

Rapid Phenotypic Detection of Gram-negative Bacilli Resistant to Oximinocephalosporins and Carbapenems in Positive Blood Cultures Using a Novel Protocol

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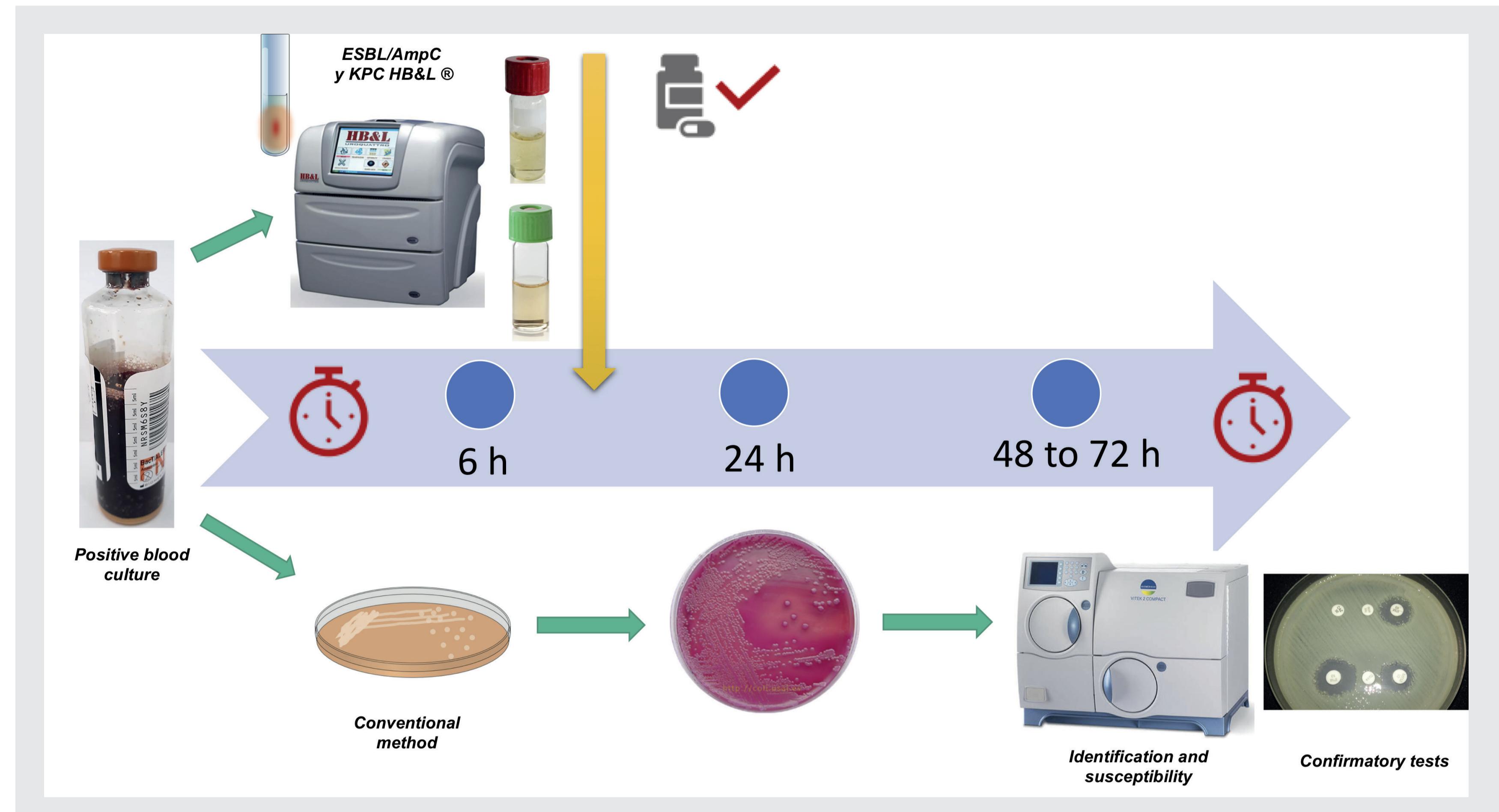
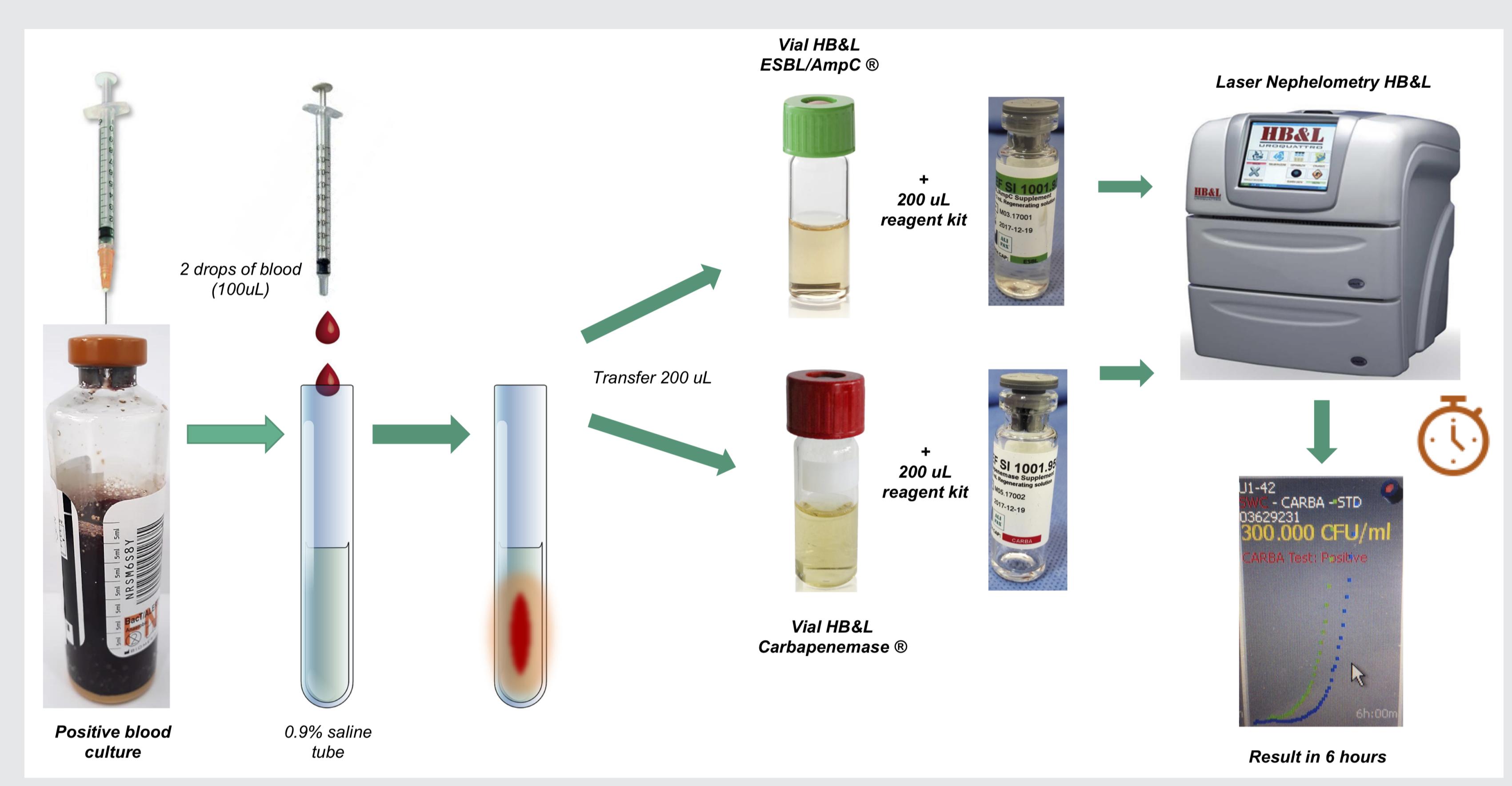
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BACKGROUND

