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**Recent epidemiological data on carbapenem-resistant *Klebsiella pneumoniae* in Greek hospitals**

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**Background:** A retrospective multicenter study was conducted to evaluate both the spread of carbapenemase genes in *K.pneumoniae* isolates, and their susceptibilities to meropenem, colistin, tigecycline, fosfomycin and gentamicin.

**Material/methods:** From October 2014 to July 2016, 15 General hospitals in Greece (8 in Athens, 3 in Thessaloniki and 4 in provincial towns) provided consecutive single-patient clinical isolates of *K.pneumoniae* to our Infectious Diseases Research Laboratory in Athens to be submitted to susceptibility testing and molecular characterization of carbapenemase genes. Isolate identification and susceptibility testing was confirmed by VITEK2. Meropenem, colistin, fosfomycin, tigecycline and gentamicin MICs were further evaluated by E-test. Carbapenemase genes were detected by PCR with specific primers.

**Results:** 399 carbapenemase-producing *K.pneumoniae* isolates were collected from 15 sites during the study period. Twenty nine (7.3%) isolates exhibited a PDR phenotype, 108 (27.1%) an XDR and the rest an MDR phenotype. A subset of 284 isolates was molecularly characterized. Carbapenemase-encoding genes were detected in all 284 strains including 191(68.3%), 49(17.3%), 19(6.7%) and 13(4.6%) cases of *bla*<sub>KPC</sub>, *bla*<sub>NDM</sub>, *bla*<sub>VIM</sub> and *bla*<sub>OXA-48-like</sub> genes, respectively. Additionally 15(5.3%) isolates harbored two carbapenemase genes, 12(4.2%) the *bla*<sub>KPC</sub> and the *bla*<sub>VIM</sub>, two (0.7%) the *bla*<sub>NDM</sub> and the *bla*<sub>OXA-48-like</sub> and one isolate (0.4%) the *bla*<sub>KPC</sub> and the *bla*<sub>OXA-48-like</sub>. Susceptibilities of isolates interpreted according to EUCAST breakpoints, are shown below. Discrepancies were observed between the meropenem MIC values reported via the Etest vs. the VITEK2 system. Forty eight isolates (12%) exhibiting MICs 0.5-8mg/L by Etest were categorized as resistant to meropenem (>8mg/L) by VITEK2. Additionally 31 isolates (7.8%) with MICs 16mg/L, for which on a theoretical basis, a possible usefulness of meropenem administration has been considered, were categorized as resistant by VITEK2 with an MIC>8mg/L.

Isolates (No)	(%Susceptibilities; MIC <sub>50</sub> / MIC <sub>90</sub> )				
	Meropenem	Colistin	Tigecycline	Fosfomycin	Gentamicin
All (n=399)	3.0%; >32/>32	63.4%; 0.25/32	51.4%; 1 /4	13.0; 128/>1024	61.5%; 2/>256
KPC (n=191)	1.6%; >32/>32	66.0%; 0.25/32	50.3%; 1 /4	10.5; 128/>1024	69.5%; 2/64
NDM (n=49)	2%; >32/>32	83.7%; 0.25/16	69.4%; 1 /2	32.7; 64/>1024	44.9%; 128/>256
VIM (n=19)	15.8%; >32/>32	73.7.4%; 0.25/32	47.4%; 2 /4	26.3; 128/>1024	42.1%; 32/>256
OXA-48 (n=13)	0%; 32/>32	53.8%; 0.5/16	76.9%; 1 /2	10.5; 128/>1024	15.8%; 256/>256
KPC+VIM (n=12)	8.3%; >32/>32	8.3%; 32/32	33.3%; 2 /2	8.3; 256/>1024	83.3%; 2/8

**Conclusions:** Colistin and gentamicin were the most active drugs *in vitro* against CPE with 63.4% and 61.5% of the isolates to be inhibited at ≤2mg/L, followed by tigecycline (S; 51.4%). Increased incidence of NDM-producing *K.pneumoniae* isolates was observed, isolated in 11 of 13 hospitals participating in the study, indicating the spread of *bla*<sub>NDM</sub> gene, for the first time, all over Greece. Meropenem MICs of CPE isolates should be further tested by Etest, as VITEK2 falsely increases meropenem MICs, therefore possibly depriving appropriate antimicrobial therapy.