

P0710

Paper Poster Session

Emergence and worldwide outbreaks of carbapenemase-producing bacteria

Dissemination of NDM producers in Argentina (2013-2015): escalation of Enterobacteriaceae belonging to the Proteaeae tribe

Fernando Pasteran*¹, Melina Rapoport¹, Ezequiel Albornoz¹, Celeste Lucero¹, Paola Ceriana¹, Diego Faccone¹, Sonia Gomez¹, Ndm Argentina Group¹, Alejandra Corso¹

¹Laboratorio Nacional de Referencia En Antimicrobianos, Inei-Anlis Dr. Carlos Malbran, Buenos Aires, Argentina

Background: Argentina is endemic to various types of carbapenemases, as KPC detected in *Enterobacteriaceae* (15% of prevalence; 2015) and OXA-like in *Acinetobacter* spp. (80%). In this scenario, NDM was first identified in 2013, and since then, the detection of this carbapenemase has been increasing. This study aims to summarize changes in the occurrence and epidemiology of NDM-producing gram negative bacilli over a three-year period in Argentina.

Material/methods: we designed an algorithm to detect carbapenemases at the level of the clinical microbiology laboratory, which is currently implemented by 432 laboratories across Argentina (National QC Program in Bacteriology, Ministry of Health). By means of this algorithm, isolates with decreased susceptibility to carbapenems and a positive synergy test result between carbapenems and EDTA disks, were considered as suspicious of NDM production and referred to the NRL. Strains were identified using MALDI-TOF. *bla*_{NDM-1} was confirmed by PCR and DNA sequencing. Antimicrobial susceptibility was evaluated by disk diffusion and dilution methods (CLSI). Phenotypic carbapenemase production was evaluated by the Blue Carba test (BCT), Carbapenem Inactivation Method (CIM) and Modified Hodge Test (MHT).

Results: Figure. Strains were isolated from urine (41%), rectal swab (31%), blood (13%) and other (15%). 60% of the isolates belonged to the tribe *Proteeae* (20/25 hospitals), with a significant annual increase of *Providencia stuartii* (PST) (10/25 hospitals). Only 2 *Proteeae* isolates were recovered from rectal swabs. Carbapenem non-susceptibility: 100% imipenem, 98% meropenem and 77% ertapenem. About 17 (20%) isolates (11 PST, 4 *Proteus mirabilis* [PMI], 1 *P. rettgeri* [PRE], and 1 *Acinetobacter baumannii*) were susceptible to only one antimicrobial agent (amikacin): 0 (2013), 2/30 -7%- (2014), and, 15/52 -29%- (2015). Only 1 PMI and 1 PST isolates were not detected by the BCT. CIM test failed to detect 9/15 (60%) PST, 4/5 (80%) PRE, 2/6 (40%) PMI and 1/1 (100%) *Morganella morganii* isolates. The highest proportion of false negative results with the MHT was observed among *Providencia* (74% PST and 56% PRE) followed by PMI (45%), *Citrobacter* (40%), *Klebsiella*

pneumoniae (33%), *Escherichia coli* and *A. baumannii* (29%).

	Year			Total (2013-2015)
	2013	2014	2015	
Total isolates blaNDM-1	4	30	52	86
No. of Hospitals (No. accumulative)	3	7 (10)	21 (25)	25
No. of Cities	1	4	7	8
Species as follow (% of total):				
<i>P. stuartii</i>		6	17	23 (27%)
<i>P. rettgeri</i>	3	8	5	16 (19%)
<i>P. mirabilis</i>		5	6	11 (13%)
<i>K. pneumoniae</i>	1	2	6	9 (10%)
<i>E. coli</i>		3	4	7 (8%)
<i>A. baumannii</i>		2	5	7 (8%)
<i>Citrobacter spp.</i>			5	5 (6%)
<i>Others*</i>		4	4	8 (9%)
Phenotypic detection of carbapenemase.				
% of isolates with a positive test:**				
Blue Carba Test				73/75 (97%)
Carbapenem Inactivation Method				20/36 (56%)
Modified Hodge Test				39/80 (49%)

* *E. cloacae* (4), *K. oxytoca* (1), *S. marcescens* (1), *M. morgani* (1), *A. pittii* (1)

** The indicated subset of isolates were screened by the test

Conclusions: we confirmed the active circulation of NDM carbapenemase in Argentina, mobilized by the escalation of *Enterobacteriaceae* belonging to *Proteeae* tribe. The increase of the co-resistance to almost all available agents during 2015, significantly associated with *Providencia* species, as well as the poor detection of NDM carbapenemase production observed with some phenotypic methods is of high concern

	Year			Total (2013-2015)
	2013	2014	2015	
Total isolates blaNDM-1	4	30	52	86
No. of Hospitals (No. accumulative)	3	7 (10)	21 (25)	25
No. of Cities	1	4	7	8
Species as follow (% of total):				
<i>P. stuartii</i>		6	17	23 (27%)
<i>P. rettgeri</i>	3	8	5	16 (19%)
<i>P. mirabilis</i>		5	6	11 (13%)
<i>K. pneumoniae</i>	1	2	6	9 (10%)
<i>E. coli</i>		3	4	7 (8%)
<i>A. baumannii</i>		2	5	7 (8%)
<i>Citrobacter spp.</i>			5	5 (6%)
<i>Others*</i>		4	4	8 (9%)
Phenotypic detection of carbapenemase.				
% of isolates with a positive test:**				
Blue Carba Test				73/75 (97%)
Carbapenem Inactivation Method				20/36 (56%)
Modified Hodge Test				39/80 (49%)

* *E. cloacae* (4), *K. oxytoca* (1), *S. marcescens* (1), *M. morgani* (1), *A. pittii* (1)

** The indicated subset of isolates were screened by the test