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Diagnosis and therapeutic management of staphylococcus associated bacterial dermatitis in dogs

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Abstract
In the current investigation, which involved screening 252 dogs for dermatological issues, 52 incidences of bacterial dermatitis were noted. There were 73.07% and 26.92%, respectively, of individuals with mild to moderate and severe bacterial dermatitis. Clinical symptoms of erythema (69.23%), alopecia (57.69%), pruritus (53.84%), crusts (50.00%), papules (34.61%), pustules (28.84%), scales (23.07%), and epidermal collarettes (15.38%) were found in 52 dogs with bacterial dermatitis. All 52 samples from the dogs with bacterial dermatitis that were collected and processed for a detailed culture analysis tested positive for 72 isolates. 52/72 of these were Staphylococci spp. (72.22%), with S. intermedius (65.38%), *S. aureus* (12.30%), and *S. epidermidis* (6.13%) making up the 34 isolates. However, 20 of these samples also showed the presence of *E. coli* in 3 (4.17%) of the samples, *Klebsiella* spp. in 9 (12.5%), and Pseudomonas spp. in 8 dogs (11.11%) that were mixed with staphylococci. Single and mixed bacterial infections occurred at rates of 61.53 and 38.47%, respectively.

Keywords: Bacterial dermatitis, occurence, symptoms, *in vitro*, sensitivity and efficacy

Introduction
In the realm of small animal medicine, pyoderma is one of the most typical causes of dermatitis. A bacterial infection of the skin that produces pus is known as pyoderma. Due to the distinct features of canine skin, including a thin stratum corneum, a lack of lipid plug in the hair follicles, and a high skin pH that increases the chance of bacterial invasion, subsequent colonization, and overgrowth, dogs are more susceptible to pyoderma. This could result in bacterial superficial folliculitis. Devriese *et al*. (2005) [12] are two examples. Lesions can be quite superficial, affecting simply the epidermis, or they might involve deeper dermal or subcutaneous tissue structures. Pyoderma is divided into three categories: surface, superficial, and deep pyoderma. According to Scott *et al*. (2003) [29], canine superficial pyoderma is characterized as a superficial bacterial infection of the epidermis and hair follicles that typically develops as a complication of allergy, parasite, endocrine, immune-mediated, conformational, or keratinization problems. Follicular papules, which may or may not be crusted, epidermal collarettes, erythema, hyperpigmentation, and alopecia are more prevalent lesions. The majority of the Staphylococcus intermediusa coagulase positive microorganisms were recovered from an affected dog.

Materials and Methods
The current study focused on clinical cases of dogs who had a history of chronic, recurrent, and persistent skin complaints, including alopecia, pruritus, scratching, and body rubbing along with erythema, papules, and pustules. These dogs were chosen for the study and underwent a thorough clinical examination. Using a sterile swab, various clinical samples, including secretions from the skin lesions, were obtained and then transferred to nutrient broth for analysis. Whole Blood was drawn, and it was examined hemologically. Two sets of sick dogs were created. Clindamycin was administered orally to Group I dogs at a dose rate of 6–11 mg/kg b.wt. once daily, while marbofloxacin was administered orally to Group II dogs at a dose rate of 2–5 mg/kg b.wt. once daily. Based on the resolution of clinical signs, clinical response score, change in haematological parameters, and length of recovery, the therapeutic efficacy was evaluated in both groups. The usage of Vitabest Derm syrup, oral cetrizine tablets, staphban F ointment, and chlorhexidine gluconate shampoo was done in both groups.

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Results and Discussion

The goal of the current investigation was to screen dogs for the presence of bacterial dermatitis. 2.94% (252/8576) of all cases of dermatological diseases were reported. The prevalence of dermatological affections in the current study was higher than that of Summers *et al.* (2014) [37] and lower than that of Sarma *et al.*'s (2013) [43] prior findings, at 5.6% and 1.3%, respectively. In this study, 52 dogs were discovered to have bacterial dermatitis, of which 38 (73.07%) tested positive for superficial lesions and 14 (26.92%) tested positive for more severe forms. According to the findings of Vasilescu and Togoe (2014) [41] and Kelany and Husein (2011) [17], superficial bacterial dermatitis occurs more frequently than deep bacterial dermatitis. In the current analysis, the prevalence of superficial and deep bacterial dermatitis was generally 15.07% (38/252), and 5.55% (14/252), respectively. This conclusion was very similar to those of Udayasree and Pillai (2006) [38, 40] and Shyma and Vijay Kumar (2011) [35], who similarly found that canine superficial pyoderma occurred at rates of 12.71 and 13.61 percent, respectively.

