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Evaluation of a Colorex™ chromogenic media and Bile-esculin azide agar with 6 ug vancomycin for the detection of Vancomycin Resistant *Enterococcus faecalis* and *Enterococcus faecium* (VRE)

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Abstract

Background: VRE are important nosocomial pathogens. A rapid and accurate method for detection of VRE from surveillance specimens is essential to prevent VRE outbreaks and decrease transmission. Selective and differential media such as bile-esculin azide agar supplemented with 6ug of vancomycin/ml (BEAV) is commonly used; however, chromogenic media provide more rapid results. The objective of this study is to compare the performance of the Colorex (CLX) to BEAV

Methods: Consecutive rectal swabs for surveillance for VRE from community hospitals in the Niagara region, Ontario were evaluated. Rectal swabs were inoculated in parallel on to CLX and BEAV. CLX was incubated aerobically at 35-37oC. QC was performed as per manufacturer's instructions. CLX was interpreted at 24, 36 and 48 hrs while BEAV was read at 24, 48 and 72hrs. Pink colonies on colorex were confirmed as VRE by gram, catalase, PYR and vitek2 GP ID card. Vancomycin resistance was confirmed using BHIV6 and Vancomycin E-test. Non-pink colonies on CLX were also evaluated.

Results: VRE were detected in 68/526 (12.9%) rectal swabs. CLX and BEAV detected 67 and 65 VRE. For CLX, 65/68 (95.6%) and 67/68 (98.5%) were detected at 24 and 36h. No additional VRE were detected at 48hr. For the BEAV, 49/68 (72.1%), 63/68 (92.6%) and 65/68 (95.6%) were detected at 24, 48, and 72hrs. Of the 133 specimens with pink colonies on CLX, 65/90(72.2%), 2/16 (12.5%), 0/27 were VRE at 24, 36, and 48h respectively. 83.3 % of the non VRE pink colonies were vancomycin sensitive *E.faecalis*. Growth of non-pink colonies occurred in 73/526 (13.9%) and the majority were coagulase negative staphylococcus (72.6%).

Sensitivity compared to composite reference standard was 95.6% (95%CI 86.8-98.9) at 24hrs, 98.5% (95%CI 91.0-99.9) at 36hrs and 98.5% (95% CI 91.0-99.9)at 48 hrs for CLX, and BEAV was 72.1% (95%CI 59.7-81.9) at 24 hrs, 92.6% (95%CI 83.0-97.3) at 48hrs and 95.6% (95%CI 86.8-98.9)at 72hrs.The specificity for CLX was 94.5% (95% CI 86.8-98.9) at 24hrs, 91.5% (95% CI 88.4-93.8) at 36hrs and 85.6% (95% CI 82.0-88.6) at 48 hrs.

Conclusion: Detection of VRE was more rapid using CLX compared to BEAV with improved sensitivity at 24 hrs (95.6% vs. 72.1%). Incubation for 36 hrs can be used for CLX given the sensitivity was equivalent to 48 hrs with better specificity. Confirmation of vancomycin resistance prior to reporting is recommended as 49.6% of pink colonies on CLX were vancomycin sensitive *E.faecalis* and *E.faecium*.

Background

Large volumes of rectal swabs for VRE surveillance are received from community hospitals from the Niagara region at LifeLabs Thorold microbiology laboratory. VRE screening is performed using Bile-esculin azide agar supplemented with 6 ug of vancomycin /ml (BEAV). All black colonies require further identification to rule out VRE. A more rapid screening method with reduction in workload is required to improve quality of testing and manage high volumes.

Objectives

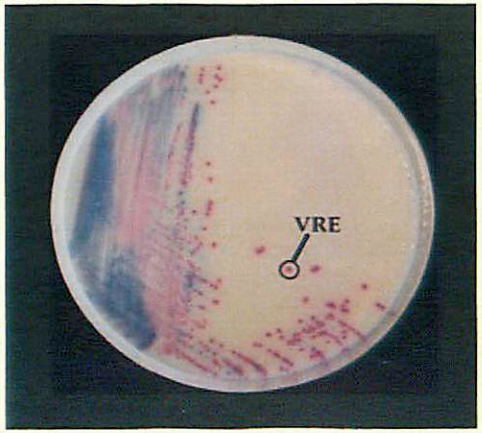
To compare the sensitivity and specificity of Colorex (CLX) to BEAV for the isolation of VRE from rectal screening swabs

Methods

- 526 rectal swabs were inoculated in parallel on to CLX and BEAV and incubated aerobically at 35-37°C
- QC was performed as per manufacturer's instructions.
- CLX was interpreted at 24, 36 and 48 hrs.
- BEAV was read at 24, 48 and 72 hrs.
- Pink colonies on colorex were confirmed as VRE by gram stain, catalase, PYR and vitek2 GP ID card.
- Vancomycin resistance was confirmed using BHIV6 and Vancomycin E-test.
- Non-pink colonies on CLX were evaluated using gram stain, catalase test, coagulase test and vitek ID cards as required.

Results

- VRE were detected in 68/526 **(12.9%)** rectal swabs.
- For CLX, 65/68 **(95.6%)** and 67/68 **(98.5%)** were detected at **24 and 36hrs**. No additional VRE were detected at 48hr.
- For the BEAV, 49/68 **(72.1%)**, 63/68 **(92.6%)** and 65/68 **(95.6%)** were detected at **24, 48, and 72hrs**.
- Of the 133 specimens with **pink** colonies on CLX, 65/90**(72.2%)**, 2/16 **(12.5%)**, **0/27** were VRE at **24, 36, and 48h.**
- **49.6%** of **pink colonies** on CLX were **non VRE**, mainly vancomycin sensitive *E.faecalis* and *E.faecium*.
- 83.3 % of the non VRE pink colonies were vancomycin sensitive *E.faecalis*.
- Growth of non-pink colonies occurred in 73/526 (13.9%) and the majority were coagulase negative staphylococcus (72.6%).



Results

Sensitivity and specificity compared to composite reference standard

	24hr	36hr	48hr	72hr
CRX Sensitivity	95.6%	98.5%	98.5%	N/A
CRX specificity	94.5%	91.5%	85.6%	N/A
BEAV Sensitivity	72.1%	N/A	92.6%	95.6%
BEAV Specificity	93.4%	N/A	83.2%	69.9%

Conclusion

- Detection of VRE was more rapid using CLX compared to BEAV with improved sensitivity at 24 hrs (95.6% vs. 72.1%).
- Incubation for 36 hrs is recommended for CLX given the sensitivity was equivalent to 48 hrs and specificity was better.
- Confirmation of vancomycin resistance prior to reporting is recommended as 49.6% of pink colonies on CLX were vancomycin sensitive *E.faecalis* and *E.faecium*.
- CLX will decrease the TAT for Infection Control active surveillance results for VRE in healthcare facilities, as well as decreasing the workload in the laboratory given the one time reading at 36 hr.

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