



Discrepancies Between Microbial Detection and Identification using the Blood Culture Identification (BCID) FilmArray Panel Assay and Standard Subculture of Positive Blood Culture Bottles

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Abstract

Background:
 The BCID panel is a multiplex PCR assay which detects multiple bacteria and yeast as well as select antimicrobial resistance genes, directly from positive blood culture bottles. We currently use this test primarily for work-up of Gram-positive cocci and yeast in blood culture bottles; we have noted occasional discrepancies with results of conventional testing.

Methods:
 We reviewed discrepancies between the BCID panel and standard blood culture bottle subculture results vis-à-vis microbial identification in our routine clinical practice.

Results:
 A total of 1,496 BCID test results were reported from January 2015 to March 2016. There were 26 apparent discrepant detections, including *Candida parapsilosis* (n=12), *Candida krusei* (n=2), *Candida tropicalis* (n=1), *Candida glabrata* (n=1), *Proteus* species (n=7), *Enterococcus* species (n=2) and *Staphylococcus* species (n=1). In ten of the *C. parapsilosis* cases, two *C. krusei* cases, and the single *C. tropicalis* case, no yeast were seen on Gram stain or isolated in culture. In the other two *C. parapsilosis* cases, yeast were seen on Gram stain, but only *C. glabrata* (co-detected by the BCID panel) was detected in culture. In the *C. glabrata* case, no yeast were seen on Gram stain or isolated from that blood culture bottle, but *C. glabrata* was recovered from another bottle from the same patient. In the seven cases of *Proteus* detection, Gram strain showed only Gram-positive cocci and no *Proteus* species were recovered in culture. In nine of the *C. parapsilosis* cases, one *C. krusei* case and the single *C. tropicalis* case, there was no clinical evidence of systemic candidiasis and the patients had good clinical outcomes with no antifungal therapy. In one *C. parapsilosis* case, the patient received caspofungin for *C. glabrata* fungemia and had a good clinical outcome. In two *C. parapsilosis* cases, the patients died of unrelated causes. Finally, in one *C. krusei* case, the patient received fluconazole as prophylaxis for neutropenia and remained clinically stable.

Conclusion:
 In routine use in our clinical practice, the FilmArray BCID panel detects organisms neither seen on Gram stain nor recovered in culture in 1.7% of cases, with *C. parapsilosis* and *Proteus* species being the most commonly involved organisms.

Background

- The BCID panel is a multiplex PCR assay which detects multiple bacteria and yeast as well as select antimicrobial resistance genes, directly from positive blood culture bottles.
- We currently use this test for work-up of Gram-positive cocci and yeast in blood culture bottles; we have noted occasional discrepancies with results of conventional testing.

Objective

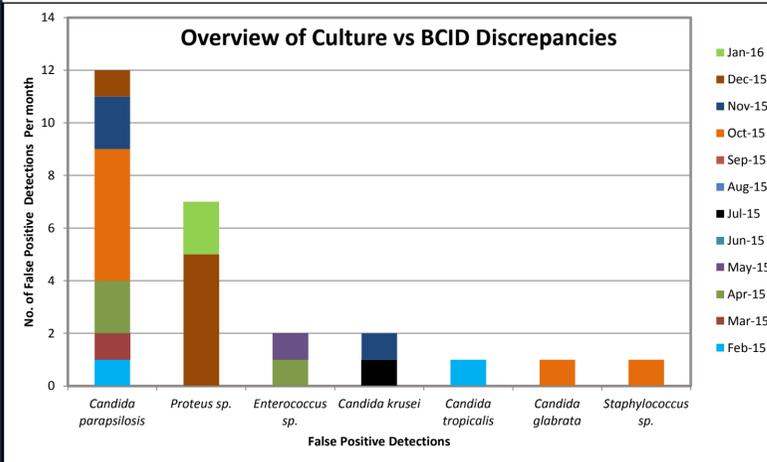
To review discrepancies between microbial identification using the BCID panel and standard subculture of positive blood culture bottles

Methods

We reviewed discrepancies between the BCID panel and standard blood culture bottle subculture results vis-à-vis microbial identification in our routine clinical practice from January 2015 to March 2016.