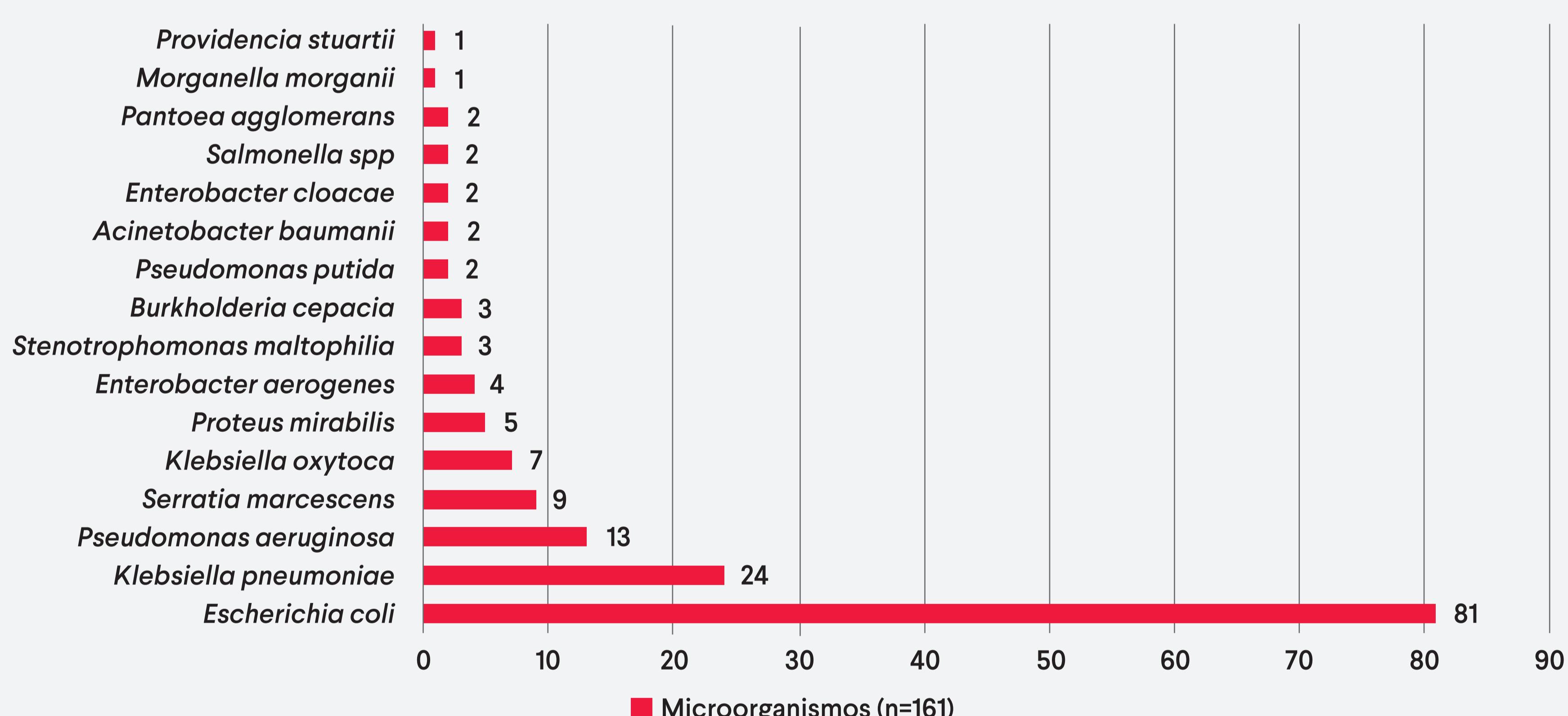
- The initiation of effective antibiotic therapy early improves the survival of patients with Bloodstream infections (BSI) (1).
- Up to 40% of patients with BSI due to multi-drug resistant pathogens (MDRP) die (2).
- The microbiological characterization of MDRP by current conventional techniques can take up to 96 hours.
- We designed a modified protocol to detect MDR Gram-negative bacilli from positive blood cultures using the HB&L® system.

