Comparison of in vitro activity (MIC) of seven antibiotics for exclusive use in humans between Staphylococcus pseudintermedius and Staphylococcus aureus

Comparison of *in vitro* activity (MIC) of seven antibiotics for exclusive use in humans between *Staphylococcus pseudintermedius* and *Staphylococcus aureus*

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Background

S. pseudintermedius is a widespread pathogen of companion animals and many strains carry multiple resistances (Lynch and Helbig, 2021)

Its identification and treatment are made hard due to difficulties in recognition from other *Staphylococcus intermedius* group staphylococci (Murugaiyan et al., 2014)

Occasional infection of pet owners by *S. pseudintermedius* has been reported (Somayaji et al., 2016; Lozano et al., 2017)

Aim of the study

1. Evaluating the MIC of seven A-category antibiotics (AMEG), namely Ceftaroline, Daptomycin, Linezolid, Quinupristin-Dalfopristin, Teicoplanin, Telavancin, Vancomycin, against *S. pseudintermedius*
2. Comparing our results with MIC distributions reported by EUCAST for *S. aureus*

Materials and methods

Sampling

40 clinical samples (31 dogs and 5 cats) from Turin University Veterinary Hospital during two years (July 2019 – May 2021)
Reason for admission: 21 orthopedic surgeries (52.5%), 9 dermatitis (22.5%), 5 soft-tissues surgeries (12.5%), 5 urinary disorders (12.5%)

Species identification and AST

MALDI-TOF identification confirmed by *nuc* gene PCR (Sasaki et al. 2010)
MIC measured by E-Tests (Liofilchem)

Statistical analysis

Visual evaluation of MIC and $\log_2$(MIC) distributions
Comparison of MIC weighted mean between *S. pseudintermedius* (our sample) and *S. aureus* (EUCAST) by non-parametric tests (Wilcoxon rank-sum)
Adjustment for multiple comparisons (Storey, 2010)

