NDM-1 has little similarity with other β-lactamases, being only 21% identical to class A cephalosporinases and 34% similar to class C β-lactamases. The gene encoding NDM-1 is located in a region of E. coli plasmid endogenous to Enterobacteriaceae. The gene is encoded on a mobile genetic element within a 140-kb plasmid. NDM-1 was also carried by distinct plasmids and one MβL in a E. coli strain and one KPC-3-producer K. pneumoniae strain from India (2006-2007).

NDM-1 was detected in at least 12 unique strains of three Enterobacteriaceae species: E. coli K12 MβL, K. pneumoniae MβL, and three E. coli MβL positive strains. These were recovered from patients hospitalized in New Delhi (two hospitals), Mumbai and Pune.

NDM-1-producing strains showed carbapenem MIC results, with imipenem being >16 g/mL; meropenem >16 g/mL; and susceptible only to imipenem, meropenem or Cefepime (Table 1). All other MICs were within specified ranges as published in CLSI documents (M07-A8). These findings are consistent with previous studies in which NDM-1 was associated with reduced susceptibility to imipenem, meropenem or Cefepime (Table 1).

Mutations in class D β-lactamases, such as the blaKPC-2 in K. pneumoniae MβL, are thought to make these enzymes more stable to β-lactamase inhibitors and reducing their inhibitory effect on β-lactamase enzymes. These findings are consistent with previous studies in which NDM-1 was associated with reduced susceptibility to imipenem, meropenem or Cefepime (Table 1).

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References


