Evaluation of Dalbavancin MIC Test Strip (MTS) Compared to Broth Microdilution MIC for Relevant Gram Positive Isolates

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Abstract

Background: Dalbavancin is a semi-synthetic lipoglycopeptide antibiotic that was approved by FDA for the treatment of acute bacterial skin and skin structure infections caused by Gram-positive organisms. Similar to other lipoglycopeptide agents, dalbavancin susceptibility testing can be challenging as a result of the large size of the molecule and binding properties. This study was performed to evaluate the performance of a newly developed strip-based method, the dalbavancin MIC Test Strip (MTS, Liofilchem, Roseto degli Abruzzi, Italy), compared to a broth microdilution method certified by Clinical and Laboratory Standards Institute (CLSI) for determining the minimum inhibitory concentration (MIC) of dalbavancin. The method was evaluated by testing 30 recent clinical isolates with each method. Results were analyzed by a scatterplot and analysis of variance (ANOVA) to determine if there were significant differences between the methods. The study included S. aureus, E. faecalis, S. pyogenes, and S. anginosus.

Methods

Viewing the MTS photographs of select study isolates were demonstrated. The dalbavancin MIC Test Strip (MTS, Liofilchem, Roseto degli Abruzzi, Italy) was compared to a broth microdilution method certified by Clinical and Laboratory Standards Institute (CLSI) for determining the minimum inhibitory concentration (MIC) of dalbavancin. The method was evaluated by testing 30 recent clinical isolates with each method. Results were analyzed by a scatterplot and analysis of variance (ANOVA) to determine if there were significant differences between the methods. The study included S. aureus, E. faecalis, S. pyogenes, and S. anginosus.

Results

To select set of 11 S. aureus with target MIC results based on replicate CLSI BMD testing, both Sensititre and BMD results were within ±1 doubling dilution. (Table 1)

All dalbavancin MIC test results for S. aureus were within ±1 doubling dilution of the BMD (100% essential agreement). Categorical agreement was 96.2%; with results for 2 isolates considered major errors (BMD MIC of 125 µg/mL, and MTS MIC of 19 µg/mL) and results for 2 isolates considered very major errors (BMD MIC of 250 µg/mL, and MTS MIC of 2.5 µg/mL). The limited number of isolates and target MICs for both MTS and BMD methods were the limitations imposed on this study. (Figure 2)

Dalbavancin MIC test results for E. faecalis were within ±1 doubling dilution of the BMD MIC (100% essential agreement). Categorical agreement was not provided as breakpoints are not currently available. (Figure 2)

Dalbavancin MIC test results for S. pyogenes were within ±1 doubling dilution of the BMD MIC (100% essential agreement). Categorical agreement was not provided as breakpoints are not currently available. (Figure 2)

Dalbavancin MIC test results for S. anginosus were within ±1 doubling dilution of the BMD MIC (100% essential agreement). Categorical agreement was not provided as breakpoints are not currently available. (Figure 2)

Conclusions

The dalbavancin MTS against S. aureus and E. faecalis performed similar to BMD testing. All MTS results were correctly categorized as susceptible by dalbavancin MTS MICs, however, most were 1-3 dilutions lower than BMD MICs. Additional testing with more isolates, at multiple sites and with multiple MPA is recommended for further validation.

The dalbavancin MTS provided an easy-to-use manual method of dalbavancin MIC determination with very close endpoints.

References

3. Liofilchem. 2015. Dalbavancin MIC Test Strip MTS. Roseto degli Abruzzi, Italy.

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Figure 1. Scatterplot of MTS MIC to BMD MIC for 30 S. aureus

Figure 2. Scatterplot of MTS MIC to BMD MIC for 30 E. faecalis

Figure 3. Scatterplot of MTS MIC to BMD MIC for 33 Streptococcus

Table 1: Dalbavancin MIC results (µg/mL) for QC strains

Table 2: Dalbavancin Target BMD results compared to study BMD and MTS results for select S. aureus

Dilution difference of dalbavancin (MTS - BMD)

Dilution difference of dalbavancin (MTS - BMD) (n)

Isolate No. & Target Result

Target BMD

Study BMD

Study MTS

Dalbavancin (µg/mL)

Very Major Error

Major Error

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