Haryana Vet. (March, 2023) **62(SI),** 26-30 ISSN 0033-4359 (P) **Research Article**

CLINICAL EPIDEMIOLOGY AND CUTANEOUS MICROBIOTA ASSOCIATED WITH CANINE PYODERMA

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ABSTRACT

Pyoderma is an important infection in canines, causing severe damage to the dog's general health. The present study was conducted to understand the clinical epidemiology, with special emphasis on age, gender and breed in 137 dogs suffering from canine pyoderma from different districts of Andhra Pradesh during the period from July, 2021 to November, 2021. Most of the dogs brought with the complaint of alopecia, erythema, papules, pustules, excessive scales, bald patches, welts around hairs, itching and scabbing. The dogs showed a higher occurance (45.25%) in the age group of 1-2 years and most of the infected dogs were males (56.2%). A higher number of cases was observed in German Shepherd (27.73%) followed by Labrador Retriever (21.9%). Out of 137 bacterial isolates obtained, 129 (94.16%) isolates were Gram positive (125 *Staphylococcus* spp. and 4 *Streptococcus* spp.), 8 (5.83%) isolates were Gram negative (4 *E. coli*, 2 *Klebsiella* and 2 *Pseudomonas*). Among the 129 gram positive isolates, 125 were *Staphylococcus* isolates and accounted for 91.24% of in total 137 isolates obtained from canine pyoderma indicating the predominant pathogen.

Keywords: Canine pyoderma, clinical signs, epidemiology, cutaneous microbiota

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INTRODUCTION

Dogs have established their existence and status as a pet or companions in society throughout the world. Basic husbandry and management are very important for the general well-being of dogs (Bhadesiya and Raval, 2014). Skin is one of the most important largest organs in the canine body. It is crucial for protection from ultraviolet light, injury and dehydration. Pyoderma is more common in dogs due to certain characteristics of the dog's skin like thin stratum corneum with less lipid material and unprotected hair follicles that are at increased risk for bacterial invasion and subsequent colonization and overgrowth. This may lead to a higher incidence of primary inflammatory disease that affects the first-line defences (Khinchi, 2019).

Clinically the disease is characterized by primary skin lesions including papules, pustules, followed by secondary skin lesions crusting, epidermal collarettes, alopecia, scaling, erythema, pruritus, lichenification and hyperpigmentation (Chaudhary *et al.*, 2019).

The present study was conducted to record the occurrence of canine pyoderma in 137 dogs from different districts of Andhra Pradesh during the period from July, 2021 to November, 2021.

MATERIALS AND METHODS

Collection of samples

Skin swab samples were collected from canine pyoderma affected 137 dogs from different districts of Andhra Pradesh showing suggestive clinical signs from July, 2021 to November, 2021. All the dogs were subjected to detailed clinical examination followed by bacterial isolation, microscopic examination for the presence of bacteria as per methods described by Markey *et al.* (2013). The dogs having a history of the fistulous tract, ulcer, scales, epidermal collarettes, erythema, alopecia, papules, pustule, nodules and hyperpigmentation were included in the present investigation.

Isolation and Identification of bacterial pathogens

The collected samples were aseptically inoculated and incubated overnight in brain heart infusion broth. Later the inoculums were streaked onto Mac Conkey agar, Eosin Methylene Blue agar, Mannitol Salt agar, Blood agar, Edward's medium and Baird Parker agar plates and incubated at 37°C overnight for the isolation of the pathogenic organism. IMViC tests were performed for the confirmation of gram negative organisms.

RESULTS AND DISCUSSION

Superficial pyoderma was characterized by alopecia, pustules, papules, erythema, focal crusting and pruritus. Both generalized and localized lesions were observed. The dogs with deep pyoderma showed pain, crusting, odour and secretions of blood and pus with redness, swelling, ulceration and blisters (Fig. 1).

The data on the occurrence of canine pyoderma in different age groups of dogs showed a higher positivity of 45.25% in the age group of 1-2 years. Whereas, the prevalence of 22.62% was observed in less than one year

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age group, 19.7% in two to three years age group and 12.41% in more than three years age group, respectively (Fig. 2). The results were in close accordance with the study done by Bloom and Rosser (2001) and Shyma and Vijayakumar (2012). They reported a 42.85% prevalence of canine pyoderma in dogs of one to three years of age. This was also in agreement with Khinchi (2019), Anikar *et al.* (2021), who also found similar findings in dogs with pyoderma.

On contrary to the present findings, 49.9% prevalence of pyoderma was observed in dogs below one year of age followed by 22.2% in one to two years of age by Khurana *et al.* (2016) and Reddy *et al.* (2014). This variation in the prevalence of canine pyoderma in different age groups might be due to early or late reporting of a patient with dermatological disorders, duration of treatment provided at different veterinary clinics before bringing the case to an institutional veterinary hospital, lack of knowledge and awareness among owners regarding prevention of dermatological disorders, improper grooming practices, lack of knowledge on use of products (e.g., shampoos) for bathing dogs etc (Anikar *et al.*, 2021).

