ISSN 110-2047. ALEX. J. VET.SCIENCE. 2001 , VOL 17 No.1 :69-74

PREVALENCE AND TREATMENT OF STAPHYLOCOCCAL SPECIES IN CANINE PYODERMA

J. Acon, Okech S.G, Kitimbo, F and Mostafa, M.B

Small Animal Clinic, Faculty of Veterinary Medicine, Makerere University, P.O. Box 7062, Kampala, Uganda

ABSTRACT ρ Bacterial swabs were collected from pyogenic skin lesions from 50 dogs for culture and sensitivity test. Six different species of staphylococcal bacteria were identified. *Staphylococcus intermedius* comprised 90%, *Staphylococcus aureus* 8%, *Staphylococcus hyicus* 1%, *Staphylococcus epidermis* 0.5%, *Staphylococcus xylosus* 0.25% and *Staphylococcus simulans* 0.25%. Sensitivity tests were done on all the 6 staphylococcal species isolated. Although *S. intermedius* exhibited significant resistance to penicillin, ampicillin, tetracycline and chloramphenicol yet, some strains were sensitive to the same previous antibiotics. Morever, it was susceptible to other antibiotics tested. Antibiotic resistance was not associated with previous antibiotic therapy nor depth of skin infection. Antibiotic susceptibilities and resistance were also variably observed amongst the other staphylococcal isolates. No single antimicrobial agent was consistently active against all staphylococcal isolates. Combined use of antibacterial shampoos and long-term antibiotic therapy helped reduction of the severity with eventual cure of chronic cases.

Introduction

Canine pyoderma caused by *Staphylococcal* bacteria is a common skin condition (DeBoer, 1990). The infection is either superficial or deep (Day, 1994) and is reported to be always secondary to some other condition (DeBoer, 1990 and Lloyd, 1994). It remains one of the most difficult problems encountered in veterinary practice, particularly in breeds such as the German Shepherd (Lloyd, 1994). Staphylococcal involvement in canine pyoderma has been known for a long time whewre *S. intermedius* which is being the most commonly isolated species followed by S. *aureus* and *S. hyicus* (Lloyd, 1994). Substantial differences in virulence between different strains of *S. intermedius* have been reported while a number of non-pathogenic staphylococcal species whose exact significance remains a mystery have also been isolated from canine

pyoderma (Lloyd, 1994).

Difficulty in treatment of superficial and deep pyoderma cases has been reported by many authors. Medleau et al. (1986) reported increased resistance by staphylococcal species to many ordinary antibiotics irrespective of the depth of skin infection. DeBoer (1990) reported many cases of canine pyoderma to be quite recurrent following antimicrobial treatment and recommended concurrent use of antibacterial shampoos, while Lloyd (1994) reported deep pyoderma to be more difficult to treat than superficial pyoderma. This study focussed on identification and sensitivity of various staphylococcal species isolated from cases of pyoderma in dogs to antibiotics.

Materials and Methods

Fifty dogs suffering from pyoderma were brought to the small animal Clinic, Faculty of Veterinary Medicne, Makerere University, Kampala, Uganda. Sterile swabs were used to obtain samples from untreated lesions. The swabs were plated on to MacConkey agar then incubated at 37°C for 24 hours, and the grooving cultures were examined for presence of taphylococci.Staphylococcal isolates were then biotyped using biochemical tests contained in a commercial staphylococcal system. In vitro sensitivity tests were done on all the isolates of staphylococci from each pyoderma case using standard antibiotic-impregnated discs containing 4 μg penicillin, 10 μg ampicillin, 25 μg tetracycline, 25 μg chloramphenicol, 15 μg erythromycin, 25 μg cotrimoxazole, 30 μg gentamicin, 200 μg sulphadimidine, 10 μg streptomycin and 30 μg neomycin. Consequently, the respective antibiotics to which the isolates were susceptible were used to treat the specific cases. Cases which failed to respond to the treatment within one week. They would be treated with combined antimicrobial agents plus antimicrobial shampoos. The data compiled was analysed using the χ^2 test.

Results

Six different staphylococcal species were isolated and identified as shown in Table I. *S. ntermedius* comprised a significant ($p<0.01$) percentage (90%) of the isolates followed by *S. aureus* (8%).

Table I. Percentages of staphylococcal bacteria isolated from 50 cases of canine pyoderma

Staphylococcal species	Percentage (%) isolated
S. intermedius	90
S. aureus	08
S. hyicus	01
S. albus	0.5
S. xylōsus	0.25
S. simulus	0.25

Variable antimicrobial susceptibility and resistance were recorded with no single antimicrobial agent observed to consistently be active against any staphylococcal isolates from one pyoderma case to another. Table II shows average susceptibility and resistance of the 6 different isolates to the 10 different antimicrobial drugs tested. There was significant ($p<0.05$) susceptibility to cotrimoxazole by all the 6 staphylococcal isolates followed by gentamicin and erythromycin.

Significant ($p<0.01$) resistance to penicillin, ampicillin, tetracycline and chloramphenicol wererecorded while variable non-significant ($p>0.05$) antimicrobial susceptibility and resistance to other antimicrobial drugs were also observed.

