In vitro antimicrobial susceptibilities of Methicillin-resistant *Staphylococcus epidermidis*

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Objective

Staphylococcus epidermidis frequently causes infections in immunocompromised patients and patients with catheters or implants. Most isolates are methicillin resistant, thus resistant to most β-lactam antibiotics. These infections are often treated with vancomycin, but treatment failure can occur due to biofilm formation, often necessitating the removal of catheters or implants. This study tests the *in vitro* activity of a wider spectrum of antibiotics for treatment of methicillin-resistant *S. epidermidis* (MRSE)

Materials & Methods

- 72 MRSE isolates regarded as clinically relevant and isolated at the Dept. of Microbiology, Haukeland University Hospital, Norway, during 2011 were included;
  - ❖ 52 from blood cultures
  - ❖ 20 from sites such as cerebrospinal fluid, burns and foreign body related infections.
- The isolates were identified as *S. epidermidis* by Vitek®2 and as MRSE based on non-susceptibility to oxacillin. All isolates were subjected to *mecA*/*nuc* PCR.
- Minimal inhibitory concentrations for 13 relevant antibiotics were obtained using MIC Test Strips (Liofilchem) and their sensitivities determined using EUCAST clinical breakpoints.

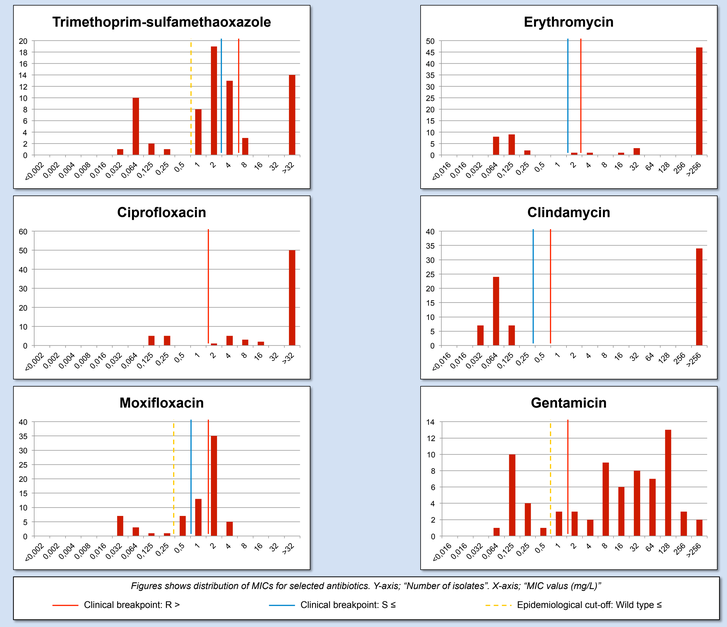
Results

All isolates were found to have *mecA,* but not *nuc*, consistent with MRSE.

The $MIC_{50,}$ MIC_{90} and the percentage of non-susceptible isolates for each of the tested antibiotics are presented in the table.

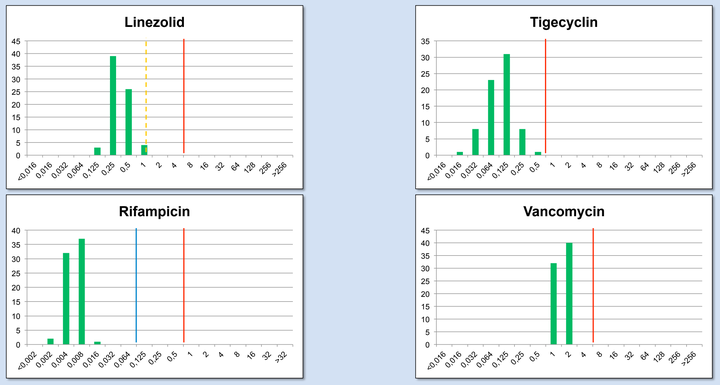
Co-resistance was found in all but one isolate, and 83 % of the isolates were resistant to multiple antibiotic classes.

Resistance to erythromycin was found in 74 % of the isolates of which 64 % had a constitutive MLS_B resistance, 25 % an inducible MLS_B resistance and 11 % had an efflux mechanism.



Antibiotic	MIC range	MIC_{50}	MIC_{90}	% Non-S
Vancomycin	1 - 2	2	2	0
Teicoplanin	0.125 - 4	1	2	0
Gentamicin	0.064 - >256	16	128	74
Trim-sulfa	0.032 - >32	2	64	43
Erythromycin	0.064 - >256	>256	>256	74
Clindamycin	0.032 - >256	0.125	>256	47
Ciprofloxacin	0.125 - >32	>32	>32	85
Levofloxacin	0.064 - >32	8	16	82
Moxifloxacin	0.032 - 4	2	2	74
Ofloxacin	0.125 - >32	>32	>32	85
Linezolid	0.125 - 1	0.25	0.5	0
Tigecycline	0.016 - 0.5	0.125	0.25	0
Rifampicin	0.002 – 0.016	0.008	0.008	0

MIC: Minimal inhibitory concentration. All MIC values are in mg/L. S: Susceptible. The clinical breakpoint (S≤) refers to EUCAST clinical breakpoint table version 2.0 2012-01-01. Trim-sulfa: Trimethoprim-sulfamethoxazole



Conclusions

- The high prevalence of resistance to gentamicin, fluoroquinolones, trimethoprim-sulfamethoxazole, erythromycin and clindamycin indicate that these antibiotics are unsuitable for empirical treatment.
- Screening for *mecA* and *nuc* directly from patient samples and finding only *mecA* would indicate considerable co-resistance.
- Relevant antibiotics to use alone or in combination seem to be vancomycin, linezolid, tigecycline and rifampicin. However, their effect on biofilm associated MRSE infections remains to be studied.

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