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Popular Article

# Diagnostic And Therapeutic Management of Canine Pyoderma

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## *Abstract*

A 2-year-old Labrador breed was presented to the Veterinary Clinical complex (VCC), College of Veterinary Science, Rajendranagar, Hyderabad with a with poor general health condition, pruritus and alopecia. Detailed clinical examination revealed scratching, rubbing all over the body along with erythemas, crusts, debris, papules, pustules, pus exudates and offensive odour. Based on clinical and laboratory examinations, the dog was diagnosed with pyoderma and it was treated with injectable prednisolone, oral amoxycillin+clavulanic acid and atarax tablets and along with these, interban-f cream, ketochlor shampoo and supportive medications. After one month of treatment, the animal showed clinical improvement. *i.e.*, the general skin lesions were improved and pruritus, pyoderma controlled. No organisms were observed on cytology staining examination and no microbial growth on culture media but complete recovered after 2 months.

**Keywords:** Pyoderma, Amoxicillin+ Clavulanic acid, Atarax, Interban-f, Ketochlor.

## Introduction

Dog is the most preferred animal as a companion pet worldwide. Of the various infectious diseases, skin diseases are significant and have an impact on the health of the dog. It also has negative effect on cosmetic appearance of the dog. Cutaneous bacterial infection or bacterial pyoderma is one



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of most common among the canine skin diseases (Shyma and Vijayakumar, 2011) [1]. Pyoderma is one of the most common causes of dermatitis with worldwide occurrence in small animal practice. Pyoderma can be defined as pyogenic or pus producing bacterial infection of the skin and its associated parts. Dogs are more prone to pyoderma due to the unique characteristic of their skin consisting of a thin stratum corneum, lack of lipid plug in the hair follicles and high skin pH. This unique characteristic poses a risk for bacterial invasion, subsequent colonization and over growth. This may lead to superficial bacterial folliculitis (Devriese *et al.*, 2005 and Takashi *et al.*, 2007) [2-3]. Pyoderma is of great importance due to its effects on the animal such as distress, irritation and offensive odour besides being a potential source of zoonotic diseases (Parish and Schwartzman, 1993) [4]. Skin is a large metabolically active organ with a high physiological requirement for proteins and other nutrients. Skin disorders in dogs have many causes and many of them that afflict people have a counterpart in dogs. The condition of dog's skin and coat can also be an important indicator of its general health. Skin disorders of dogs vary from acute, self-limiting problems to chronic or long-lasting problems requiring life-time treatment. They also need to be differentiated based on being of primary or secondary (due to scratching, itch) in nature, making diagnosis complicated. Dog skin disorders may be grouped into categories according to the causes. Lesions may be quite superficial and may affect only the epidermis or may involve deeper structures in the dermis or subcutaneous tissue. Pyoderma is classified according to the depth of infection as surface, superficial and deep pyoderma. Canine superficial pyoderma is defined as a superficial bacterial infection of the epidermis and hair follicles and is usually secondary to allergic, parasitic, endocrine, immune-mediated and conformational or keratinisation disorders (Scott *et al*., 2001 and Patel, 2006) [5-6]. More common lesions are follicular papules, which may or may not be crusted, epidermal collarettes, erythema, hyperpigmentation and alopecia. The primary pathogen of superficial pyoderma cases involves *Staphylococcus intermedius*, a member of the normal flora in most dogs. *Staphylococcus aureus* also plays a major role in dermatitis. However, other causative organisms such as *Proteus spp, Pseudomonas spp, Escherichia coli, Actinomyces spp, Actinobacillus spp, Fusobacterium spp and Mycobacterium spp.* may cause pyoderma (Paradis *et al.*, 2001)[7]. Since most of the superficial pyodermas are associated with underlying problems, it is very essential to identify and address them properly in order to prevent recurrence. For treatment of canine pyoderma, antibiotics should be selected upon their good skin penetration ability and spectrum of antibacterial activity (especially,



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*Staphylococcus intermedius*). In addition, the selection of antibiotic depends on the type of infection, efficacy and safety profile.

