Evaluation Of Brilliance VRE Agar For Detection Of Vancomycin Resistant Enterococci From Four Geographically Different Hospitals In The United States

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Overview

Purpose: The study evaluated performance of Thermo Scientific™ Oxoid™ Brilliance™ VRE Agar and Remel™ Bile Aesculin Azide Agar (Thermo Fisher Scientific) containing 6µg/ml vancomycin (BAAV) for detection of Vancomycin-resistant enterococci (VRE).

Methods: Brilliance VRE Agar and BAAV was inoculated with rectal swabs and stool samples prior to incubation. Performance of the two media was compared.

Results: Brilliance VRE Agar performed better than BAAV for the detection of VRE and inhibited more non-VRE than BAAV.

Introduction

VRE are becoming more prevalent worldwide. The two most common species, Enterococcus faecalis and E. faecium, can harbour transmissible vanA and vanB genes, which encode resistance to vancomycin. In the USA, between 1989 and 1993, there was a 20-fold increase in the proportion of enterococci resistant to vancomycin, with some infection rates estimated as high as 1 in 3 patients on intensive care units.

VRE are therefore significant nosocomial pathogens and may cause serious infections, including bacteremia. Management of a VRE outbreak requires strategies to contain cases and decrease rates of transmission, including isolation of infected or colonized patients. VRE colonization can be monitored by screening stools or rectal swabs, using selective media.

Brilliance VRE Agar is able to differentiate between the clinically relevant vancomycin-resistant Enterococcus faecalis and E. faecium (light blue and indigo-purple colonies respectively) while inhibiting growth of intrinsically resistant E. gallinarum and E. casseliflavus whereas BAAV is unable to distinguish between Enterococcus species.

Conclusion

Brilliance VRE Agar is a effective and reliable product for the screening of gastrointestinal colonisation of VRE, providing reliable and accurate results within 24 h to aid the prevention and control of VRE infection in healthcare settings.

Results

Two hundred and twenty one vancomycin-resistant Enterococcus faecalis and E. faecium (all with MIC >256µg/ml) were isolated from 208 specimens, showing a 34% prevalence rate.

Performance of Brilliance VRE Agar and BAAV are shown in table 1.

Table 1. Performance of Brilliance VRE Agar and BAAV

<table>
<thead>
<tr>
<th>Performance</th>
<th>Brilliance VRE Agar</th>
<th>BAAV</th>
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<tbody>
<tr>
<td>Sensitivity (%)</td>
<td>98.6 (95% CI 97.7-99.5)</td>
<td>96.0 (95% CI 94.5-97.5)</td>
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<tr>
<td>Specificity (%)</td>
<td>99.8 (95% CI 99.5-100)</td>
<td>82.2 (95% CI 79.3-85.1)</td>
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<tr>
<td>PPV (%)</td>
<td>99.5 (95% CI 99.0-100)</td>
<td>76.5 (95% CI 73.3-79.7)</td>
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<tr>
<td>NPV (%)</td>
<td>99.3 (95% CI 98.7-99.9)</td>
<td>97.1 (95% CI 95.8-98.4)</td>
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</table>

Both the sensitivity (P<0.0455) and specificity (P<0.0001) of Brilliance VRE Agar were significantly higher than BAAV; the PPV and NPV were also markedly higher. Overall performance of Brilliance VRE Agar was equivalent to the gold standard whereas performance of BAAV was significantly lower (P<0.0001).

BAAV failed to inhibit growth of vancomycin-sensitive enterococci (MIC <6µg/ml); also Leucoostoc, Pediococcus and Lactobacillus species (all intrinsically resistant to vancomycin) as well as other Gram positive rods. This resulted in a considerable increase in the number of additional confirmatory tests required to identify VRE.

Brilliance VRE Agar is able to differentiate between the clinically relevant vancomycin-resistant E. faecalis and E. faecium (light blue and indigo-purple colonies respectively) while inhibiting growth of intrinsically resistant E. gallinarum and E. casseliflavus whereas BAAV is unable to distinguish between Enterococcus species.

References