

TITLE: DETECTION OF *E. CLOACAE* CARRYING *bla*_{NDM-1} GENE FROM INFECTED DOGS, BRAZIL

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ABSTRACT:

The emergence and spread of microorganisms with acquired carbapenemases is of great concern worldwide and their reservoirs are disseminated among hospitals, communities and the environment. Carbapenems are broad-spectrum beta-lactam antibiotics employed for the treatment of serious infections but are still not approved for use in animals in any part of the world. On the other hand, its overuse in humans has been implicated as a major cause of emerging carbapenem resistance. The close contact between household people and pets offers favorable conditions for bacterial transmission, and particularly worrisome is the evidence of cross-transmission of carbapenem-resistant pathogens between them. The New Delhi Metallo-β-lactamase 1-producing (NDM-1) *Enterobacter cloacae* complex is one of the highly resistant pathogens affecting the human intensive care units. Since it was first reported, the *bla*_{NDM-1} gene has been discovered worldwide over the past decade, being reported in several countries in isolates of human origin. However, in Brazil, there were none reports of NDM-1-producing *E. cloacae* in clinical isolates from companion animals. Thus, this study aimed to investigate the occurrence of the *bla*_{NDM-1} gene in *E. cloacae* from pets. There were considered bacterial isolates from dogs and cats showing phenotypic resistance to carbapenems, identified during routine microbiological investigation between July 2018 to July 2020 in Joinville, Southern Brazil. Conventional phenotypic methods were performed to define the microbial species and the antimicrobial phenotypic resistance were determined by disc-diffusion agar method. To verify the presence of *bla*_{NDM-1} gene, the Polymerase Chain Reaction was employed using specific primers. This investigation identified four *E. cloacae* complex isolates bearing NDM-1-encoding gene from companion animals. To our knowledge, this is the first study showing the detection of NDM-1 in isolates from animal outpatient clinical samples in Brazil. Of note, the *bla*_{NDM-1} gene may be located in readily transferable plasmids, increasing the variety of transmission vectors of resistance to carbapenems, also considering that the species carrying the gene identified in this study are widely distributed and shared among the environment, animals, and humans.

Keywords: *New Delhi metallo-beta-lactamase*, carbapenemase, multidrug resistance, *bla*_{NDM} Gene, *Enterobacteriales*, Companion Animal

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