**Materials and Methods**

The present investigation was carried out in the Department of Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, and the animal was brought with a poor general health condition, pruritus and alopecia. Detailed clinical examination was revealed scratching and rubbing all over the body along with erythemas, crusts, debris, papules, pustules, pus exudates and offensive odour (Fig. 1 to 3). The samples that were collected using a sterile corkscrew cotton swabs then rolled on a clean glass slide and stained by using Gram's staining method (Fig. 4). Further, swabs were also transferred to the nutrient broth and incubated for 24 hrs at 37°C. After 24 hrs of incubation, the sample is streaked onto selective specific media. Subsequently, performed antibiogram test.

**Results**

Microscopic examination of cytology staining revealed *Staphylococcus organisms* and also these organisms were isolated by culture examination (Fig. 5 and 6). Based on the clinical history and laboratory findings, the present case was diagnosed as Pyoderma with *Staphylococcus* bacterial infection. Conducted antibiotic sensitivity tests revealed that *Staphylococcus spp.* was more sensitive to Amoxicillin + Clavulanic acid (Fig. 7). Complete blood picture count was revealed increased white blood cell counts (Table.1). Based on clinical and laboratory findings, treatment was initiated with prednisolone @0.5 mg/kg, S/C for 3 days. Oral medications with TOXO-MOX (Amoxicillin + Clavulanic acid) – 250 mg, ½ tablet, twice daily for 21 days, Tab. Atarax (Anti-histamine) -10 mg, ½ tablet, once daily for 14 days, Medicated bath with Ketochlor shampoo (Virbac), once weekly for removal of crusts and debris, Interban-f cream (Corise) twice daily for 14 days. Supportive therapy with Vitabest derm (Virbac) syrup, 4 ml BID for 1 month and Immuncare (Vetrina) syrup, 4 ml BID for 1 month. After one month of treatment, the animal showed clinical improvement. *i.e.*, the general skin lesions were improved, pruritus and pyoderma was controlled. No organisms were observed on cytology staining examination and no microbial growth on culture media but complete recovered after 2 months (Fig.8 and 9).



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Fig. 1 and 2: Pustules, exudates and crusts in Pyoderma dog before treatment