Results 1/2

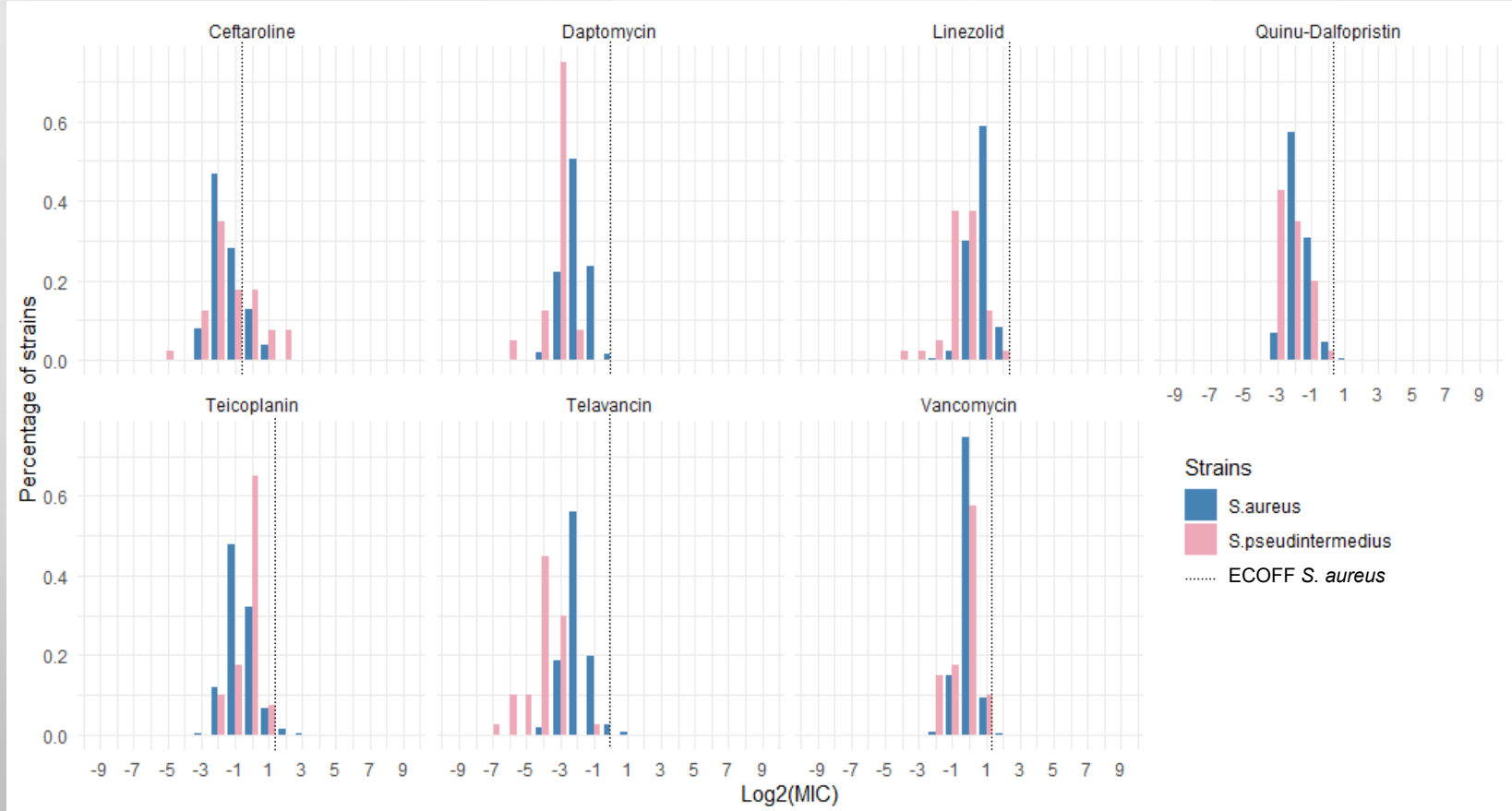

Figure 1. Distributions of $\log_2$(MIC) for *S. aureus* (EUCAST, n = 40609 ± 32124.69) and *S. pseudintermedius* (our sample, n = 40). Data are presented as percentages

Results 2/2

Only one population of *S. pseudintermedius* identified, thus it was not possible to differentiate between wild-type and resistant strains

The $\log_2$(MIC) values of Daptomycin, Linezolid, Quinu-Dalfopristin, and Telavancin were higher for *S. aureus* than *S. pseudintermedius* ($p < 0.001$)

The $\log_2$(MIC) of Teicoplanin was higher for *S. pseudintermedius* than *S. aureus* ($p = 0.003$)

No difference was observed in the $\log_2$(MIC) of Ceftaroline and Vancomycin.

Discussion and conclusion

Referring to *S. aureus* ECOFFs, isolated *S. pseudintermedius* likely belong to wild type for all antibiotics but Ceftaroline

Nonetheless, about Teicoplanin, Vancomycin, Quinu-Dalfopristin and Linezolid some concerns are advisable since strains are susceptible to the upper-limit concentration

Bibliography

- Lynch, S.A., and Helbig, K.J. (2021). The Complex Diseases of Staphylococcus pseudintermedius in Canines: Where to Next? *Veterinary Sciences 8,* 11.
- Murugaiyan, J., Walther, B., Stamm, I., Abou-Elnaga, Y., Brueggemann-Schwarz, S., Vincze, S., Wieler, L.H., Lübke-Becker, A., Semmler, T., Roesler, U. (2014). Species differentiation within the *Staphylococcus intermedius* group using a refined MALDI-TOF MS database. *Clinical Microbiology and Infection, 20,* 1007-1014.
- Decristophoris, P., Fasola, A., Benaglia, C., Tonolla, M., Petrini, O. (2011). Identification of *Staphylococcus intermedius* Group by MALDI-TOF MS. *Systematic and Applied Microbiology, 34,* 45–51.
- Somayaji, R., Priyantha, M.A.R., Rubin, J.E., Church, D. (2016). Human infections due to *Staphylococcus pseudintermedius*, an emerging zoonosis of canine origin: report of 24 cases. *Diagnostic Microbiology and Infectious Disease, 85,* 471-476.
- Lozano, C., Rezusta, A., Ferrer, I., Pérez-Laguna, V., Zarazaga, M., Ruiz-Lipa, L.., Revillo, M.J., Torres, C. (2017). Staphylococcus pseudintermedius Human Infection Cases in Spain: Dog-to-Human Transmission. *Vector borne and zoonotic diseases, 17,* 260-270.
- Sasaki, T., Tsubakishita, S., Tanaka, Y., Sakusabe, A., Ohtsuka, M., Hirotaki, S., Kawakami, T., Fukata, T., Hiramatsu, K. (2010). Multiplex-PCR Method for Species Identification of Coagulase-Positive Staphylococci. *Journal of Clinical Microbiology, 48,* 765-769.
- Storey, J.D. (2003). The positive false discovery rate: a Bayesian interpretation and the q-value. *The annals of statistics, 31,* 2013-2035.
- https://mic.eucast.org/ last access 21/07/2021.