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Development of optimal algorithm for determination of *Escherichia coli* and Klebsiella pneumoniae with phenotypic $ESBL_A$ and $ESBL_M$ based method

Ülle Parm[1], Sirje Laks[2] and Svetlana Rudenko[2]
[1]Tartu Health Care College
[2]The North Estonia Medical Centre
University of Tartu, Estonia

Background: Wide-spread of β-lactamase-producing (ESBL) *Enterobacteriaceae* is the contemporary worldwide problem. For better results in infection prevention and therapy antimicrobial-resistance surveillance is needed.

Aim: To compare results of different β-lactamases phenotypic screening and confirmatory tests (screening disks, combined disks and gradient strips) used in the clinical microbiology laboratory.

Methods: Altogether, 171 strains of bacteria (78 *Escherichia coli*; 93 *Klebsiella pneumoniae*) with decreased sensitivity to third generation cephalosporines were enrolled the study. Clavulanic acid and cloxacillin gradient strips (Liofilchem) and combined disks from companies Rosco and MAST were used to determine the mechanisms of resistance.

Results: The most frequent β-lactamase was ESBLA. Outcome of all used three tests showed the matching ESBLA in 70 of 152 any positive cases got from different tests that were 41% of all strains. There were no differences in determining of ESBLA in comparing MAST and Rosco tests, but the gradient strips showed statistically more ESBLA ($p=0.02$ and <0.001, respectively) and ESBLAM strains ($p<0.01$ and 0.024) in comparing with Rosco and MAST tests. The MAST tests showed more ESBLM strains in comparing with Rosco ($p<0,001$). Similar results were only three ESBLM strains by using all three tests and for ESBLAM strains there were no matching results. With all three tests two strains gave similarly negative results (1%).

Conclusions: Usage of different phenotypic tests gives different results. Due to the price and work load, it would be beneficial to use the combined discs of MAST. However, until there is no molecular confirmation, we could not give recommendations.

Biography

Ülle Parm is a Lecturer of infectious diseases, epidemiology and hospital infections in Tartu Health Care College (Estonia) and scientist in Institute of Microbiology in University of Tartu. Several text books about these topics for students have been published in Estonia. Numerous publications and presentations in international scientific conferences have been done. The mean subject of research work has been associated with development of rectal and nasopharyngeal microbiota in relation to infection in neonates who needs intensive care. Also, the other branches of study have been in interest: e.g. the prevalence of Lyme borreliosis in Estonia and problems with laboratory diagnostics; contamination of gowns and devices (including cell-phones) that hospital staff uses and association with hygienic aspects; the ESBL strains in hospitals etc. She is also the member of Estonian Society for Infection Control (ESIC).

ylleparm@nooruse.ee

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