Out of 137 dogs inspected, 77 (56.2%) clinical cases were of males and 60 (43.7%) cases were of females (Fig 3). These findings were related to Kumar and Haque (2015) and Asmita *et al.* (2015). A similar result was shown by Khurana *et al.* (2016) who reported the higher prevalence occurrence of canine pyoderma in males (64.1%) compared to females (35.95%). The results were also in accordance with Khinchi (2019) and Anikar *et al.* (2021) who observed a higher prevalence of 71.87% and 54.80% in males and females, respectively. Higher prevalence in males could have been associated with the confounding factors *viz*., a greater number of owners preferring males over females, preference and purpose of dog keeping, the difference in market values, perceived notions on health issues in females etc (Anikar *et al.*, 2021). Contrary to the present findings, Shyma and Vijayakumar (2012) and Reddy *et al.* (2014) reported a higher prevalence of canine pyoderma in females compared to males.

In the present study, the higher occurrence of disease was observed in German Shepherd (27.0%), Labrador Retriever (21.9%), Nondescript (17.51%) Rottweiler (16.78 %), than Spitz (8.03%), Pug (2.92%) and Dachshund (2.2%), Doberman (2.2%) and Lhasa Apso, (1.46%) dogs (Fig 4). The result was in concordance with Shyma and Vijayakumar (2012) who revealed 26.19% prevalence of canine pyoderma cases in German Shepherd, whereas Khinchi (2019) and Anikar *et al.* (2021) reported the higher prevalence in Labrador Retriever followed by German Shepherd and other breeds. The variations in the breed-wise prevalence of dermatological disorders in dogs could be due to preference of breeds by owners in different regions, the purpose of keeping dogs, the difference in the behaviour of different breeds, owner preferences to keep selective breeds in a particular area (Anikar *et al.*, 2021).

Table 1

Number of bacterial organisms isolated from canine pyoderma

S. No.	Organisms Isolated	No. of isolates	Per cent (%)
1	*Staphylococcus* spp.	125	91.24
2	*Streptococci* spp.	4	2.92
3	*E. coli*	4	2.92
4	*Klebsiella* spp.	2	1.46
5	*Pseudomonas* spp.	2	1.46
	TOTAL	**137**	**100**

In the present study, fewer cases were noticed in Dachshund (2.2%), Doberman (2.2%) and Lhasa Apso (1.46%). Such least occurrence in these breeds compared to others may be due to the less available number of the particular breed due to owner preferences as pets in the study area.

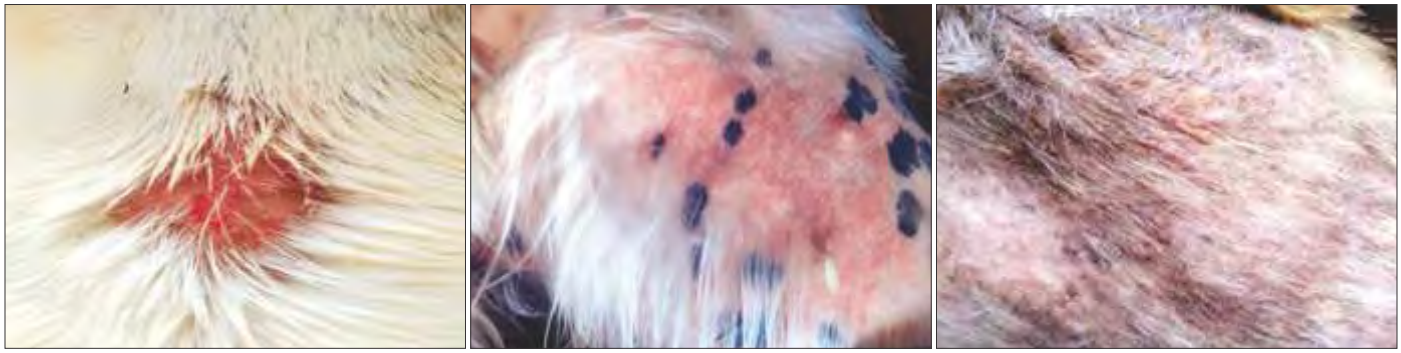
The isolation and identification of pathogenic bacteria results showed that out of 137 bacterial isolates obtained, 129 (94.16%) isolates were Gram positive [*Staphylococcus* spp. (Fig. 5a, b) and *Streptococcus* spp. (Fig. 6)] and 8 (5.83%) isolates were Gram negative [*E. coli* (Fig. 7a, b), *Klebsiella* (Fig. 8), *Pseudomonas* spp. (Fig. 9)]. Details of the incidence of different bacterial species isolated from canine pyoderma were shown in (Table 1, Fig. 10). These findings match with the study conducted by Chaudhary *et al.* (2019) who observed predominance of Gram positive bacteria from canine pyoderma cases.