METHODS

- Observational study, prospective, diagnostic test
- ESBL/AmpC HB&L® test and Carbapenemase kit HB&L® test were evaluated in blood cultures
- Operational characteristics, concordance and reduction of identification time were calculated



RESULTS



RESULTS

- Concordance with traditional method was 99% (159/161)
- Identification times were significantly shorter (Median [IQR]; 19 hours [18, 22] Vs 61 hours [60, 64], p<0.001)
- 33% (53/161) isolations usual resistance patterns
- 21% (34/161) were producer of carbapenemases and 13% (21/161) of extended-spectrum β-lactamases.

	Microorganisms	(n)	Conventional Method / HB&L Method						
			Sensitive	IRT	BLEA	ESBL	AmpC repressed	AmpC repressed	Carbapenem resistant
Enterobacteria	<i>E. Coli</i>	81	34/34	13/13	15/15	17/17			2/2
	<i>K. pneumoniae</i>	24	6/6		1/1	2/2			15/15
	<i>S. marcescens</i>	9					4/4	5/5	
	<i>K. oxytoca</i>	7	4/4		2/2	1/1			
	<i>P. mirabilis</i>	5	5/5						
	<i>E. aerogenes</i>	4					1/1	1/1	2/2
	<i>E. cloacae</i>	2						2/2	
	<i>Salmonella spp</i>	2	1/1			1/1			
	<i>P. agglomerans</i>	2							2/2
NonFermenters	<i>M. morganii</i>	1						1/1	
	<i>P. stuartii</i>	1					1/1		
	<i>P. putida</i>	2							2/2
	<i>P. aeruginosa</i>	13				5/5	3/1**	5/5	
	<i>B. cepacea</i>	3	2/2						1/1
	<i>S. maltophilia</i>	3							3/3
	<i>A. baumanii</i>	2							2/2

	Vial ESBL/AmpC®			Vial Carbapenemase®				
	Positive	Negative	Total	Positive	Negative	Total		
Positive conventional culture	61	2	63	S (95%)	34	0	34	S (100%)
Negative conventional culture	0	98	98	E (100%)	0	127	0	E (100%)
Total	61	100	161		34	127	161	
	PPV 100%	NPV 98%		PPV 100%	NPV 100%			

S: sensitivity; E: specificity; PPV: Positive predictive value; VPN: Negative Predictive Value

CONCLUSIONS

- Using our HB&L® modified protocol is an effective strategy to reduce the time to MDRP detection.
- Faster results, at a lower cost and with high concordance

REFERENCES

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- Giske CG et al., 2008. Clinical and economic impact of common multidrug-resistant Gram-negative bacilli. Antimicrob Agents Chemother. 2008;52(3):813-21