Performance of the T2Resistance panel in detecting antibiotic resistant bacteria directly in whole blood, and implications for improving appropriate therapy of bloodstream infections (#654)

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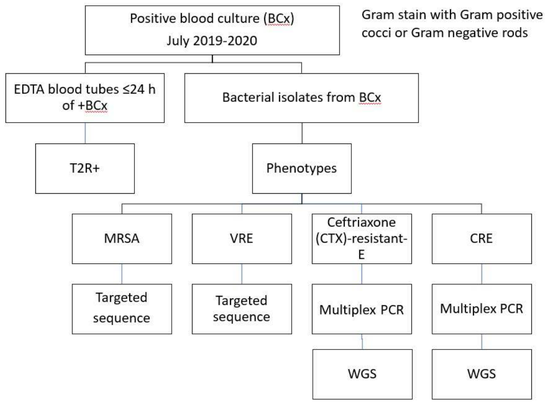
Background

- Appropriate antibiotic (Ab) therapy of bloodstream infections (BSI) is often delayed by time to blood culture (BC) positivity, speciation and Ab sensitivity
- The T2Resistance (T2R) Panel is a direct-from-blood diagnostic that detects 13 genetic markers associated with methicillin-resistant *S. aureus* (MRSA), vancomycin-resistant Enterococcus (VRE), ESBL- and carbapenemase-producing Enterobacteriaceae (E).

Objectives

- Evaluate the performance of the T2R+ Panel in detecting targeted resistance markers from whole blood samples of patients with BSI due to ESKAPE bacteria
- Evaluate the potential impact of T2R+ Panel on time to appropriate antibiotic therapy

Methods



Results

Table 1 – Descriptions of BSIs and Blood cultures (BCs)

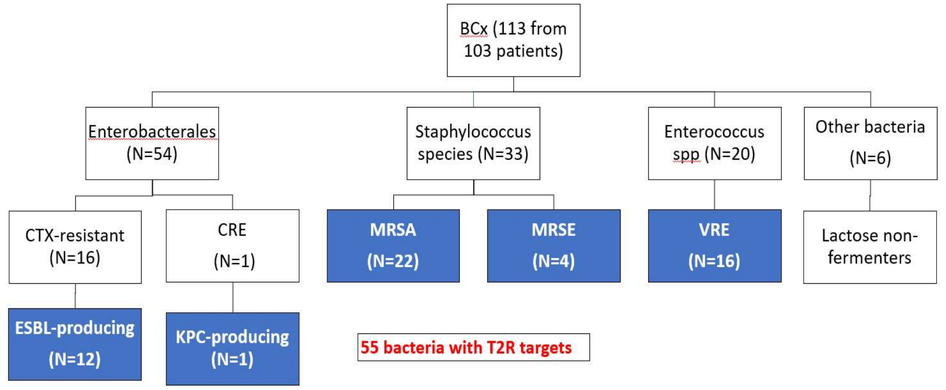


Table 2 – Performance of T2R panel

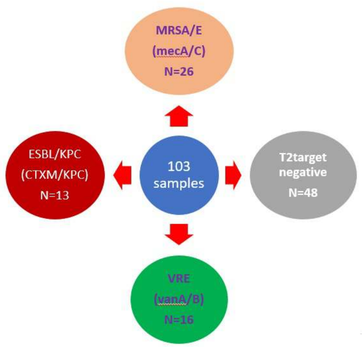
	Number of specific targets	Sensitivity	Specificity	Note
mecA/C	26	58%	99%	
vanA/B	16	100%	99%	One patient with VRE intra-abdominal abscess
CTXM-14/15	12	92%	99%	One with false negative result
KPC	1	100%	100%	Micro lab misidentified the isolate as ESBL-producing (KPC variant)
OXA-48	0	-	99%	
NDM, VIM, IMP	0	-	99%	
AmpC (CMY/DHA)	1	100%	99%	

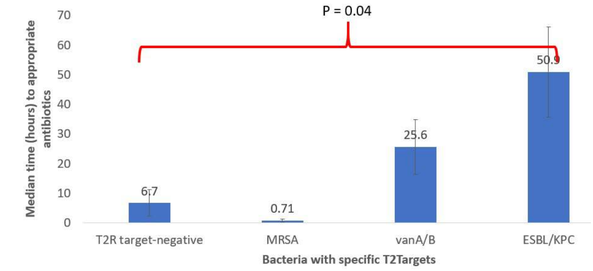
Compared with sequencing:
- Sensitivity: 92-100%
- Specificity: 99-100%

- T2R detected resistance determinants in 3-7h

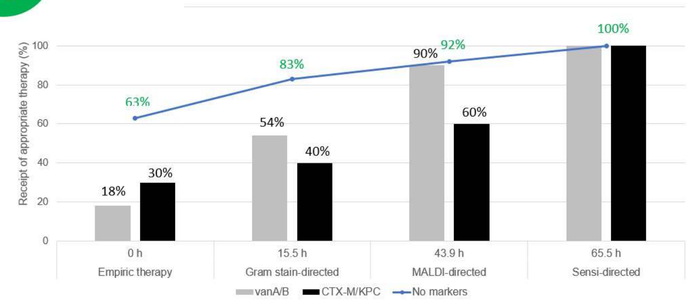
Results

Figure – Time to appropriate antibiotics





Time to appropriate Ab was significantly longer for VRE (25.6h) and ESBL- or KPC-E (50.9h) BSIs than for T2R marker-negative bacteria (6.7h; p=0.04).



- Patients with VRE or ESBL-/KPC-E BSI were less likely to receive appropriate empiric antibiotic (18% and 30%, respectively) than pts with T2R marker-negative BSI (63%; p=0.02).
- Median times to achieve ≥80% appropriate antibiotic therapy of marker-negative, VRE and CTX-M/KPC-E BSIs were 15.5h (after Gram stain), 43.9h (after MALDI) and 63.5h (after sensi), respectively.

Conclusions

- There was a significant delay in appropriate Ab therapy of BSIs, especially in pts infected with VRE and ESBL/KPC-E.
- T2R rapidly and accurately detected BSI caused by VRE and ESBL/KPC-E, and has the potential to significantly shorten time to appropriate Ab.