COMPARISON OF A CUSTOM MADE THERMO SCIENTIFIC SENSITITRE PANEL WITH EUCAST DISC DIFFUSION FOR ANTIMICROBIAL SUSCEPTIBILITY TESTING OF *STAPHYLOCOCCUS AUREUS*

ANDERS RHOD LARSEN*, ANDREAS PETERSEN, ROBERT SKOV

MICROBIOLOGY AND INFECTION CONTROL, STATENS SERUM INSTITUT, COPENHAGEN, DENMARK

* EMAIL: ARL@SSI.DK, PHONE: +45 3268 8674

STATENS SERUM INSTITUT

Objectives

A custom made panel (Thermo Scientific Sensititre, Thermo Fisher Scientific) including 21 different antimicrobials was introduced in our laboratory in January 2013.

In order to test its accuracy the panels were evaluated against EUCAST disc diffusion.

Vancomycin and oxacillin posed a challenge as they require 24h of incubation according to EUCAST, which exceeds the 16-20h required for the other antimicrobials. As reading the plates twice is laborious, a second aim of the study was to evaluate the impact of incubation time on the Thermo Scientific Sensititre results.

Methods

The evaluation included 214 *S. aureus* (109 MSSA and 105 MRSA) isolates for the comparison between MIC and disc diffusion and an additional 60 isolates for the evaluation of incubation time. Disk diffusion was performed according to the methodology and breakpoints of EUCAST for the following antimicrobials: Penicillin, cefoxitin, erythromycin, clindamycin, tetracycline, kanamycin, rifampin, fusidic acid, norfloxacin, linezolid, mupirocin and trimethoprim-sulfametoxazole. The Thermo Scientific Sensititre panel included the same antimicrobials and in addition ceftobiprole, ceftaroline, daptomycin, gentamycin, linezolid, moxifloxacin, oxacillin, teicoplanin, tigecyclin and vancomycin. The panels were read after 20h and 24h of incubation. Vancomycin results were compared with a challenge set of eight (hVISA and VISA) reference strains

ATCC29213 control strain was included on every day of readings, and incubators temperature checked

	20 vs. 24 hours incubation of Thermo Scientific Sensititre panels (N=274)				Disk diffusion vs. Thermo Scientific Sensititre panels (N=214)
Antimicrobial	Number of 2-fold dilution divergence			Categorial agreement	
	0	1	2		
Cefoxitin	274			274	1 ME (mecA positive isolate)
Penicillin	268	5		273	4 VME, 1 ME
Erythromycin	212	62		274	1 VME, 1 ME, 1 minor error
Clindamycin	270	4		274	No errors
Tetracycline	261	12		274	2 ME, 2 minor errors
Fusidic acid	194	79	1	274	2 VME, 4 ME
Norfloxacin	265	8		274	2 VME, 2 ME
Rifampicin	274			274	4 minor errors
Trimethoprim/ Sulfametoxazole	261	11		272	1 VME, 3 ME, 4 minor errors
Kanamycin	274			274	1 ME, 2 minor errors
Mupirocin	207	67		274	No errors
Linezolid	217	57		274	No errors
Ceftaroline	232	42		274	ND
Ceftobiprole	249	25		NA	ND
Vancomycin	266	8		274	ND
Daptomycin	272	2		274	ND
Moxifloxacin	273	1		274	ND
Tigecycline	224	50		274	ND
Gentamycin	252	22		273 (S -> R)	ND
Oxacillin	242	31	1	273 (S-> R; MRSA)	ND

Table 1. Evaluation of custom made Thermo Scientific Sensititre panels, readings at 20 vs. 24 hours and vs. Disk diffusion. ME: Major error; VME: very major error; ND: not detected; R: resistant; S: Susceptible

Results

A total of 5,475 readings were obtained for the comparison between 20h and 24h incubation.

An essential agreement (MIC within ± one 2-fold dilution) was seen for all but two readings. All readings which differed by one or two 2-fold dilutions had higher MICs after 24h compared to 20h.

Categorical agreement was seen for all but two interpretations: One strain was recorded as susceptible for oxacillin after 20 h and resistant after 24 h. The strain was an MRSA and the correct result was therefore obtained after the correct incubation time.

All eight hVISA and VISA challenge strains were correctly detected with an MIC at 4 mg/L or more after 24h of incubation.

A total of 2,568 SIR-interpretations were done on the 214 isolates for the comparison between disk diffusion versus MIC. A total of 38 errors (1.5%) were observed. Of these were 13 minor errors, 15 were major errors (ME), and 10 (0.4%) were very major errors (VME). Trimethoprim/sulfametoxazole was involved in most errors, 1 VME, 3 ME and 4 minor errors. For cefoxitin only 1 ME was observed. However, for this discrepancy the MIC was correct as confirmed by PCR.

Conclusion

For a surveillance purpose the introduction of a custom made panel increased the number of antimicrobials routinely surveyed without compromising the quality of the surveillance. Likewise the incorporation of antimicrobials requiring different incubation times did not compromise the overall results.

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