, *N. farcinica*, *N. abscessus*, and *N. otitidiscaviarum* were 0.001, 0.020, 0.038, and 0.102, respectively.

Table 1 *In vitro* activities of linezolid and contezolid against clinical *Nocardia* isolates

Species (no. of isolates)	Linezolid		Contezolid		P value
	MIC <sub>50</sub>	MIC <sub>90</sub>	MIC <sub>50</sub>	MIC <sub>90</sub>	
<i>N. cyriacigeorgica</i> (34)	4	4	2	4	<b>0.001</b>
<i>N. farcinica</i> (15)	4	4	2	4	<b>0.020</b>
<i>N. abscessus</i> (9)	2	4	2	2	<b>0.038</b>
<i>N. otitidiscaviarum</i> (9)	4	4	2	4	0.102
Novel species I (6)	1	2	1	1	0.059
<i>N. asteroides</i> (4) <sup>a</sup>	2-4		4-8		0.102
<i>N. brasiliensis</i> (4)	4		4		1.000
<i>N. asiatica</i> (3)	2		1-2		0.157
<i>N. puris</i> (3)	1-2		1-2		0.317
<i>N. wallacei</i> (3)	1-2		1		0.317
<i>N. nova</i> (2)	1-2		1-2		1.000
Novel species II (2)	2		1-2		0.317
Total (94)	2	4	2	4	<b>&lt;0.001</b>

<sup>a</sup> The species that the number of isolates is <5 listed the MIC range instead of MIC<sub>50</sub> and MIC<sub>90</sub>. MIC, minimum inhibitory concentration; MIC<sub>50/90</sub>, MIC for 50% and 90% of the isolates.

## Conclusion

Though MIC<sub>50</sub>/MIC<sub>90</sub> values for linezolid and contezolid for all *Nocardia* isolates evaluated appeared to be similar, there was a statistically significant difference between the two antibiotics. Furthermore, the MIC<sub>50</sub> values for the most commonly encountered species *N. cyriacigeorgica* and *N. farcinica* were lower for contezolid than for linezolid. Therefore, the *in vitro* activity of contezolid is better than that of linezolid against clinical *Nocardia* isolates, and contezolid could also be an option for the treatment of *Nocardia* infections.

## References

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