Evaluation of the Rapid Polymyxin Pseudomonas Test (ELITechGroup) for colistin resistance detection in Pseudomonas aeruginosa

Katy Jeannot*¹, Pauline Triponney¹, Patrick Plésiat¹

¹Hôpital Jean Minjoz, National Reference Centre for Antibiotic Resistance, Besançon, France

Background: Polymyxins are increasingly used to combat infections due to MDR and XDR Pseudomonas aeruginosa (PA) isolates. However, determination of susceptibility to colistin by standard methods requires overnight bacterial cultures. A more rapid (4h) screening test was very recently developed by the ELITechGroup company. The aim of this study was to evaluate this test on PA clinical strains, in comparison with the broth microdilution (BMD) method.

Materials/methods: 59 strains of PA from various clinical samples were selected from the lab collection. In parallel, reference strain PAO1 (MIC=1 mg/L) and three in vitro-selected, colistin-resistant mutants with alterations in proteins ParS, PmrB or PhoQ were used as controls. Colistin MICs were determined by the BMD method with cation-adjusted Mueller Hinton II broth. The Rapid Polymyxin test (RP test) (ELITechGroup) enables early detection of bacterial growth in the presence of colistin through a color change of pH indicator bromocresol purple due to sugar fermentation/oxidation. PA colonies were resuspended in RP NaCL solution to 1.5 - 2 McF. Next, 500 µL of the suspension were transferred into RP Medium while 100 µL of this dilution served to inoculate 3 microwells containing lyophilized colistin (2, 4, and 8 mg/L). The results were read after 4h incubation at 37°C and interpreted according to the EUCAST 2017 recommendations.

Results: Among the 63 strains tested, 14 were found resistant to colistin (22.22%) with the BMD reference method. MICs ranged from 0.25 to 128 mg/L, and MIC₅₀ and MIC₉₀ were both equal to 1 mg/L. Thirteen of the 14 resistant strains (MIC>2 mg/L) gave a positive RP test, while 1/14 failed to grow in the control well (sensitivity of 92.86%). So no false-negatives were recorded with the RP test. Thirty-eight of the 49 colistin susceptible strains yielded a negative RP test (specificity 77.55%). However, the 11 remaining strains turned out to be positive (false-positive results).

Conclusions: Detection of resistance to colistin in PA with the RP test is easier to perform and faster (4h) than the BMD method. Because of lack of specificity of the RP test, we suggest that positive strains be confirmed by determination of colistin MIC.