The In Vitro Activity of Omadacycline and Comparators Against Anaerobic Bacteria

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ABSTRACT

Background: A diverse array of anaerobic bacteria exist as part of the normal human microflora, as well as part of the flora of patients suffering from infections. Anaerobes are particularly abundant in the gastrointestinal tract and are seen in a variety of environments worldwide. Despite the fact that anaerobic infections occur upon disruption of this commensal relationship with the host, most antibiotics developed to date have been either against gram-positive or gram-negative bacteria. Methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant enterococci (VRE) are major clinical problems for which there are limited therapeutic options. Metronidazole is the standard of care for treatment of anaerobic infections, and limited information exists regarding the in vitro activity of omadacycline against anaerobic bacteria. Omadacycline is a new investigational agent currently undergoing phase 3 clinical development by Micromyx in the USA for the treatment of moderate-to-severe acute bacterial skin and skin structure infections (ABSSSI) and complicated urinary tract infections (cUTI)

Methods: Omadacycline (OMC) is a 4-oxo9-fluorenyl carboxylic acid derivate of tetracycline. The activity of OMC was evaluated against in vitro anaerobic test isolates (N=186), which were tested against positive anaerobes in awake (P/T) and in vivo (P/T) studies. The %S of OMC and comparators were within quality control limits (Table 1). In-vitro studies were conducted using freshly prepared stock solutions of OMC and comparators. Activity of OMC was compared to tigecycline (TGC), and metronidazole (MTZ) against Gram-positive and Gram-negative bacteria. The susceptibility of anaerobic test isolates was determined by the agar dilution method and expressed as the percentage susceptible (%S).

RESULTS

The isolated isolates were highly susceptible to P/T (100% across species) and MEM (96% across species). MTZ was the least active of the comparators tested, with a MIC range of 0.12-4 mg/L (Table 1). The %S of OMC and CLI did not exceed 100% for all isolates tested, and in vivo susceptibility was below 75% (Table 2). The %S of OMC and comparators were within quality control limits (Table 1).

CONCLUSIONS

• Omadacycline had potent activity in vitro against Gram-negative and positive anaerobes commonly isolated from human infections.
• The in-vitro activity of omadacycline against anaerobes pathogens along with the in vivo efficacy against anaerobic in animal models of intra-abdominal infections and in human skin infections highlight the potential of omadacycline for the treatment of human anaerobic infections.

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References

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