Emerging macrolide resistance in Mycoplasma pneumoniae in children: detection and characterization of resistant isolates.

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BACKGROUND: Epidemiologic data from Asia have documented the rapid and extensive emergence of macrolide resistance in Mycoplasma pneumoniae. This drug resistance has also been documented in Europe and recently in the United States, but there is very little information currently available on its prevalence. A rapid technique to identify macrolide-resistant M. pneumoniae is needed to guide management of patients with community-acquired respiratory infections. METHODS: Culture and Minimum Inhibitory Concentration testing identified macrolide-resistant M. pneumoniae infection in 2 seriously ill hospitalized children with community-acquired pneumonia. A portion of the 23S ribosomal RNA gene from 2 macrolide-resistant M. pneumoniae isolates from these children as well as 4 laboratory-induced macrolide-resistant strains was amplified by PCR, and the PCR products were sequenced to identify mutations associated with macrolide resistance. A real-time PCR assay was designed to identify 3 known mutations in the 23S rRNA gene associated with macrolide resistance and applied to the clinical specimens from which these isolates were obtained and to the bacterial isolates. RESULTS: Macrolide-resistant M. pneumoniae from both children were found to carry an A2063G transition in the 23S rRNA gene previously identified in resistant isolates from China, Japan, France, and recently in an encephalitis outbreak in Rhode Island. Three laboratory-induced mutant strains had an A2064G mutation whereas the other one had an A2063G mutation. A real-time PCR assay successfully detected the macrolide-resistant M. pneumoniae directly in clinical specimens and discriminated them from wild-type isolates. CONCLUSIONS: Macrolide-resistant M. pneumoniae can be associated with prolonged severe respiratory infection in children. Real-time PCR offers a rapid method of diagnosing macrolide resistance in community-acquired respiratory infections due to M. pneumoniae.