Conclusion

- The FilmArray BCID panel detected organisms neither seen on Gram stain nor recovered in culture in 1.7% of cases.
- *C. parapsilosis* and *Proteus* species were most commonly involved



Results

Collection Date	BCID Result	Gram Stain Result	Final Culture Report	Revised Report: No or Yes with explanation
2/3/2015	<i>Streptococcus</i> species and <i>Candida tropicalis</i>	Gram positive cocci resembling <i>Streptococcus</i> species	<i>Streptococcus mitis</i> group, not <i>S. pneumoniae</i>	No - Not seen on Gram stain
2/21/2015	<i>Candida glabrata</i> , <i>Candida parapsilosis</i> and <i>E. coli</i>	Gram negative bacilli and yeast	<i>C. glabrata</i> and <i>E. coli</i> Mycology experts did not see a second yeast morphology	Yes - report of <i>C. parapsilosis</i> was removed
3/29/2015	<i>Staphylococcus</i> species and <i>C. parapsilosis</i>	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus epidermidis</i>	No - Not seen on Gram stain
4/15/2015	<i>Staphylococcus aureus</i> , <i>mecA</i> not detected and <i>C. parapsilosis</i>	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>S. aureus</i> , <i>mecA</i> not detected	No - Not seen on Gram stain
4/24/2015	<i>Enterococcus</i> species, <i>Streptococcus</i> species, <i>Enterobacteriaceae</i> , <i>Klebsiella oxytoca</i>	Gram positive cocci resembling <i>Streptococcus</i> species Gram negative bacilli	<i>Streptococcus anginosus</i> group, <i>Enterococcus</i> spp., <i>vanA/B</i> not detected <i>Enterobacter cloacae</i> complex <i>Klebsiella oxytoca</i>	No - <i>Enterococcus</i> species reported with comment of "Organism not viable, detected by molecular method only"
4/25/2015	<i>Candida glabrata</i> and <i>C. parapsilosis</i>	Yeast	<i>C. glabrata</i>	No - <i>C. parapsilosis</i> not reported
5/11/2015	<i>Enterococcus</i> species, <i>vanA/B</i> not detected, <i>Streptococcus pneumoniae</i>	Gram positive cocci resembling <i>Streptococcus</i> species	<i>S. pneumoniae</i>	Yes - removed <i>Enterococcus</i> spp. from report
7/15/2015	<i>Staphylococcus</i> species, <i>mecA</i> detected, <i>Candida krusei</i>	Gram positive cocci resembling <i>Staphylococcus</i> spp., Yeast?	<i>Staphylococcus</i> , coagulase negative, <i>mecA</i> detected	Yes - removed <i>Candida krusei</i> from report
10/1/2015	<i>Streptococcus agalactiae</i> , <i>Candida parapsilosis</i>	Gram positive cocci resembling <i>Streptococcus</i> species	<i>Streptococcus agalactiae</i>	No - Not seen on Gram stain
10/1/2015	<i>Enterococcus</i> species, <i>vanA/B</i> not detected, <i>Candida glabrata</i>	Gram positive cocci resembling <i>Streptococcus</i> species	<i>Enterococcus</i> spp., <i>vanA/B</i> not detected	No - Not seen on Gram stain Second bottle grew <i>C. glabrata</i> . Report amended to add yeast
10/16/2015	<i>Enterococcus</i> species, <i>vanA/B</i> not detected, <i>Candida parapsilosis</i>	Gram positive cocci resembling <i>Streptococcus</i> species	<i>Enterococcus</i> spp., <i>vanA/B</i> not detected	No - Not seen on Gram stain
10/22/2015	<i>Candida albicans</i> , <i>Staphylococcus</i> species, <i>mecA</i> not detected	Yeast	<i>C. albicans</i>	No - Not seen on Gram stain Test performed as part of validation
10/23/2015	<i>Candida parapsilosis</i> , <i>Staphylococcus</i> species, <i>mecA</i> not detected	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus</i> , coagulase negative, <i>mecA</i> not detected	No - Not seen on Gram stain
