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Multicenter study of automated systems for colistin susceptibility testing

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Objectif - Introduction
Broth microdilution (BMD) is the reference testing method for determination of antimicrobial susceptibility testing (AST) to colistin and relying on this method is considered crucial for patient management and for monitoring of colistin resistance. This multicenter study aimed to evaluate the performance of routine automated systems for colistin AST among Enterobacteriaceae since the majority of laboratories use automated systems as first-line AST.

Matériels (ou Patients) et méthodes
Twenty colistin resistant (COL-R) including 10 MCR producers and 10 colistin-susceptible (COL-S) Enterobacteriaceae isolates were blindly tested for colistin susceptibility with the routine automated AST systems used by 8 laboratories (3 with BD Phoenix, 3 with Vitek2 and 2 with MicroScan). The same lot of AST cards was tested at different laboratories for each of the three automated AST systems. Results were compared to BMD performed at the reference laboratory by calculating the categorical agreement (CA), very major errors (VME) and major errors (ME). Additionally, 3 reference strains (*E. coli* ATCC25922, *E. coli* NCTC 13846 and one COL-R mcr-negative *K. pneumoniae*) were tested in triplicate by each laboratory and the reproducibility of each method was assessed by calculating the precision categorical agreement (PCA).

Résultats
A total of 90, 90 and 60 colistin results for the 30 collection strains were obtained by Vitek2, BD Phoenix and MicroScan respectively. While a CA of 100% was observed for BD Phoenix and MicroScan, Vitek2 failed 11 times (VME of 12%) to detect 9 COL-R isolates (including 6 MCR producers) giving a CA of 88%. Among the 11 VME by Vitek2, a MIC of 2 mg/l was obtained 8 times.
A total of 27, 27 and 18 results for the 3 reference strains were obtained by Vitek2, BD Phoenix and MicroScan respectively. The PCA was 100% for BD Phoenix and MicroScan, while Vitek2 yielded 5 incorrect false susceptible results for the *E. coli* NCTC 13846 strain resulting in a PCA of 81%.

Conclusion
BD Phoenix and MicroScan automated AST systems provide accurate and reproducible categorical results for the testing of colistin in Enterobacteriaceae. However, Vitek2 system has insufficient performance for the detection of COL-R isolates. COL-S result with MIC of 2 mg/l should be confirmed by a BMD method of which several commercial assays are currently available.

Mots Clés
colistin susceptibility, automated AST systems, performance, Enterobacteriaceae