Among the 129 Gram positive isolates, 125 were *Staphylococcus* isolates. This also accounted for 91.24% of in total 137 isolates obtained from canine pyoderma. The higher incidence of *Staphylococcus* isolates in canine pyoderma was also noticed as 71.15%, 67.2% and 92.3% by Shah *et al.* (2017), Ankita and Gandge (2018) Chaudhary *et al.* (2019), respectively.

CONCLUSION

The present study observed a higher prevalence (45.25%) in the age group of 1-2 years followed by (22.62%) in less than one year age group. Most of the infected dogs were males (56.2%) and a higher number of

(a) Fistulous tract **(b) Ulcer** **(c) Scales**



(d) Epidermal collarettes **(e) Erythema** **(f) Alopecia**

(g) Papules **(h) Pustule** **(i) Nodules**

(j) Hyperpigmentation **(k) Recurrent pyoderma**

Fig. 1. Dogs suffering with canine pyoderma

cases was observed in German Shepherd (27.73%) followed by Labrador Retriever (21.9%). The predominant pathogen observed was *Staphylococcus* isolates (91.24%). The observations generated through the study will encourage veterinary doctors to regularly analyse the prevalence of canine pyoderma to generate preventive measures in the future. Preventive measures like antibiotic therapy for a minimum of three to four weeks. Further, topical therapy (Shampoos, creams, gels, ointments) can be effective as the sole treatment in superficial pyoderma.

