In vitro efficacy of Linezolid on clinical strains of Mycobacterium tuberculosis and other mycobacteria

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SUMMARY

Linezolid, an oxazolidinone that acts by inhibiting protein synthesis, was evaluated in strains of tuberculosis and non-tubercular mycobacteria resistant to one or more drugs isolated in northern Sardinia. The in vitro activity of Linezolid (Pfizer) was assessed on different isolates of Mycobacterium spp. from clinical samples by the Proportional Method. Linezolid demonstrated an excellent activity against the 24 strains of M. tuberculosis and against M. gordoneae, M. marinum, M. aurum, M. phlei, and M. avium, with MIC values ranging from 0.5 to 2 µg/ml. Linezolid can be used in combination with the standard antitubercular medications, or as an effective therapeutic alternative in infections caused by M. tuberculosis or by other species of non-tubercular mycobacteria.

KEY WORDS: Linezolid, Mycobacterium spp., Proportional method, MIC

INTRODUCTION

Tuberculosis is one of the leading causes of death from a single infectious agent worldwide. According to the World Health Organization, 3 million people die of tuberculosis each year, and about 8 million new cases are reported (Dye C. et al., 1999). The tuberculosis problem is exacerbated by the appearance of Multi Drug Resistant (Kim Jim Yong et al., 2005) (MDR) strains and by the decreasing efficacy of the anti-tubercular drugs available for therapy, that have paradoxically been the same for 30 years. Drug resistant strains have been isolated in Sardinia, but their frequency appears to be lower than in the USA or Eastern Europe. Annually, about 5% of the mycobacterial strains isolated are resistant to at least one drug, and over the years strains resistant to 3 or even 4 drugs have emerged. Infections caused by non-tubercular mycobacteria are a source of considerable and increasing concern (Bouza E. et al., 2000; Skogberg K. et al., 1995; Wallace R.J. et al., 1997) both in immunocompromised and immunocompetent patients. Therefore, it is urgent to discover new drugs to be placed alongside the traditional therapy for patients infected by M. tuberculosis and other species of mycobacteria.

The new generation chemotherapeutic Linezolid (Pfizer) is a synthetic antibacterial agent belonging to a new class of antimicrobial compounds, the oxazolidinones. This drug has an optimum in vitro activity against Gram-positive bacteria (Cercenado E. et al., 2001). Linezolid selectively inhibits the synthesis of bacterial proteins by binding to the bacterial ribosome (23S of the 50S subunit) and preventing the formation of the 70S ribosomal initiation complex, a basic component...