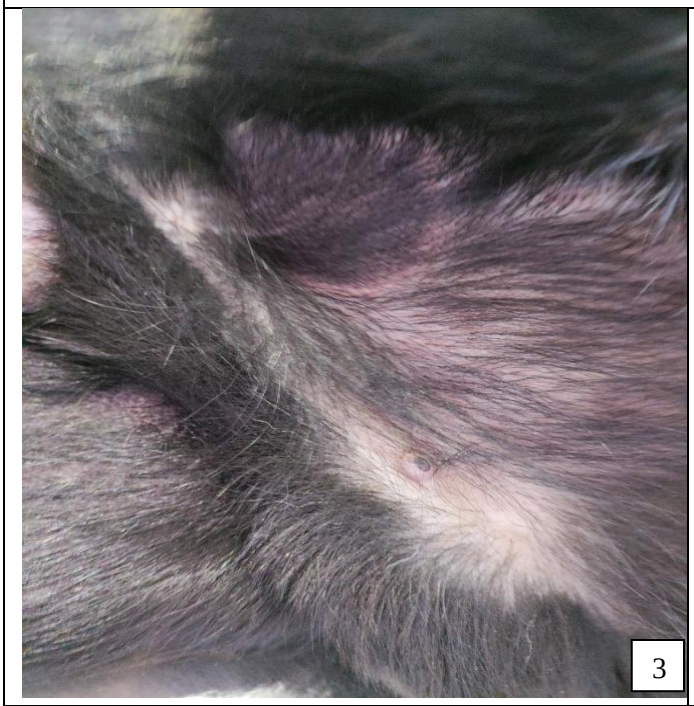


Fig. 3: Pustules on abdominal region in Pyoderma dog before treatment

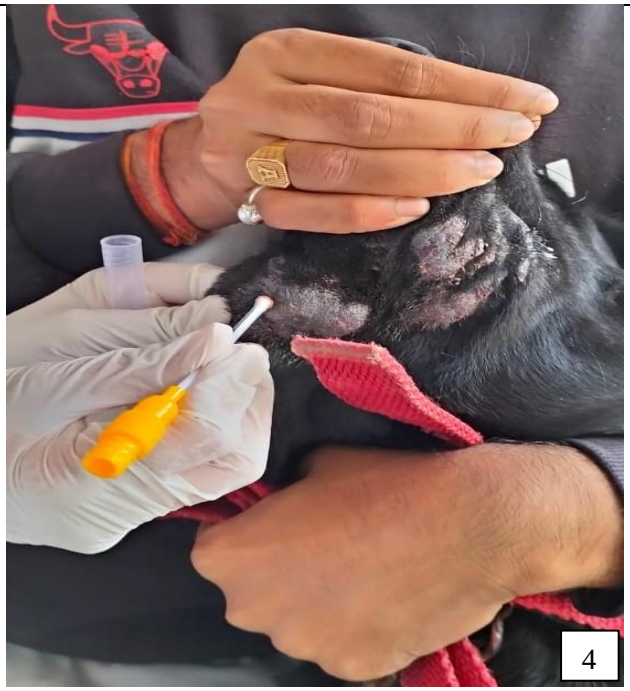


Fig. 4: Collection of sample using dry sterile swab



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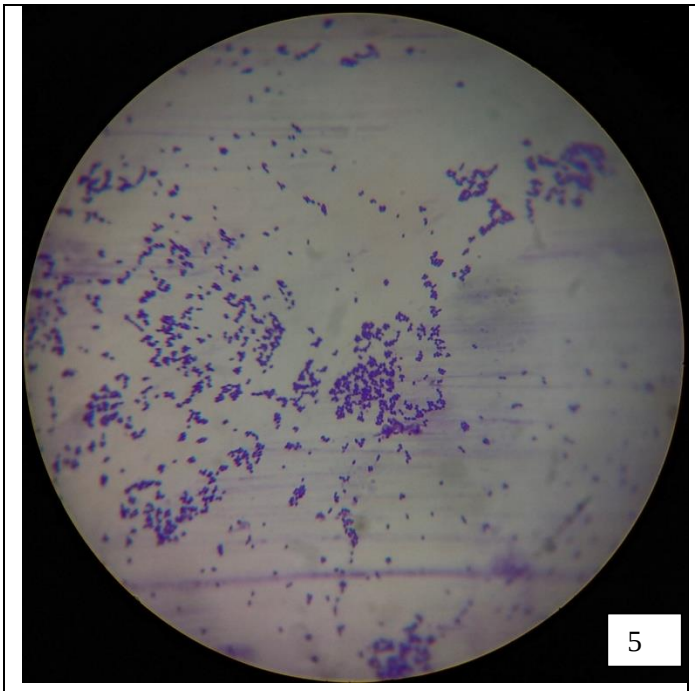


Fig. 5: Growth of *Staphylococcus* organisms on MSA


Fig.6: Isolated *Staphylococcus spp*. on mannitol salt agar


Fig.7: Isolated *Staphylococcus* sensitive to Amoxycillin+Clavulanic acid


**Fig. 8:** Clinical improvement of Pyoderma dog after treatment



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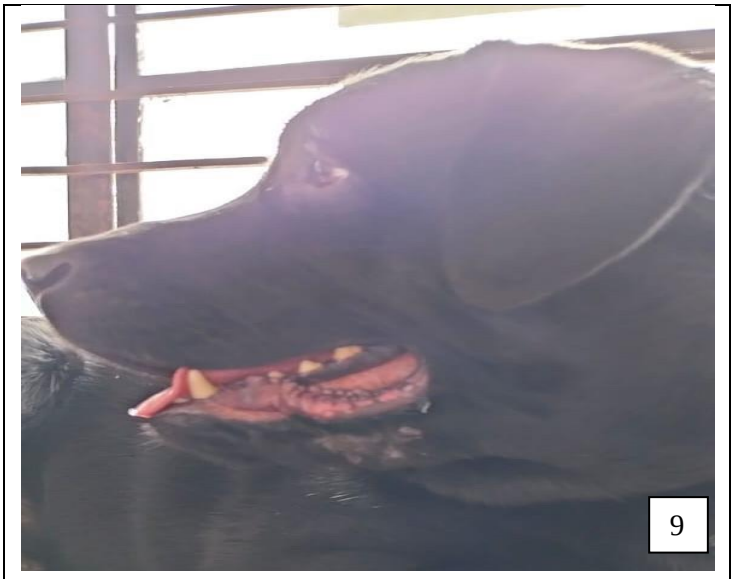


