Mycoplasma pneumoniae is a common cause of a broad spectrum of human respiratory tract infections which can be followed by extrapulmonary complications. Especially in epidemiology, up to 20% to 40% of all cases of community-acquired pneumonia have been attributed to these cell wall-less bacteria (1, 2). Tetracyclines, fluoroquinolones, and macrolides are the only effective antibiotics for the treatment of infections due to M. pneumoniae. With respect to side effects, macrolides are the first-line antibiotics and the only ones recommended for treatment of pediatric patients. In Asia, a dramatic increase of macrolide resistance, in some regions approaching more than 90% of M. pneumoniae strains investigated, was observed in recent years (3). In other parts of the world, the rates of macrolide-resistant strains are currently lower; i.e., rates of 0% (the Netherlands), 2% (Denmark), 8% (France and the United States), and 22% (Israel) were previously reported (4–8). In a previous study, we demonstrated macrolide resistance in 1.2% of M. pneumoniae-positive respiratory tract specimens sampled between 2003 and 2008 in Germany (9). It is important that between 2010 and 2012, high incidences of infections due to M. pneumoniae in different European countries, resulting in increased prescription of macrolides, were reported (2; data from Germany are not available). Results from different reports showed that the possibility of development of macrolide resistance during appropriate therapy for M. pneumoniae pneumonia cannot be excluded (10).

To monitor a possible increase in the macrolide resistance rate, we investigated 84 M. pneumoniae-positive respiratory tract samples (all from different patients) submitted between 2009 and 2012 to the German Reference Laboratory for Mycoplasma. The specimens (bronchoalveolar lavage fluids, sputa, tracheal swabs, and throat-washing fluids) were sampled in outpatients and inpatients with a median of age of 38 years (range, 1 to 92 years; 61% males) from different parts of Germany. DNA was extracted as previously described, and M. pneumoniae was detected by real-time PCR (11). Macrolide resistance in mycoplasmas was tested by a culture-independent approach using PCR and melting curve analysis (9). Mutations at positions 2063 and 2064 and at position 2617 of the 23S rRNA of M. pneumoniae were confirmed by sequencing.

In three samples, a mutation (A to G at position 2063) could be demonstrated which is the most common one associated with complete macrolide resistance. The resulting rate of resistant strains of 3.6% is higher than that found in specimens sampled between 2003 and 2008 but still remained at a low level in Germany. Nevertheless, the data showed a resistant strain circulation that requires further monitoring of M. pneumoniae-positive clinical samples to allow early identification of changes in the resistance pattern of this important agent of human respiratory tract infections.

ACKNOWLEDGMENTS

We thank S. Gäbler and S. Menzel for excellent technical assistance.

REFERENCES


Published ahead of print 6 May 2013
Address correspondence to Roger Dumke, roger.dumke@tu-dresden.de.
Copyright © 2013, American Society for Microbiology. All Rights Reserved. doi:10.1128/AAC.00706-13