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Case Report

Clinical Management of Dermatophytosis and Staphylococcal Pyoderma Co-Infection in A Pitbull Dog

Amit Kumar Verma1*, Afroz1, Desh Deepak1, Arbind Singh1, Surendra Upadhayay2, Amit Kumar2, and T. K. Sarkar1

[1]Department of Veterinary Medicine, College of Veterinary & Animal Sciences, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, INDIA
[2]College of Biotechnology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, INDIA

*Corresponding Author: drakverma79@gmail.com

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Abstract

The present report discussed the diagnosis and therapeutic management of dermatophytosis and staphylococcal pyoderma coinfection in a Pitbull dog. A three-year-old male Pitbull dog was presented at the veterinary clinical complex with a history of skin lesions, mild itching, bilateral ocular discharge, and difficulty walking due to pedal lesions without any response to Ivermectin administration. Clinical examination revealed focal alopecia over the dorsal side of the body, lesions around the eyes and margins of ears, crust formation on all over the body including the scrotal region, pododermatitis, congested mucus membrane, mildly swollen lymph nodes, a rectal temperature of 102.8 ℉ and negative pinna pedal reflex. Three samples (impression smear, deep skin scraping, and some hair and debris) were collected for further diagnosis. The etiological agents were identified on the basis of the presence of fungal hyphae in skin scrapping and antimicrobial sensitivity testing. Treatment consisted of a combination of systemic antibacterial (Cefadroxil) and antifungal (Itraconazole) drugs selected on the basis of in vitro antimicrobial susceptibility tests along with the topical application of Nebasulf Powder. A slight improvement in pedal lesions was noticed one week after the therapy and the dog showed marked recovery after 20 days of treatment.

Keywords: Dog, Dermatophytosis, Pyoderma, *Staphylococcus spp*, Skin infection

Introduction

Skin diseases in canines are most frequently encountered pathologies and are usually caused by bacteria, fungi or parasitic infections (Moriello et al., 2017). These cutaneous pathologies can be independent bacterial or fugal or parasitic infection or can be co-infections as all cutaneous lesions of independent infections are associated with breach in integrity of skin aiding establishment of secondary bacterial or fungal infections. Among these, bacteria are the major infectious causes followed by fungi either alone or in association with bacterial infections. Dermatophytosis is a superficial skin infection caused by fungus belonging to three anamorph genera Microsporum, Trichophyton, and Epidermophyton. The clinical manifestations of dermatophytosis are scaling, crusting, folliculitis, and focal or multifocal patches of alopecia. Among the skin infections of dogs, pyoderma is considered as the most common disease (Nesbit and Ackerman, 1998; Kalim et al., 2017). It can be classified as deep and superficial pyoderma on the basis of the depth of infection in skin layers. The most common causative agent of pyoderma in canine is Coagulase positive Staphylococcal species, but some gram negative bacteria may also leads to pyoderma in dogs (Reddy et al., 2011). Among pet dogs, breeds like Golden retriever, Dachshund, Beagle etc are more susceptible to pyoderma (Paterson, 2008). The drugs for the treatment of skin infections should be selected on the basis of their antimicrobial spectrum and ability to penetrate skin (Kalim et al., 2017). The present case deals the diagnosis and therapeutic management of dermatophytosis and staphylococcal pyoderma in a Pitbull dog.

Materials and Methods

Case History and Observations

A black coloured three-year-old male Pitbull dog was presented to Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Meerut with the clinical signs of skin lesions, minor itching, bilateral eye discharge, difficulty in walking owing to pedal lesions, and not responding to Ivermectin given 10 days earlier (Fig. 1). The dog was examined clinically for presence of ectoparasites. On the basis of history and clinical examination a pinna pedal reflex test was performed by rubbing the dog's ear from the base. It came out to be negative, which partially ruled out the possibility of scabies. For laboratory examination, the impression smear and skin scrapping was collected. Some hairs along with debris were taken in a sterilized cryovial for microbial culture and antibiotic sensitivity.