Fig. 9

**Fig. 9:** Clinical improvement of Pyoderma dog after treatment

**Table 1: Hematological parameters**

| Haematological analysis | | | |
|---|---|---|---|
| **Parameters** | **Before treatment** | **After treatment** | **Normal ranges** |
| Hemoglobin (g/dl) | 13.8 | 14.2 | 12-18 |
| PCV (%) | 41 | 44 | 37-55 |
| RBC ($10^6$/µl) | 6.42 | 7.13 | 5.5-8.5 |
| Platelets ($10^5$/µl) | 2.38 | 2.56 | 200-500 |
| WBC ($10^3$/µl) | 22.6 | 15.33 | 6-17 |
| Neutrophils (%) | 94 | 71 | 55-80 |
| Lymphocytes (%) | 26 | 28 | 12-30 |
| Monocytes (%) | 2 | 3 | 3-10 |
| Eosinophils (%) | 3 | 2 | 2-10 |
| Basophils (%) | 0 | 0 | 0-1 |

## Discussion

*Staphylococcus spp.* is a normal commensally of dog skin but due to some changes of the skin macro and micro environment, it becomes pathognomic and causes infection. Erythema, alopecia, pruritus, papules, pustules, pus exudates and offensive odour were noticed in the present



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study. These were similar to the findings of Kelany and Galal (2011) [8] and Beigh *et al.* (2013) [9]. These symptoms were attributed to the bacterial proliferation on the skin and subsequent release of bacterial toxins and enzymes resulting in inflammation and pruritus (Loeffler *et al.,* 2008) [10]. Symptoms like erythema, exudation, scaling, alopecia and offensive odour might be due to the release of chemical mediators such as serotonin, prostaglandins, peptides and leukotrienes at the site of inflammation. Folliculitis occurred as follicle growth shifted towards telogen phase after the occurrence of inflammation, in and around follicles that resulted in diffuse or patchy alopecia (King *et al.*, 2006) [11]. The dog with pyoderma of the present study diagnosed primarily through cytological staining examination was also further confirmed by the cultures obtained from the lesions and isolated *Staphylococci spp.* on mannitol salt agar. The findings of the present study were in accordance Wilkoek *et al.* (2006) [12] who also identified *Staphylococcus spp.* was the major pathogen in dogs with pyoderma. Muller *et al.* (1983) [13] opined that *Staphylococcus pseudointermedius* is a part of normal skin microflora which breaks the cutaneous ecosystem and becomes pathogenic under certain favourable conditions. While Bond and Loeffler (2012) [14] documented that every *Staphylococcus intermedius* was considered as part of *Staphylococcus pseudointermedius* species. Elevated total leukocyte count with neutrophilia was noticed in the present study. These were in accordance with the reports of Beigh *et al.* (2013) [9], stress due to dermatitis and bacterial toxins had been suggested as possible reason for marked leucocytosis (Aujla *et al.,* 1997) [15]. Isolated *Staphylococcus spp*. showed more sensitivity to Amoxycillin+Clavulanic acid, Amoxycillin+Clavulanic acid has an increased spectrum of activity against gram-negative bacteria due to the presence of the "suicide" drug, clavulanicacid. Clavulanic acid irreversibly binds to f-lactamases, allowing the amoxycillin fraction to interact with the bacterial pathogen. This combination usually has excellent bactericidal activity against B-lactamase-producing *Staphylococci, E. coli, Klebsiella spp.,Pseudomonas spp., Enterobacter spp;* Pencillins have greater stability to lactamases so they have greater activity against *Staphylococci* and gram negative bacterias (Petricia and Dowling, 1996) [16]. Used Interban-f cream might be due to its safe and effectiveness in bacterial skin infections like pyoderma by strongly interrupting the growth of S*taphylococcus intermedius*. Used Vitabest derm syrup might be due to maintaining of skin health, integrity of the epithelial barrier, shiny and lustrous coat. The rational for immune-modulator therapy includes the stimulation of enhanced immune surveillance and altered response to bacterial allergens



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leading to diminish recurrence (Ihrke, 2005) [17]. The immune-modulatory activity of the immune booster used in the present study might be due to the synergistic action of various ingredients (Vitamin A, vitamin C, vitamin E, selenium, zinc, ashvagandha).

## Conclusion

Canine pyoderma is a group of various skin diseases and an accurate diagnosis is mandatory. An appropriate antibacterial therapy is required in most cases of canine pyoderma, in association with topical therapy. Antibiotics must be selected carefully and used with appropriate dosage and duration of treatment.

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