In the current study dogs suffering from bacterial dermatitis exhibited a wide spectrum of clinical manifestations which in their descending order of frequency were erythema (69.23%), alopecia (57.69%), pruritus (53.84%), crusts (50.00%), papules (34.61%), pustules (28.84%), scales (23.07%), epidermal collarettes (15.38%), hyper pigmentation (9.61%), moth eaten appearance and erosions (7.69% each), edema of toes (3.84%) and nodules (1.92%). Erythema, alopecia, pruritus, papules, and pustules were more prevalent among the clinical symptoms noted in the current study. These findings concurred with those of Kelany and Husein (2011) [17], Beigh *et al.* (2013) [4], Hillier *et al.* (2006) [16], Craig (2003) [10], and Hillier *et al.* 2006 [16].

The majority of the dogs (52) in the current study who had bacterial dermatitis were identified cytologically, and this was later validated by looking at Gram's stained smears of cultures taken from the lesions. 52 samples were used in the cultural examination, which revealed a total of 72 bacterial isolates. Staphylococci spp. were found in all 52 samples according to bacterial isolation investigations, and in 20 samples, they were mixed with gram negative bacteria. Based on cultural traits and biochemical characteristics, Staphylococcus' species identification was confirmed (Castellanos *et al.*, 2011). Among 52 Staphylococci isolates, 34 (65.38%) were S. intermedius, 12 (23.77%) were S. aureus, and 6 (11.53%) were S. epidermidis. The results according to Cavalcanti *et al.* (2005) [9], Wilkoek *et al.* (2006) [42] and Bensignor and Germain (2004) [5], S. intermedius was also identified as the primary pathogen in dogs with pyoderma in the current investigation.

Even though an in-vitro antibiogram revealed that the bacteria isolated from the bacterial dermatitis cases were susceptible to a wide range of antibiotics, two formulations (Clindamycin and Marbofloxacin) were chosen to test for efficacy. Based on prior studies and the outcomes of an in-vitro sensitivity test in a pilot research, the antibiotics used in the current investigation were chosen. In the current investigation, the majority of the gram negative isolates and all Staphylococci isolates were in-vitro susceptible to enrofloxacin and clindamycin. Additionally, Kelany and Husein (2011) [17]

advised starting treatment with an antibiotic that is known to be effective against more than 90% of isolates of S.intermedius, the most common causal agent of canine bacterial dermatitis. It was recommended that the corresponding antibiotics be continued for one week after clinical cure to lessen the likelihood of reinfection in accordance with the advice of earlier researchers (Beale *et al.*, 2003; Beco *et al.*, 2013 and Reddy *et al.*, 2014) [2, 3, 27].

Clindamycin hydrochloride was administered orally to Group I dogs once daily at a dose rate of 6–11 mg/kg b.wt. Previous reports on the use of clindamycin in canine bacterial dermatitis came from Bloom and Rosser (2001) [6]. Based on the remission of clinical symptoms, which was consistent with Bloom and Rosser (2001) [6], the therapy had an excellent response in the present study dogs in this group. By the third day, three of the dogs had a day wise percentage of clinical cure, but by the end of the treatment period, every dog had responded to therapy, with 10 of them having excellent clinical responses and the other two having good ones. Bloom and Rosser (2001) [6] also reported that clindamycin had an excellent clinical response. The average number of days it took for the lesions on the dogs in this group to regress and show clinical improvement was 5.0 +/- 0.46 days. According to Udayasree and Pillai (2006) [38, 40] and Reddy *et al.* (2014) [27], the majority of dogs with bacterial dermatitis needed antibiotic treatment for at least three weeks. This finding was somewhat in agreement with their findings.

The treatment for the dogs in Group II began with the oral administration of marbofloxacin at a dose rate of 2 to 5 mg/kg body weight each day. Regular evaluation of the dogs based on the absence of clinical indicators showed complete clinical cure in five dogs by the third day, although response to therapy (with grades ranging from fair to outstanding) was seen in all the dogs by seven days after therapy started. However, all of the dogs had seen complete therapeutic efficacy and outstanding clinical improvement by day 7. For all 12 dogs in this group II of cases, the average time required for lesions to regress and clinical improvement was 4.66 +/- 0.48 days.

Although the two medications used in Groups I and II were equally efficient in curing canine bacterial dermatitis, significant variations in the course of recovery were seen. Within 7 days following the start of therapy in Groups I and II, all of the dogs had a response (with grades ranging from fair to excellent). By day 5, 75% of the dogs in Group II showed outstanding clinical recovery, compared to just 66.66% of the dogs in Group I instances, according to the recovery path. However, all of the dogs had seen complete therapeutic efficacy and outstanding clinical improvement by day 7. In Group I and Group II dogs treated with clindamycin and marbofloxacin, respectively, the average time required for clinical recovery with the resolution of symptoms was 5.0+/- 0.46 days and 4.66 +/-0.48 days, respectively. The results of the current study are consistent with those of Bloom and Roser (2011) [6] and Paradis, Abbey, and Baker (2001) [25], who believed that clindamycin hydrochloride is superior to marbofloxacin for treating bacterial dermatitis over a 14-day period with an excellent recovery path. Therefore, it may be inferred from the current study that marbofloxacin is a more effective treatment for bacterial dermatitis.