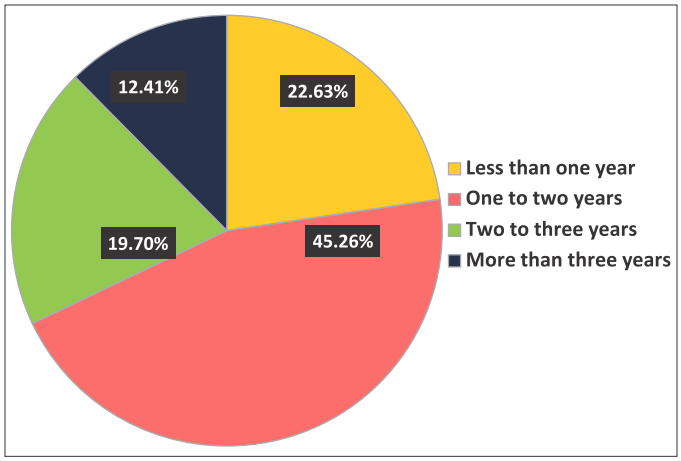


Fig. 2. Age wise occurrence of canine pyoderma

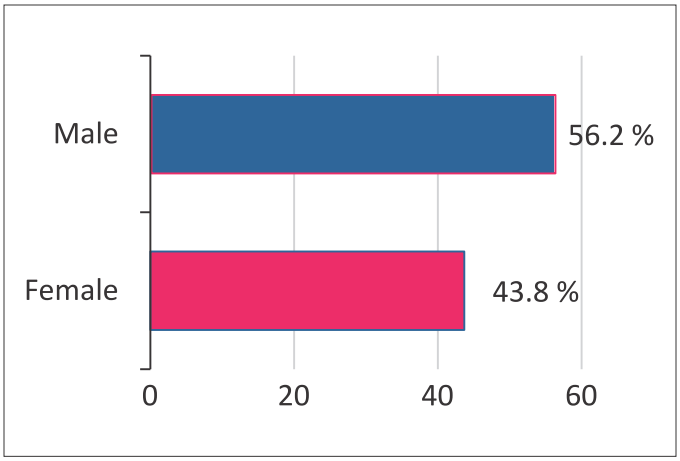


Fig. 3. Sex wise occurrence of canine pyoderma

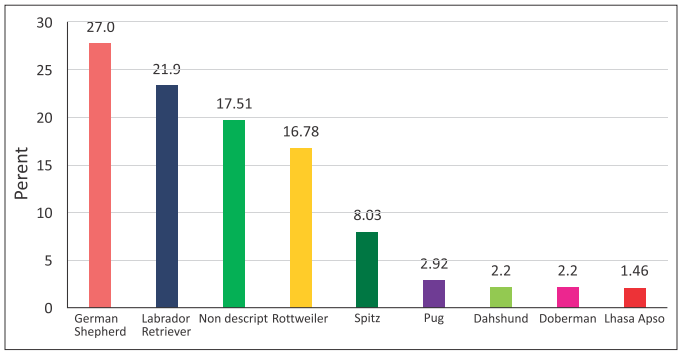


Fig. 4. Breed wise occurrence of canine pyoderma

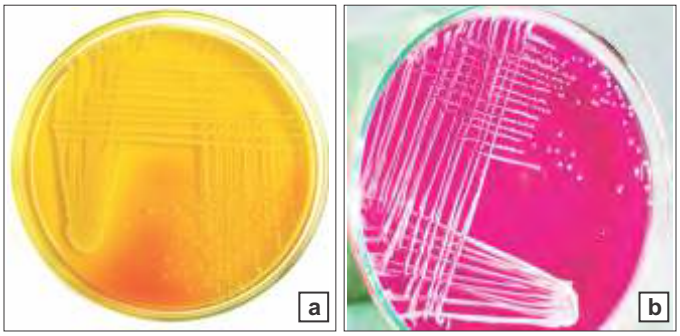
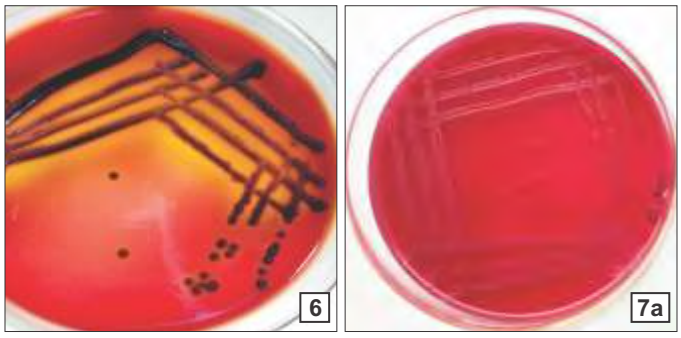


Fig. 5. **(a)** Golden yellow colonies of *Staphylococcus* spp. on MSA indicating mannitol fermenters; **(b)** Pink colonies of *Staphylococcus* spp. on MSA indicating mannitol non-fermenters



Figs. 6-8. **(6)** Black dew drop colonies on Edward's medium due to asculin hydrolysis; **7a.** Lactose fermenting pink coloured colonies of *E.coli* on MacConkey agar; **7b.** *E. coli* showing greenish metallic sheen on EMB agar; **(8)** Lactose fermenting mucoid colonies of *Klebsiella* on MacConkey agar

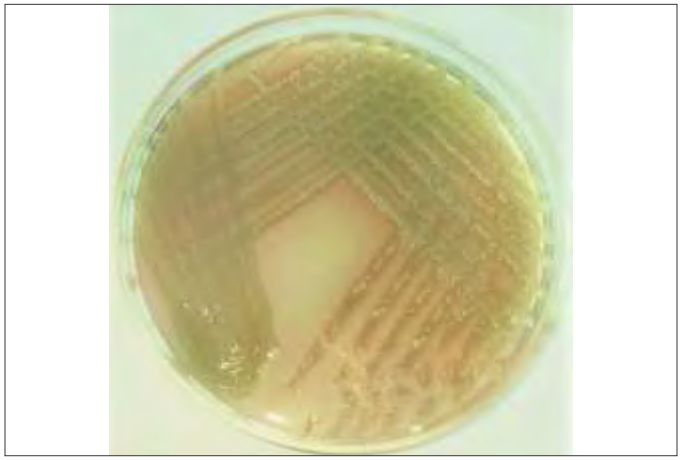


Fig. 9. Pseudomonas on nutrient agar

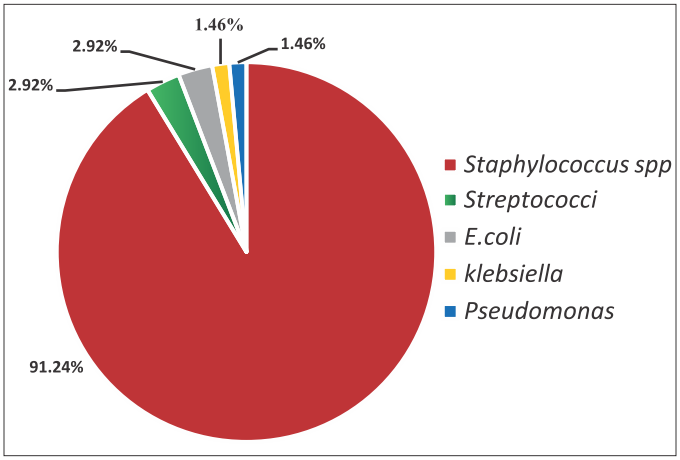


Fig. 10. Bacterial pathogens identified from canine pyoderma

Dogs with superficial pyoderma should be bathed with a medicated shampoo recommended by its veterinarian. Attention to grooming is crucial. The hair coat should be clipped in dogs with deep pyoderma.

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