Laboratory Examination

Direct microscopic examination of skin scrapping did not reveal presence of mites, however some fungal hyphae were seen. Sample was also examined under woods lamp to diagnose the dermatophyte infection. Then samples were processed further for microbial culture and antibiotic sensitivity. The skin hair along with debris was placed in Nutrient broth and Sabouraud's dextrose broth and incubated at 37^{o}C overnight and then inoculated on Nutrient agar and Sabouraud's dextrose agar. On nutrient agar, the Gram positive cocci in clusters were detected, which were suggestive of staphylococci. The bacteria were further confirmed by biochemical tests. The growth on Sabouraud's dextrose was further identified on the basis of colony characteristics and microscopic features of the fungal isolates as per the standard procedure (Rippon, 1988; Larone, 1995). The diagnosis was confirmed on the basis of clinical manifestations, laboratory culture and woods lamp examination revealing dermatophyte and bacterial co-infection. The antibiotic sensitivity tests were performed by disk diffusion method (CLSI, 2017) using commercially available antibiotics namely amoxycillin, amoxyclav, cefpodoxime, Cefadroxil, ceftriaxone, amikacin, itraconazole, Fluconazole, Ketoconazole and Cotrimoxazole (Himedia, India) based on previous reports and recommendations of clinicians for the treatment of canine dermatitis. The antimicrobial sensitivity revealed that dermatophytes were susceptible to itraconazole and Staphylococcus isolate was highly sensitive to Cefadroxil.

Result and Discussion

Based on the antibiotic sensitivity testing, the therapy for the Pitbull dog included oral administration of Cefadroxil @ 20 mg/kg body weight B.D. for 7 days and for dermatophyte infection antifungal Itraconazole @ 10 mg per kg body weight B.D. PO for next 10 days, topical application of Nebasulf powder for 10 days and Micodin shampoo weekly for 3 weeks. As a supportive therapy, vitamin E containing capsule (Evion), twice weekly PO, an amino acids and omega-3 fatty acids containing syrup (Nutriocoat) was also prescribed. The diagnosis of skin infections in canine are based on the history, clinical signs and some laboratory examinations like skin scraping and microbial

culture. These skin infections may be treated using antimicrobial drug based on the antibiotic sensitivity test. Cephalosporin group of antibiotics are considered as most suitable for the treatment of skin infections in dogs because of their broad spectrum and good safety margin. Cefadroxil, an oral cephalosporin having good effect for pyodermas used in the present report was found effective in treating the skin infections. Slight improvement in pedal lesions was noticed one week after the therapy and the dog showed marked recovery after 20 days of treatment. In the present study, the topical application of Nebasulf and Micodin shampoo and supportive therapy using vitamin and fatty acids assisted in faster recovery of dog.

Fig 1: Skin of the Pitbull dog with dermatophytosis and staphylococcal pyoderma co-infection

Dermatophytosis is a contagious zoonotic infection of cornified epidermal tissue of skin of livestock, pets and human (Indarjulianto *et al*., 2017). More than 60 species of dermatophytes belonging to three genera viz. Microsporum, Trichophyton and Epidermophyton are mainly responsible for clinical cases of dermatophytosis (Azrad *et al*., 2019). Due to appearance of specific circular centered healed ring like lesion in humans, disease is more commonly known as Ring worm (Pin, 2021). Dermatophytosis showed variability in skin lesions from case to case depending upon causative species, secondary infections, site of infection and environmental conditions (Aktas and Yıgıt, 2015). Skin lesions reported in this case are distribute over trunk, around eyes and on limbs were in accordance to earlier reports (Cunha et al., 2019); (Indarjulianto *et al*., 2017). Antimicrobial sensitivity study reveals sensitivity of pathogen for cefadroil, amoxycillin, enrofloxacin and itraconazole. Keeping in mind the narrow bactericidal spectrum for coccus bacteria, from the sensitive antibiotics, Cefadroxil was selected for management of bacterial infection. This was in accordance to earlier studies recommending first generation as first line of choice against pyoderma in canines (Summers *et al*., 2012; Beco *et al*., 2013). The Dermatophytes infection was successfully managed with oral administration of itraconazole and topical miconazole wash. Similar success is also reported in some earlier established studies. (Chermette et al., 2008; Valandro et al., 2017).

Conclusion

In the present case, dermatophytes and staphylococci were detected in skin infections of dog. Cefadroxil, Itraconazole along with topical antimicrobial and antifungal shampoo and supportive therapy was found successful for the treatment of Canine dermatophytosis and staphylococcal pyoderma. Regular microbial culture and sensitivity test should be done before starting the treatment, which not only help in successful therapy of the clinical case but also prevent the development of antimicrobial resistance.

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Contribution by Authors

All the authors contributed equally to writing the manuscript. The final manuscript was read by all others and consented to publication.

Conflict of Interests

There is no conflict of interest.

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