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Performance Evaluation of the ASTar System for Rapid Antimicrobial Susceptibility Testing from Positive Blood Cultures

Background

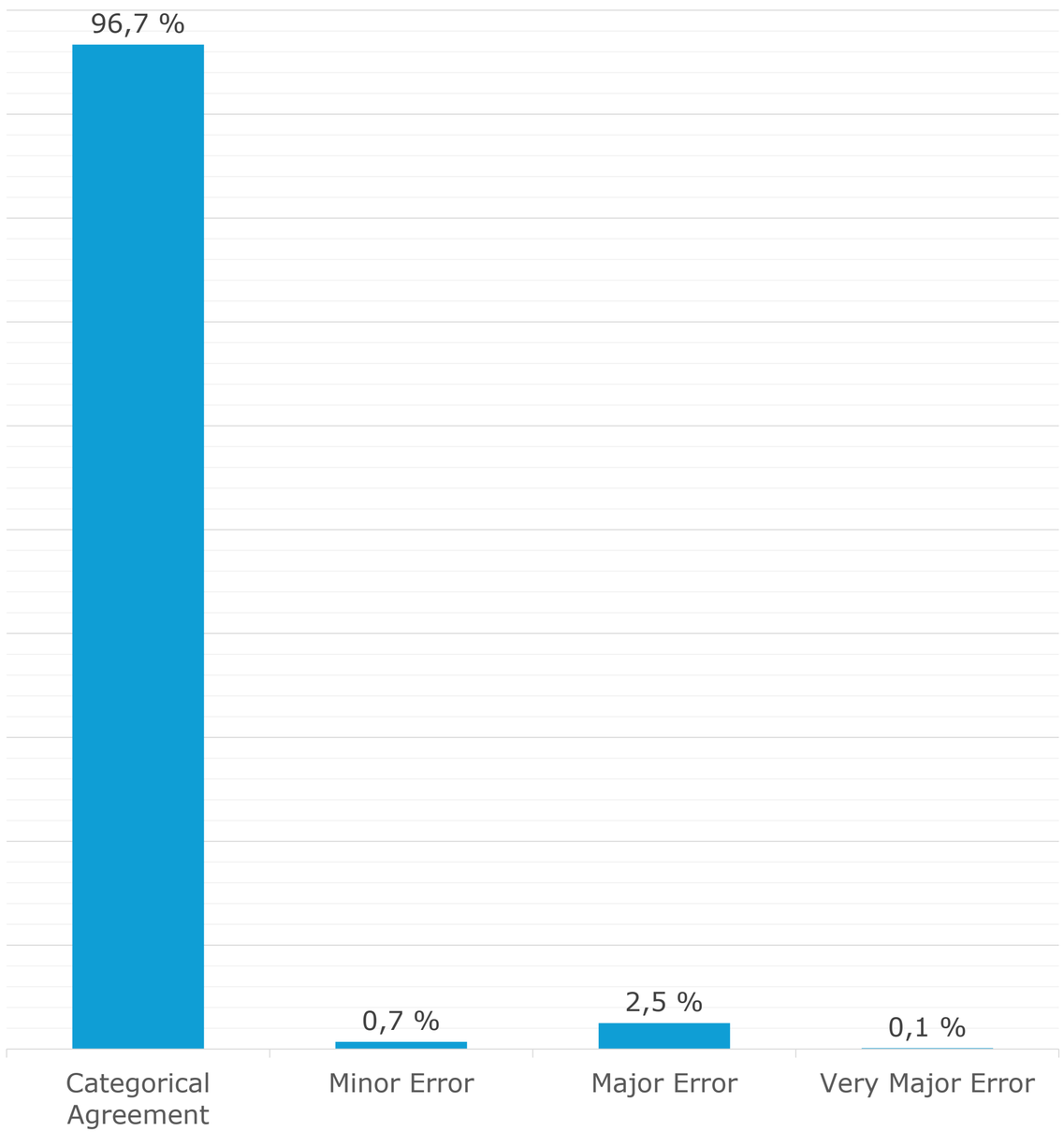
Identification of antimicrobial resistance in bloodstream infections is critical for optimizing therapy and improving outcomes. Automated systems offer potential for rapid antimicrobial susceptibility testing (AST) directly from positive blood cultures.

Methods

We evaluated the performance of the ASTar system (Q-linea) for direct AST of Gram-negative bacteria from positive blood cultures, comparing results with standard laboratory methods.

A total of 151 positive blood culture isolates were analyzed using the ASTar instrument between April and August 2024. The comparator method was routine disk diffusion performed directly from flagged bottles; discrepancies were resolved using broth microdilution (Sensititre).

Categorical agreement (CA), very major errors (VME), major errors (ME), and minor errors (mE) were calculated according to standard definitions. MIC values from ASTar and Sensititre were also compared.



ASTar - Image by Q-linea

Results

Of 1905 isolate-antibiotic combinations analyzed, 1843 (96.7%) showed categorical agreement. VMEs, MEs, and mEs occurred in 0.1%, 2.5%, and 0.7% of cases, respectively.

Enterobacterales isolates (n=140) showed high agreement across most agents (94–100%), with exceptions noted for amoxicillin-clavulanate (CA: 84%) and tobramycin (CA: 92%).

Escherichia coli was the most frequent species tested (n=100), with ME rates of 19% for amoxicillin-clavulanate and 8% for tobramycin.

All *Pseudomonas aeruginosa* isolates (n=11) demonstrated 100% agreement across tested agents.

MIC comparisons revealed a consistent trend toward higher MIC values with ASTar for several antibiotics, most notably piperacillin-tazobactam (+0.88 dilution steps) and tobramycin (+0.88).

Conclusion

The ASTar system demonstrated excellent overall performance in detecting antimicrobial resistance in Gram-negative bloodstream isolates, with categorical agreement exceeding 96% and a low rate of VMEs.

While systematic overestimation of MICs was observed for certain agents, the platform offers a rapid and reliable alternative to traditional AST methods.

Further evaluation in clinical settings is warranted to determine how rapid AST results influence antimicrobial therapy decisions and patient outcomes.