Performance of the VITEK® REVEAL™ , for fast Antimicrobial Susceptibility Testing of Gram-negative bacteremia: results from a comparative prospective monocentric study in Hong Kong.

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BACKGROUND & OBJECTIVE

Bloodstream infections (BSIs) are a **leading cause of morbidity and mortality**. Initial antimicrobial therapy for BSIs is typically empirical and subsequently refined as diagnostic results become available. However, conventional antimicrobial susceptibility testing (AST) methods require long turnaround time, limiting their impact on antimicrobial stewardship.

This study compared different **AST methods** from positive blood culture (PBC) broth, including the **VITEK® REVEAL™** (bioMérieux), a novel rapid AST system, and the conventional **Disk Diffusion** (DD) used as a standard of care.

METHODS

A total of **102 monomicrobial Gram-negative PBC** identified by Gram-stain microscopy were prospectively included in the study between February and July 2025 at the Prince of Wales Hospital in Hong Kong (Figure 1). Gram staining was followed by subculture on agar plates, identification by MALDI-TOF MS (MALDI Biotyper, Bruker). AST was performed using both **VITEK® REVEAL™, and DD on pure isolates.**

Results from the two methods were compared for **categorical agreement (CA), minor (miD), major (MD), and very major (VMD) discrepancies** rates using M100 ED34:2024 CLSI breakpoints. Standard zone diameter breakpoints defined for 16-24h incubation were used for DD.

The Time To Result (TTR) data were also compared between the two methods. For VITEK® REVEAL™ TTR was measured from AST panel loading on the instrument to the availability of the final AST results. For DD, it was calculated from incubation start to inhibition-zone reading.

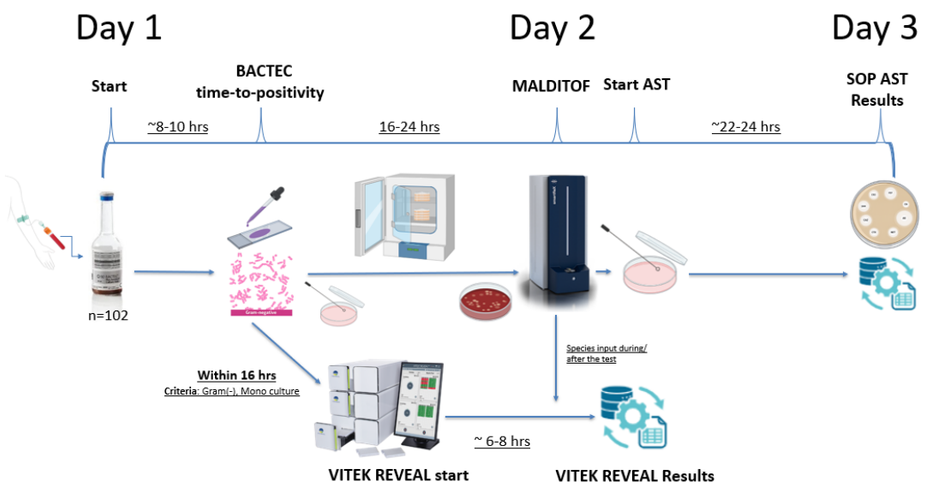

Figure 1. Study workflow

RESULTS

Species distribution was *Escherichia coli* (67/102; 66%), *Klebsiella pneumoniae* (25/102; 25%), *Proteus mirabilis* (4/102; 3,9%), *Pseudomonas aeruginosa* (4/102; 3,9%), *Proteus mirabilis* (3/102; 2.9%), and 1 isolate of *Klebsiella aerogenes* and *Enterobacter cloacae* complex.

Table 1. Performance of VITEK® REVEAL™ against DD.

		VITEK REVEAL			DISK DIFFUSION			Agreement & errors							
Antimicrobial	n PWC	S	I	R	S	I	R	n.CA	CA (%)	n.VMD	VMD (%)	n.MD	MD (%)	n.miD	miD (%)
Amikacin	102	86	15	1	96	5	1	87	85.3	0	0.0	1	1.0	14	13.7
Amoxicillin/Clavulanate	81	69	3	9	57	13	11	67	82.7	0	0.0	0	0.0	14	17.3
Cefepime	98	79	9	10	77	7	14	91	92.9	1	7.1	0	0.0	6	6.1
Cefotaxime	94	69	0	25	69	2	23	88	93.6	2	8.7	2	2.9	2	2.1
Ciprofloxacin	101	50	19	32	47	20	34	87	86.1	0	0.0	1	2.1	13	12.9
Ertapenem	95	92	3	0	94	0	1	91	95.8	1	100.0	0	0.0	3	3.2
Gentamicin	97	75	1	21	77	0	20	95	97.9	0	0.0	1	1.3	1	1.0
Imipenem	4	4	0	0	4	0	0	4	100.0	0	NA	0	0.0	0	0.0
Levofloxacin	100	64	10	26	69	6	25	88	88.0	1	4.0	1	1.4	10	10.0
Meropenem	100	100	0	0	100	0	0	100	100.0	0	NA	0	0.0	0	0.0
Piperacillin/Tazobactam	89	82	2	5	66	12	11	69	77.5	6	54.5	0	0.0	14	15.7
Overall	**961**	**770**	**62**	**129**	**756**	**65**	**140**	**867**	**90.2**	**11**	**7.9**	**6**	**0.8**	**77**	**8.0**

S, Susceptible; I, Intermediate; R, Resistant; * P. aeruginosa excluded

A total of 961 drug-bug combinations, of which 27.99% (269/961) were resistant, were analysed from 98 claimed *Enterobacterales* and 4 *P. aeruginosa* isolates (Table 1).

Overall, the **CA, miD, MD and VMD** rates were **90.2%, 8%, 0.8% and 7.9%**, respectively. The discrepancies were mainly minor (n=77) while 6 MD and 11 VMD were observed.

Amikacin, amoxicillin-clavulanate, ciprofloxacin, levofloxacin and piperacillin-tazobactam did not yield a CA above 90% due to high proportion of miD.

Table 2. Distribution of TTR (hours) for VITEK® REVEAL™ and DD (n=102)

AST METHOD	Median (hrs)	Min (hrs)	Max (hrs)
VITEK REVEAL	8	6.5	8.13
DISK DIFFUSION	22	20	25

The median TTR for VITEK® REVEAL™ and DD was **8.0 and 22.0 hours**, respectively (Table 2).

CONCLUSIONS

VITEK® REVEAL™ produced AST results with a **good agreement** compared to DD testing with a **TTR that was 14 hours shorter** not including the additional 18-24 hours sub-culture step required for DD.

These results support the potential benefit of VITEK® REVEAL™ in guiding antimicrobial prescriptions for patients with BSI.

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