Letters to the Editor

Detection of CTX-M-1, CTX-M-15, and CTX-M-2 in Clinical Isolates of Enterobacteriaceae in Bogotá, Colombia

This is the first report regarding the detection of bla_{CTX-M} genes encoding CTX-M-1, CTX-M-15, and CTX-M-2 cefotaximases in clinical isolates of enterobacteria collected in hospitals in Bogotá, Colombia.

During a period of 4 months in 2005, 117 isolates of enterobacteria having extended spectrum beta-lactamases (ESBL) phenotype were collected from nine third-level hospitals in Bogotá, Colombia. Beta-lactamase-producing bla_{CTX-M} genes were detected in 56 of them (47.9%) by PCR, having isoelectric points of 8.0, 8.7, and 8.9. CTX-M-1 group genes were detected in 89.3% of these isolates; the rest were from the CTX-M-2 group. No other bla_{CTX-M} genes were detected. Amplified product sequences showed 100% similarity with the bla_{CTX-M-12} gene in 56 isolates (60.7%), with bla_{CTX-M-1} (16.1%), with bla_{CTX-M-15} (12.5%), and with bla_{CTX-M-2} (10.7%). Seven isolates obtained from nonhospitalized patients associated with infections acquired in the community were included in this study; the bla_{CTX-M-1} gene was found in one of them, bla_{CTX-M-15} in three, and bla_{CTX-M-2} in the other three.

Group one cefotaximases characterized by greater hydrolytic activity against cefotaxime and ceftriaxone than against cefazidime have been reported from different parts of the world, initially in Europe, Asia (1), and Africa (5) and recently in North America (6). Group 1 CTX-M enzyme variants manifesting greater activity against cefazidime, such as CTX-M-15, reported in European countries (2, 3, 4), and especially in Great Britain, have been associated with the appearance of epidemic outbreaks (9). The presence of group 1 bla_{CTX-M} genes was observed in a study carried out in Colombia with nosocomial enterobacteria (8). Likewise, a high prevalence of CTX-M-1 group cefotaximases was found by our group in a study using isolates collected in 2004 in four hospitals in Bogotá (J. R. Mantilla Anaya, E. M. Valenzuela de Silva, E. B. González Mejía, A. M. Méndez, and A. L. Leal, IV Encuentro Nacional de Investigación en Enfermedades Infecciosas, abstr. 16, Infeccto 8:143, 2004). Six enterobacteria carrying the bla_{CTX-M-2} gene were also found in this study. The bla_{CTX-M-12} gene was identified in both studies.

The isolates included in this study presented coresistance to cefepime in 79% of cases, to cefotixin in 18.3%, to aztreonam in 65.3%, to ciprofloxacin in 30.6%, to gentamicin in 30.6%, to amikacin in 47%, and to sulfamethoxazole in 61.2%. All the isolates studied were susceptible to imipenem. The increase in cefepime resistance with respect to the 20% reported in 2002 (8) is worth noting.

All Escherichia coli transconjugants showed resistance to cefotaxime, since they had acquired the bla_{CTX-M} genes previously detected in parental isolates. In no case was simultaneous transfer of bla_{SHV} genes observed, while simultaneous transfer of bla_{TEM} genes was observed in some cases. No transfer of resistance to other groups of antibiotics being evaluated was observed. This could indicate that resistance to aminoglycosides presented by some parental isolates is encoded by another plasmid, one different from the one which was transferred, contrary to what previously has been reported by several authors. Two bla_{CTX-M-15} carrier isolates and two bla_{CTX-M-2} carriers from the community transferred bla genes by conjugation, contrary to what was reported in another study with cepotaximases (10). The facility of these genes’ transfer by conjugation has become a cause for alarm due to the implications for public health of these microorganisms’ dissemination in the community (2, 9).

CTX-M-2 cefotaximase is the ESBL having the greatest prevalence in Argentina, where it recently was reported for the first time (7). It has since become disseminated in several countries in South America (7) and is also endemic in Asian countries (1). bla_{CTX-M-2} genes were detected in isolates from both hospitalized and nonhospitalized patients in the present study.

Similar to what has been reported from other countries, Klebsiella pneumoniae has been found with greater frequency among isolates associated with intrahospital infection, while E. coli has been found to predominates in isolates from the community (2, 4, 9).

The dissemination of the bla_{CTX-M-12} gene was observed to be continuing in hospitals in Bogotá in this study. As the populations in these hospitals were eminently polyclonal, it was presumed that this dissemination was due to the transmission of extrachromosomal elements. Other genes (bla_{CTX-M-2}, bla_{CTX-M-15}, and bla_{CTX-M-1}) were also identified in hospital isolates and in those from the community.

The dissemination and appearance of different types of cefotaximases in our setting reveals the need for evaluating and controlling possible selection mechanisms which have favored this phenomenon.

REFERENCES


Emilia María Valenzuela de Silva*
José Ramón Mantilla Anaya
María Teresa Reguero Reza
Elsa Beatriz González Mejía
Ingrid Yamile Pulido Manrique
Iván Darío Llerena

Daniel Velandia
Grupo de Epidemiología Molecular
Instituto de Biotecnología
Universidad Nacional de Colombia
Avenida 30 No. 45-03
Edificio Manuel Ancízar
Bogotá, Colombia

*Phone: (57 1) 3165000, ext. 16965
Fax: (57 1) 3165415
E-mail: jrmantillaa@unal.edu.co