Table 1: The course of recovery in dogs with bacterial dermatitis

Group (n=12)	Percent of dogs recovered (day - wise)			Average days taken for recovery
	Day 3	Day 5	Day 7	
I	3 (25%)	5 (66.66%)	4 (100%)	5.16 ± 0.45
II	5 (41.66%)	4 (75%)	3 (100%)	4.66 ± 0.48

Dog showing erythema, alopecia and pustules before therapy

Dog showing purulent and erythematic lesions before therapy

Day 3rd with absence of erythema and pustules

Day 3rd with reduction of purulent and erythematic lesions

Day 5th with improvement

Day 5th with improvement in condition

Day 7th with complete absence of erythema and pustules

Day 7th with complete recovery

Day 15th with improvement in hair regrowth
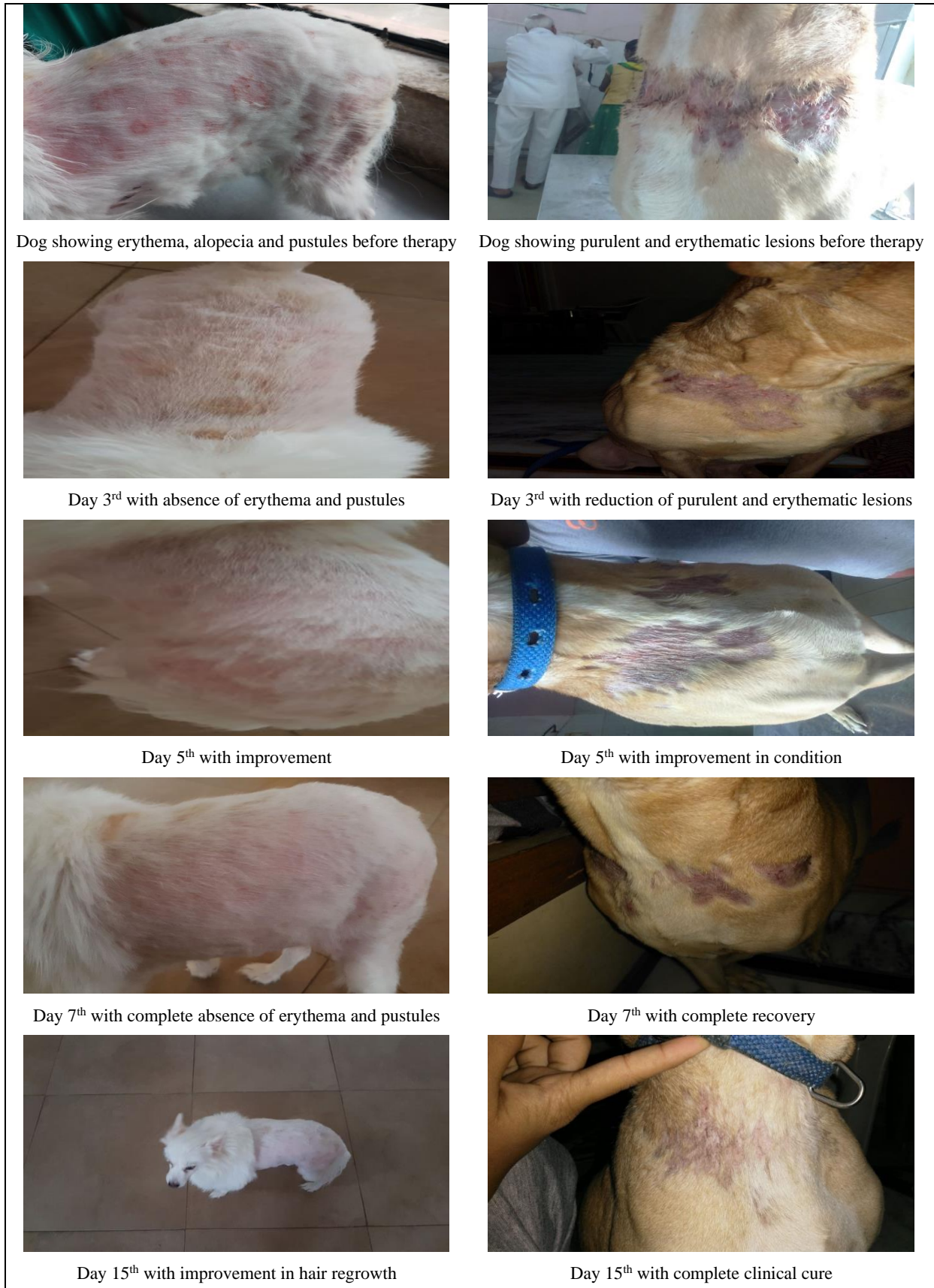

Day 15th with complete clinical cure

Fig 1: In Group I and Group II dogs, the path to recovery

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