Assessment of the SPECIFIC REVEAL® Rapid AST System in the determination of the sensitivity of *Pseudomonas aeruginosa* to antibiotics

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ANTIBIOTIC RESISTANCE

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Introduction

In *P. aeruginosa* bacteremias, reducing the time to obtain an antibiogram is believed to be a key element in improving the survival rate of patients infected with multi-drug resistant strains. Where appropriate, it also helps to limit the use of last resort antibiotics, accordance with the Antibiotic Stewardship Program.

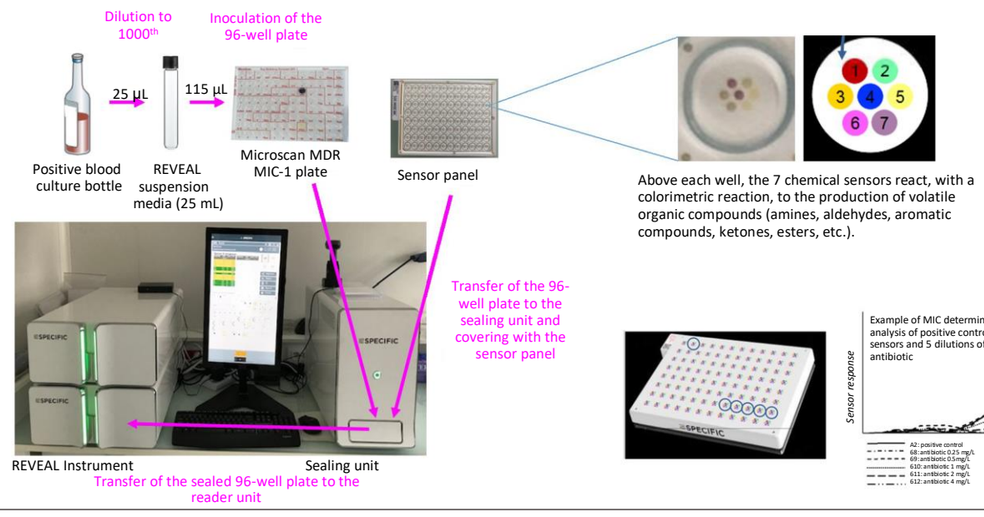
Goal

The aim of the study was to assess the performance of Specific Diagnostics' SPECIFIC REVEAL® Rapi AST System (SPECIFIC REVEAL) capable of determining bacterial sensitivity to antibiotics (MIC) by microdilution from blood culture bottles with the detection of volatile organic compounds.

Methods

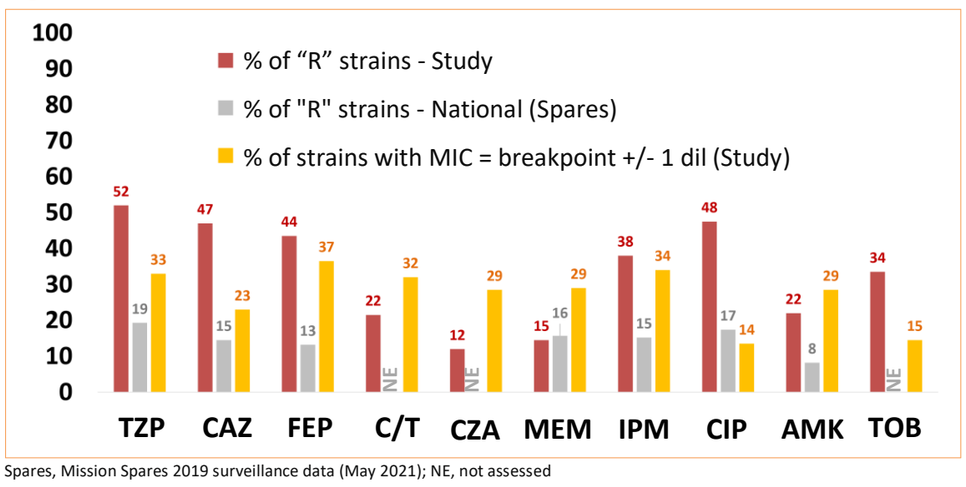
- 200 strains of previously genotyped *P. aeruginosa* were selected on the basis of their antibiotic sensitivity profiles.
- BACTEC blood culture bottles were inoculated with 10^2 CFU of each strain and incubated until bacterial growth.
- The broths from the positive bottles were then withdrawn and diluted to inoculate the microplates for the SPECIFIC REVEAL BC-AST Assay (Figure 1).
- A broth microdilution method (Sensititre® GN6F) was used as the reference.
- The results were interpreted according to CA-SFM 2021.
- The performances have been calculated according to the ISO 20776-2: 2007 standard.

Figure 1. SPECIFIC REVEAL - Analytical Process



Results

Figure 2. Characteristics of the studied strains



Spares, Mission Spares 2019 surveillance data (May 2021); NE, not assessed

Table 1. Performance of the SPECIFIC REVEAL

	TZP	CAZ	FEP	C/T	CZA	MEM	IPM	CIP	LVX	AMK	TOB	Total
Render time (average in h)	7:35	6:12	5:56	6:23	5:56	6:31	6:28	5:59	6:31	6:23	6:03	**6:22**
% uninterpretable results	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	**0.1**
% CA	96.5	94.5	89.5	99.0	98.5	92.5	92.5	98.0	98.5	97.5	100.0	**96.1**
% VME	1.0	3.2	0.0	4.5	0.0	0.0	0.0	2.1	3.1	2.3	0.0	**1.6**
% ME	6.3	7.5	18.6	0.0	1.7	0.0	11	1.9	0.0	2.6	0.0	**4.2**
% Me	-	-	-	-	-	7.0	-	-	-	-	-	**0.6**

ISO 20776-2: 2007 acceptance criteria: category agreement (CA) **≥ 90%**; very major errors (VME) **≤ 3%** and major errors (ME) **≤ 3%**

- Collection studied. The strains analyzed were more resistant than those normally isolated routinely (Spares 2019 data). For 13%to 36% of the strains, the MICs were located within +/- 1 dilution of the CA-SFM breakpoint depending on the molecules.
- Practicability. The antibiogram preparation was simple and quick (<5 min).
- Time to result. Results were available in an average of 6 hours 22 minutes, and were released after the species information was entered in to the SPECIFIC REVEAL.
- Performance. In view of the collection studied and compared to the reference technique, the performance of the SPECIFIC REVEAL was very satisfactory (%CA> 90%, %VME <3%). However, the %ME was > 3% due to a relatively high percentage of strains erroneously made resistant to cefepime (FEP) and imipenem (IPM).

Conclusions

The SPECIFIC REVEAL can reliably determine the sensitivity of *P. aeruginosa* strains in antibiotics from blood culture bottles, within an average of 6.5 hours. Its impact on the early management of patients with bacteremia must now be evaluated on a routine basis.

The poster is available on our website