

Evaluation of two novel immunochromatographic screening assays for detection of carbapenemase producers

L. Heireman¹, L. Bouchier¹, S. Steyaert¹



¹Laboratory Department, General Hospital Maria Middelaes, Ghent, Belgium

Introduction

- Carbapenemase producers are frequently involved in nosocomial outbreaks, making early and reliable laboratory detection essential
- We evaluated the performance of two recently introduced immunochromatographic screening tests for the detection of carbapenemase producers:

RESIST-4 O.K.N.V. K-set
(Coris BioConcept, Gembloux, Belgium)



NG-Test CARBA 5
(NG Biotech, Guipry, France)



Methods

- 15 selected *Enterobacteriaceae* and 2 *Pseudomonas* spp. strains producing carbapenemases type OXA-48/KPC/VIM/NDM + 5 non-carbapenemase producers
→ quality control isolates (N=13) or well-characterized by our laboratory using multiplex PCR (N=9)
- Cultured and subcultured (± 24 h at 35-38°C, 5% CO₂) on Columbia agar + 5% sheep blood (Biomérieux)
- RESIST-4 test: OXA-48/KPC/VIM/NDM
- NG-Test CARBA 5 test: OXA-48/KPC/VIM/NDM/IMP
- Diagnostic accuracy of both screenings tests were determined

Results

- All (non)-carbapenemase producers were correctly detected by both screening tests
- Both tests showed an excellent sensitivity and specificity of 100%
- Results were available in less than 20 minutes

Resistance mechanism (reference method)	MIC meropenem ($\mu\text{g/mL}$)	Isolate	Result RESIST-4	Result CARBA 5
OXA-48	0.5- >32	<i>Klebsiella pneumoniae</i> (N=5)	OXA-48	OXA-48
	0.5-0.75	<i>Escherichia coli</i> (N=2)		
VIM	4- >32	<i>Klebsiella pneumoniae</i> (N=2)	VIM	VIM
	8- >16	<i>Pseudomonas aeruginosa</i> (N=2)		
	32	<i>Enterobacter cloacae</i> (N=1)		
NDM	>32	<i>Klebsiella pneumoniae</i> (N=1)	NDM	NDM
		<i>Enterobacter cloacae</i> (N=1)		
KPC	>32	<i>Klebsiella pneumoniae</i> (N=3)	KPC	KPC
Negative	0.01-0.13	<i>Escherichia coli</i> (N=1)	Negative	Negative
		<i>Klebsiella pneumoniae</i> (N=2)		
	>32	<i>Pseudomonas aeruginosa</i> (N=1) <i>Enterobacter aerogenes</i> (N=1)		

Conclusion

- Both RESIST-4 O.K.N.V. K-set and NG-test CARBA 5 are rapid, easy and accurate tests for screening of carbapenemase producers and less expensive than multiplex PCR
- However, in contrast to RESIST-4 K-set, the CARBA 5 test also detects IMP-type carbapenemase producers