10/25/2015	<i>Candida parapsilosis</i> , <i>Staphylococcus</i> species, <i>mecA</i> not detected	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus</i> , coagulase negative, <i>mecA</i> not detected	No - Not seen on Gram stain Test performed as part of validation
10/25/2015	<i>Candida parapsilosis</i> , <i>Staphylococcus aureus</i> , <i>mecA</i> detected	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus aureus</i> , MRSA	No - Not seen on Gram stain
11/5/2015	<i>Enterococcus</i> species, <i>vanA/B</i> not detected, <i>Candida krusei</i>	Gram positive cocci resembling <i>Streptococcus</i> species	<i>Enterococcus faecalis</i>	No - Not seen on Gram stain
11/18/2015	<i>Enterococcus</i> species, <i>vanA/B</i> not detected, <i>Candida parapsilosis</i>	Gram positive cocci resembling <i>Streptococcus</i> species	<i>Enterococcus faecalis</i>	No - Not seen on Gram stain
11/19/2015	<i>Enterococcus</i> species, <i>vanA/B</i> not detected, <i>Streptococcus</i> species, <i>Candida parapsilosis</i> , <i>Klebsiella pneumoniae</i> , <i>E. coli</i> , KPC not detected.	Gram positive cocci resembling <i>Streptococcus</i> species Gram negative bacilli	<i>Enterococcus faecium</i> , <i>Streptococcus</i> species Group C, <i>Klebsiella pneumoniae</i> complex and <i>E. coli</i> .	No - Not seen on Gram stain
12/16/2015	<i>Staphylococcus</i> species, <i>mecA</i> not detected, <i>Enterobacteriaceae</i> , <i>Proteus</i> species	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus</i> , coagulase negative, <i>mecA</i> not detected	No - Not seen on Gram stain
12/18/2015	<i>Staphylococcus</i> species, <i>mecA</i> detected, <i>Enterobacteriaceae</i> , <i>Proteus</i> species	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus</i> , coagulase negative, <i>mecA</i> detected	No - Not seen on Gram stain
12/20/2015	<i>Staphylococcus</i> species, <i>mecA</i> not detected, <i>Candida parapsilosis</i>	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus</i> , coagulase negative, <i>mecA</i> not detected	No - Not seen on Gram stain
12/29/2015	<i>Staphylococcus aureus</i> , <i>mecA</i> not detected, <i>Enterobacteriaceae</i> , <i>Proteus</i> species, KPC not detected	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus aureus</i> , <i>mecA</i> not detected	No - Not seen on Gram stain
12/31/2015	<i>Staphylococcus aureus</i> , <i>mecA</i> not detected, <i>Enterobacteriaceae</i> , <i>Proteus</i> species, KPC not detected	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus aureus</i> , <i>mecA</i> not detected	No - Not seen on Gram stain
12/31/2015	<i>Staphylococcus</i> species, <i>mecA</i> detected, <i>Enterobacteriaceae</i> , <i>Proteus</i> species, KPC not detected	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus epidermidis</i>	No - Not seen on Gram stain
1/15/2016	<i>Staphylococcus aureus</i> , <i>mecA</i> not detected, <i>Enterobacteriaceae</i> , <i>Proteus</i> species, KPC not detected	Gram positive cocci resembling <i>Staphylococcus</i> species	<i>Staphylococcus aureus</i> , <i>mecA</i> not detected	No - Not seen on Gram stain
1/30/2016	<i>Streptococcus</i> spp., <i>Enterobacteriaceae</i> , <i>Proteus</i> species, KPC not detected	Gram positive cocci resembling <i>Streptococcus</i> species	<i>Streptococcus mitis</i> group, not <i>S. pneumoniae</i>	No - Not seen on Gram stain