

**Title:** Evaluation of resistance genes and genetic relationship in enterobacteria associated with meningitis

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**Abstract:** Few reports describe enterobacteria causing meningitis, however it is still worrying. These microorganisms have been shown resistance to many beta-lactam antibiotics and quinolone, reducing the therapeutic options. This study aimed to investigate the presence of beta-lactamases genes (*bla*<sub>CTX-M</sub> groups 1,2,8,9 and 25), *bla*<sub>TEM</sub> and *bla*<sub>SHV</sub>) and genes that confer resistance to quinolones (*qnr* A,B,S e *acc(6)'*-Ib-cr) and to evaluate the genetic diversity among enterobacteria from cerebrospinal fluid and blood of patients with suspected meningitis in different hospitals from Ribeirão Preto region, from 2007 to 2014. Were studied 12 enterobacteria including 5 *Klebsiella pneumoniae*, 3 *Enterobacter aerogenes*, 3 *Enterobacter cloacae* and 1 *Serratia marcescens*. The genes conferring resistance to antibiotics were investigated by PCR and the genetic similarity was established by PFGE. The value used to determine the similarity was  $\geq 90\%$ . The *K. pneumoniae* isolates were not considered genetically related. The gene *bla*<sub>CTX-M</sub> group 2 was found in 2 isolates, *bla*<sub>TEM</sub> in 1 and *bla*<sub>SHV</sub> in 2. The gene *aac(6)'*-Ib-cr was also found in three *K. pneumoniae* isolates. All *E. aerogenes* isolates showed *bla*<sub>TEM</sub>, and in 2 also carried *qnrS* and *aac(6)'*-Ib-cr. Two isolates from the same hospital were considered genetically related while the other one from another hospital was not genetically related. All three *E. cloacae* isolates from the same hospital were not genetically related. One of the isolates harbored *bla*<sub>CTX-M</sub> group 1 gene, *qnrB* and *aac(6)'*-Ib-cr. The other two isolates carried *aac(6)'*-Ib-cr and one isolate showed *bla*<sub>TEM</sub>. The *S. marcescens* isolate showed *bla*<sub>TEM</sub>. According to the evaluated data *bla*<sub>CTX-M</sub> group 2 was most prevalent among *K. pneumoniae* isolates. Other studies have shown that this beta-lactamase gene is the most prevalent amongst Enterobacteriaceae in Brazil. The gene *bla*<sub>CTX-M</sub> group 1 was found in only one *E. cloacae* isolate.. This group is the most prevalent in Europe. In Brazil, it was recently identified for the first time, however with increasing prevalence. Studies showed that quinolone resistance genes have been detected in *Enterobacter* species, which corroborates with our data. The genetic diversity among isolates of each species even from the same hospitals, suggest a non-clonal dissemination. Resistant enterobacteria causing meningitis may be associated with complications in the development of the disease.

**Key-words:** Enterobacteriaceae, meningitis, ESBL, qnr

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