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Comparison of antimicrobial susceptibility in staphylococci from first-time canine pyoderma cases versus cases with an unknown treatment history

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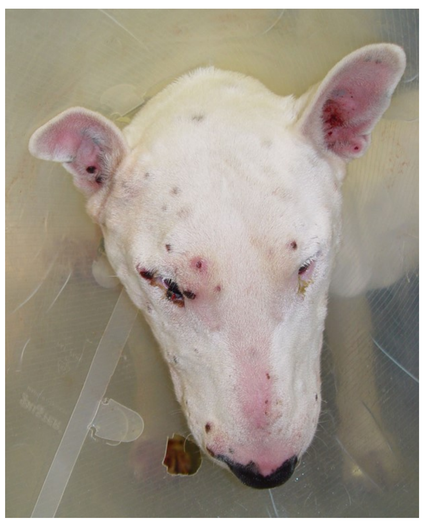
Introduction

Pyoderma is a common condition in dogs caused by staphylococci and often treated with antimicrobials. For a good empirical choice, data on antimicrobial resistance in staphylococci from pyoderma cases should be available. Most resistance data are obtained from routine diagnostic laboratories. Submissions to these laboratories are often biased towards samples from recurrent cases, that might result in an overestimation of antimicrobial resistance (AMR) prevalence

Aim of the study

The aim of this study was to assess whether the prevalence of antimicrobial resistance in staphylococci from first-time canine pyoderma differs from the prevalence in cases with an unknown treatment history

Staphylococcus pseudintermedius on blood agar plate (VMDC)



Dog with pyoderma (Medical Centre for Animals, Amsterdam)

Materials and Methods

- Study period: February – August 2018
- Bacteriological examination for staphylococci and Minimal Inhibitory Concentration (MIC) determination by broth microdilution at Veterinary Microbiological Diagnostic Centre
- Active monitoring

  Samples from targeted first-time canine pyoderma cases before antimicrobial treatment (58 isolates)
- Passive monitoring

  Samples from canine pyoderma cases submitted for routine diagnostics with unknown treatment history (148 isolates)
- AMR results of isolates obtained via passive monitoring compared to AMR results of isolates obtained via active monitoring; significance level *P*-value < 0,05

Results (Table 1)

Comparison of MIC-results of staphylococci from canine pyoderma obtained via active and passive monitoring showed significant differences in resistance prevalence for chloramphenicol (17.2% vs. 31.7%), clindamycin (15.5% vs. 33.1%), kanamycin (17.2% vs. 41.5%) and erythromycin (17.2% vs. 38.7%). For penicillin a considerable trend towards significance in resistance prevalence was seen (63.8% vs. 77.5%; *P* < 0,10)

Conclusions

The prevalence of antimicrobial resistance for chloramphenicol, clindamycin, kanamycin and erythromycin is significantly lower in staphylococci from first-time canine pyoderma compared to staphylococci from cases of canine pyoderma with an unknown treatment history

Table 1. MIC-distribution (%), MIC_{50} (µg/mL), MIC^{90} (µg/mL), (intermediate) resistance (R, %) and the corresponding confidence interval (CI, %) for Staphylococci from canine pyoderma obtained via both active and passive monitoring

Antimicrobial	*Staphylococcus* (n=58) obtained by active monitoring														
	MIC values (µg/mL)												MIC_{50}	MIC_{90}	R	CI
	0,06	0,13	0,25	0,5	1	2	4	8	16	32	64	128	(µg/mL)	(µg/mL)	(%)	(%)
Penicillin	31	5.2	1.7	1.7	1.7	6.9	5.2	8.6	22.4	15.5			=4	>16	63,8	50,1-76,0
Oxacillin			96,6	1,7	1,7								<=0,25	<=0,25	3,4	0,4-11,9
Chloramphenicol							81,0	1,8	0,0	17,2	0,0		<=4	=32	17,2	8,6-29,4
Clindamycin				84,5	1,7	0,0	0,0	13,8					<=0,5	>4	15,5	7,3-27,4
Fusidic acid					98,3	0,0	1,7						<=1	<=1	1,7	0,0-9,2
Enrofloxacin			98,3	1,7	0,0	0,0	0,0	0,0					<=0,25	<=0,25	0,0	0,0-6,2
Gentamicin						100,0	0,0	0,0	0,0	0,0			<=2	<=2	0,0	0,0-6,2
Kanamycin									82,8	5,2	10,3	1,7	<=16	=64	17,2	8,6-29,4
Neomycin								98,3	1,7	0,0	0,0		<=8	<=8	1,7	0,0-9,2
Erythromycin			81,0	1,8	1,7	0,0	0,0	0,0	15,5				<=0,25	>8	17,2	8,6-29,4
Trimethoprim/ Sulfamethoxazol[a]				98,3	0,0	0,0	1,7	0,0					<=0,5	<=0,5	1,7	0,0-9,2

Antimicrobial	*Staphylococcus* (n=148) obtained by passive monitoring														
	MIC values (µg/mL)												MIC_{50}	MIC_{90}	R	CI
	0,06	0,13	0,25	0,5	1	2	4	8	16	32	64	128	(µg/mL)	(µg/mL)	(%)	(%)
Penicillin	19,7	2,8	3,5	2,8	3,5	7	5.2	11,3	24,6	21,8			=8	>16	77,5	69,7-84,0
Oxacillin			95,8	2,1	2,1								<=0,25	<=0,25	4,2	1,6-9,0
Chloramphenicol							66,9	1,4	0,7	24,6	6,3		<=4	=32	31,7	24,1-40,0
Clindamycin				66,9	1,4	0,7	1,4	29,6					<=0,5	>4	33,1	24,4-41,5
Fusidic acid					95,8	2,1	2,1						<=1	<=1	4,2	1,6-9,0
Enrofloxacin			94,4	2,8	0,7	0,0	0,0	2,1					<=0,25	<=0,25	2,8	0,8-7,1
Gentamicin						97,2	1,4	1,4	0,0	0,0			<=2	<=2	1,4	0,2-5,0
Kanamycin									58,5	6,8	22,5	12,2	<=16	>64	41,5	33,3-50,1
Neomycin								96,5	3,5	0,0	0,0		<=8	<=8	3,5	1,2-8,0
Erythromycin			59,9	1,4	0,0	0,7	0,7	0,0	37,3				<=0,25	>8	38,7	30,7-47,3
Trimethoprim/ Sulfamethoxazol[a]				95,1	0,7	2,1	0,7	1,4					<=0,5	<=0,5	2,1	0,4-6,0

Dilution series applied for each individual antibiotic are marked green and red; green refers to the 'susceptible' and red to the 'resistant' range (where applicable, 'resistant' includes both 'intermediate' and 'resistant'). To the right of the dilution ranges, percentages of isolates with a MIC value higher than the highest concentration of the dilution range are mentioned in red. The percentage of isolates mentioned at the lowest concentration of a dilution range, refers to isolates with a MIC value equal to or lower than the lowest concentration evaluated in the specific dilution range.

[a] *Only the concentration of trimethoprim, tested in a 1 :19 ratio (trimethoprim : sulfamethoxazole) is mentioned.*

Acknowledgements

The researchers would like to thank the Dutch Ministry of Agriculture, Nature and Food Quality for financing this pilot study as part of the VETMAP project. In addition the researchers would like to thank the members of the VETMAP Counseling Committee.