Ability of automated susceptibility testing instruments to detect Glycopeptide Intermediate resistance in *Staphylococcus aureus*.

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M. WOOTTON, J. ANDREWS, J. RICHARDS, J. BRADLEY, L. DAVIES, V. KUNDALIA, R.A. HOWE

Introduction

Reduced glycopeptide susceptibility in *Staphylococcus aureus* is an important clinical problem. It is now current UK practice not to disc test for detection of homogenous and heterogeneous intermediate resistance to glycopeptides in *S. aureus* (GISA/hGISA). It is thought that disc testing glycopeptides in *S. aureus* is unsatisfactory and BSAC & EUCAST recommend MIC determination. MICs can be determination by varied techniques including gradient strips and automated methods. With automated susceptibility testing now common in laboratories plus varied manufacturers of gradients strips it is important to evaluate their use in detecting hGISA/GISA.

Table 1: Frequencies of positive results

Method	Mean % detected	
	hGISA	GISA
Etest	11.3	60.9
MICE	38.7	58.6
Phoenix	0	33
Vitek	9.1	59.6

Methods

11 hGISA & 9 GISA plus 3 *S. aureus* susceptible controls were used in this study. MIC determination was performed in two centres (Cardiff & Birmingham) by 2 technicians in each centre using vancomycin (V) Etest (BioMerieux) & MICE (Oxoid) plus Vitek (Birmingham) & Phoenix (Cardiff). All gradient tests were performed on Mueller Hinton agar (MHA) as advised by the manufacturer. MIC & interpretation was compared for all methods using BSAC guidelines. Standard error will be calculated for each isolate with gradient strips (Figure 2).

Figure 2: Variance of MIC in Etest/MICE

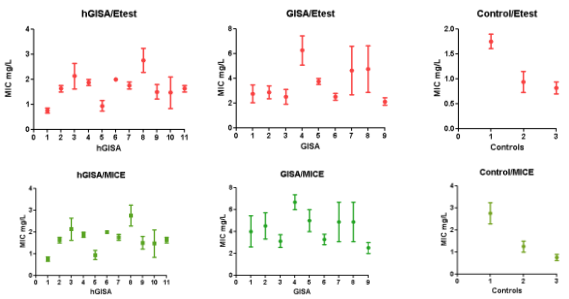

Figure 1: Percentage of isolates with MIC ≥2mg/L

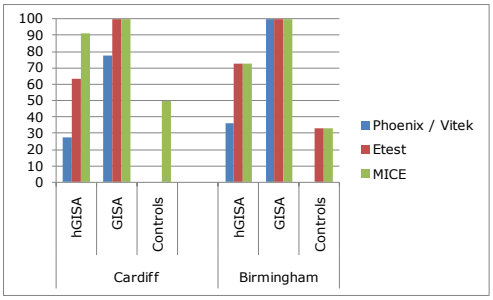

Table 2: No of isolates with MIC ≥2mg/L

Method	No ≥2mg/L					
	Cardiff			Birmingham		
	hGISA	GISA	Controls	hGISA	GISA	Controls
Phoenix / Vitek	3/11	7/9	0/6	4/11	9/9	0/3
Etest	7/11	9/9	0/6	8/11	9/9	2/6
MICE	10/11	9/9	3/6	8/11	9/9	2/6

Results

All isolates were identified as *S. aureus* by both Phoenix and Vitek. Of 11 hGISA 11.3%, 38.7%, 0% & 9.1% were detected successfully by Etest, MICE, Phoenix and Vitek respectively. Of 9 GISA 60.9%, 58.6%, 33% & 59.6% were detected successfully by Etest, MICE, Phoenix and Vitek respectively (Table 1). 0% of 2 control strains exhibited MICs of >2mg/L using both Etest & MICE. MICs of >2mg/L were seen in ATCC 25923 on 75% of occasions using MICE and 0% using Etest.

Diagnostic laboratories may wish to refer or further test any isolates with a vancomycin MIC of 2mg/L. Figure 1 and Table 2 show the number of tests ≥2mg/L.

Conclusions

Detection of hGISA/GISA was poor for all methods, with approximately 40% of GISA missed by most methods. Gradient strips detected more hGISA than any automated instrument, with MICE detecting more hGISA than Etest but suffering false positives with the ATCC 25923 sensitive control strains. Further work is required to determine a satisfactory method for diagnostic laboratories to detect reduced glycopeptides susceptibility in *S. aureus*.

Specialist Antimicrobial Chemotherapy Unit, Public Health Wales, Cardiff, UK.
Email: mandy.wootton@wales.nhs.uk