Table II. In vitro susceptibility and resistance of 6 different staphylococcal isolates to 10 different antimicrobial drugs

	Percentage of the staphylococcal isolates sensitive to the antimicrobial Drugs						Percentage of the staphylococcal isolates resistant to the antimicrobial Drugs					
Antimicrobial drugs	SL	SA	SH	SE	SX	SS	SI	SA	SH	SE	SX	SS
Penicillin 4,ug	05	10	13	20	15	08	95	90	87	80	85	92
Ampicillin 10,ug	10	15	20	15	14	25	90	85	80	85	86	75
Tetracycline 25,ug	12	10	20	11	28	22	88	90	80	89	72	78
Chloramphenicol 25,ug	30	35	28	40	38	28	70	65	72	60	62	72
Erythromycin 5,ug	92	90	94	89	92	95	08	10	06	11	08	05
Cotrimoxazole 25,ug	95	80	85	82	87	90	05	20	12	18	13	10
Gentamicin30,ug	96	90	92	91	88	94	04	10	08	09	12	06
Sulphadimidine 200,ug	70	85	60	70	65	78	30	15	40	30	35	22
Streptomycin 10,ug	55	60	70	70	80	58	45	40	30	30	20	42
Neomycin 30,ug	90	85	78	81	75	92	10	15	22	19	25	08

Key:SI= S. intermedius, SA= S. aureus, SH= S.hyicus, SE= S. epidermis, SX=S.xylosus, SS= simulan

Cases where the antibacterial sensitivity tests were over 90% sensitive resulted into cure with one Weekof treatment ($p<0.05$). Antibiotic treatments that did not result into cure within one week were prolonged and coupled with antiseptic shampoos. Severity was reduced and eventual cure was achieved following 3 to 24 weeks of treatment.

Discussion

Canine pyoderma is one of the most common and yet one of the most difficult skin lesions to treat in

veterinary practice (Lloyd, 1994). Staphylococcal involvement has been for long been known by many researchers (Lloyd, 1994). Although different species of staphylococcoci have been isolated from canine pyodermas the most common species are *S. intermedius, S. aureus, S. hyicus, S. epidermis, S. xylosus, S. simulans* and *S. hominis*. It is interested that in this study, all the previous staphylococcal species were isolated (Medleau et al., 1986), DeBoer, 1990, Lloyd, 1994), Harvey, 1996) and Corlotti et al., 1999). Although many recent studies reported that *S. intermedius was* the most predominant and significant in many canine pyodermas yet, earlier studies concluded that *S. aureus* was the isolate responsible for the condition (Krogh and Kristensen, 1981).

Antimicrobial susceptibility tests against staphylococcal isolates have also been done by many researchers. Medleau et al. (1986) reported significant S. *intermedius* resistance to many antimicrobial drugs. Deboer (1990) recommended the management of S. *intermedius* pyoderma cases by a combination of susceptible antibiotics, antimicrobial shampoos, immunomodulatory drugs and long term therapy. Lloyd (1994) strongly recommended that in the management of canine pyoderma, it is necessary to identify the species of staphylococcus involved. because genetically S. *intermedius* is different form the other commonly isolated staphylococci. Schwarz et al. (1995) recorded the chloromphesmicol resestance in staphyloccas intermedias and evidence for plasmid and chromosomal locotion of the resistance genes. Lloyd (1994) reported that S. *intermedius* colonize the nose, throat, mouth and anus of dogs. High-dose antibiotic therapy does not eliminate S. *intermedius* form these areas (Lloyd, 1994 and Saijonmaa-Koulumies et al., 1998) from where re-infection of the affected skin areas with resistant strains takes place. Littlewood et al (1999) showed clindamycin to be significantly more effective that clavulanate-amoxycillin combination in the treatment of superficial pyoderma. In the present study no single antimicrobial drug was consistently active Against all staphylococcal isolates. This is in agreement with previous studies (Goldstein et al., 1986)

Maany factors have been outlined to be underlying canine pyoderma (Lloyd, 1994). Humoral immune basis for lack of antibiotic response to many cases of canine pyoderma has been advanced as responsible for many cause of therapeutic failure (Day, 1994 and Shearer et al., 1997). Unless transient the underlying cause of canine pyoderma be identified and eliminated coupled with stapled with staphylococcal identification, sensitivity test, specific treatment, antimicrobial shampoo and sometimes long term therapy.

References

Day, M.J. (1994) An immunopathological study of deep pyoderma in the dog. *Res Vet Sci*, 56(1), 18 DeBoer, D.J. (1990). Strategies for management of recurrent pyoderma in dogs. *Vet Clin North Am Small Anim Pract.* 20:1509

Goldstein, E.J.C. and Finegold, S.M. (1986) Antimicrobial agents and chemotherapy. J Clin Microbiol, 29:556.

Krogh, H.V and Kristensen, S. (1998) A study of skin diseases in dogs and cats. VI. Microflora Of major canine pyodermas. *Nord Vet Med.* 33(1): 17

Littlewood, J.D; Lakhani, K.H; Peterson, S; Wood J.L and Chanter, N(1999) Clindamycin hydrochloride and clavulanate-amoxycillin in the treatment of canin superficial pyoderma *Vet Rec, 144 (24) : 662*

Lloyd, D. (1994) Skin infection: Causes and solutions. *S.A.M.S. News.* 3(2): 3Medleau, L., Long, R.E., Brown, J and Miller, W.H. (1986). Frequency and antimicrobial susceptibility of Staphylococcal species isolated from canine pyodermas. *Am J Vet Res* 47(2): 229

Saijonmaa-Koulumies, L;Parsons, E and Lloyd D,H (1998). Elimination *of staphylococcus intermedius* in healthy dogs by topical treatment with fusidic acid. *J. Small Anim Pract, 39 (7) :341*

Schwarz, S; Werckenthin, C; Pinter L; Kent L E and Noble W C (1995) Chloramphenicol resistance in Staphylococcus intermedius from a single veterinary centre : evidence for plasmid and chromosomal location of the resistance genes. *Vet Microbiol, 43 (2–3):151*