Study to Assess the Beneficial Effects of Immunol Liquid in the Management of Canine Pyoderma

Uday Ravi Bhat[1] and Bhagwat V.G.*[2]

1. Prajna Veterinary Clinic, Banashankari, Bangalore, India,
2. R&D Center, The Himalaya Drug Company, Bangalore, India
* Corresponding author

Abstract

A study was conducted in 30 selected dogs with pyoderma (superficial and deep) to evaluate the therapeutic effect of antibacterials and their combination with immunomodulators (Immunol liquid at a dosage of 1–2 mL for small breeds and 2–3 mL for large breeds twice daily). Among these, 12 dogs were treated with antibacterials alone and 18 dogs were treated with a combination of antibacterials and immunomodulators (Immunol liquid). Of these 12 dogs with pyoderma, 8 (66.66%) were successfully cured with antibacterials alone. However, only 6 of them (50%) stayed healthy after a period of 1.5 months. Of the 18 dogs treated with a combination of antibacterials and immunomodulators, 14 (77.77%) regained health within the therapeutic period; among them, 12 (85.71%) remained completely cured after the completion of the therapy. Recurrence of pyoderma was more (25%) in antibacterial-treated group compared to those treated with the combination drug (14.28%). Results of the study suggest that in dogs with pyoderma the combination therapy was more effective than antibacterials therapy alone.

Key words: Pyoderma, Antibacterials, Immunol liquid, *Staphylococcus spp*

Introduction

Pyoderma is one of the most common causes and the most persistent in small animal practice, worldwide (Ihrke, 1987; Hill and Moriello, 1994). Many factors have been found to be contributed to the pathogenesis of canine pyoderma, including bacterial infection, impaired immunity, endocrine abnormalities, seborrhea, and allergic conditions (Muller, 1989). Staphylococcus intermedius is the predominant coagulase-positive staphylococcus isolated from normal and infected canine skin (Berg et al., 1984). Lesions may be quite superficial and may affect only the epidermis or may involve deeper structures in the dermis or subcutaneous tissue. However, other causative organisms such as Proteus spp, Pseudomonas spp, Escherichia coli, Actinomyces spp, Actinobacillus spp, Fusobacterium spp, and Mycobacterium spp may cause pyoderma (Debouer, 1995; Scott et al., 1995; Paradis et al., 2001). A good skin penetration and antimicrobial activity of the selected antibacterials against Staphylococcus spp are required for the treatment of canine pyoderma.

Antibacterial shampoos can be considered as adjunct treatment, but corticosteroid drugs should not be used. If canine pyoderma recurs in the absence of an identifiable underlying cause, antibacterials or their combination drugs can be used in eliminating the recurrence or limiting the severity of the disease. Immunomodulatory drugs are helpful in enhancing the efficacy of antibacterials in the treatment of pyoderma. The Immunol liquid of The Himalaya Drug Company, Bangalore, India, contains Tinospora cordifolia, Withania somnifera, Boerhaavia diffusa, Asparagus racemosus, Trigonella foenum-graecum, Tylophora indica, and Terminalia chebula.

Materials and Methods

A total of 30 selected dogs aged between 1 and 9 years were examined for staphylococcal pyoderma in a private veterinary hospital in Bangalore over a period of 12 months. Among them, 11 dogs had superficial infections (folliculitis), 12 had deep infections (furunculosis), and 7 had both superficial and deep infections. These selected dogs (18 males and 12 females, weighing 5–40 kg) represent different breeds including five mongrels. A physical examination (such as body temperature, pulse, and respiratory rate) of all dogs was performed during the pretreatment period. Dogs suspected of underlying diseases such as hypothyroidism and diabetes mellitus that might affect their ability to respond to therapy were excluded from the study. Skin scrapings and microscopic examination of pus from skin lesions were performed on all dogs. Exudate collected from intact pustules or nodules on all dogs was submitted for bacterial culture. Superficial or

deep pyoderma was diagnosed based on clinical examination and the laboratory investigation. Based on the duration of infections, the dogs were divided into two groups: group 1 (duration of infection less than 6 months) and group 2 (duration of infection more than 6 months).

Group 1 dogs received antibacterial therapy and group 2 dogs received the combination therapy (antibacterials and immunomodulator), where Immunol liquid was used as an immunomodulator. The antibacterials were administered at a dosage of 10 to 20 mg/kg body weight and Immunol liquid at 1 to 2 mL for small breeds and 2 to 3 mL for large breeds, respectively. Treatment was continued until infections were visually and palpably cured in both superficial and deep pyoderma infections.

Results and Discussion

Staphylococcus spp was isolated from all 30 dogs. Among the 12 dogs (group 1) treated with antibacterials, 8 dogs (66.66%) showed excellent responses (complete resolution of the infections) and 4 dogs (33.33%) did not show any response. Treatment periods ranged from 3 to 6 weeks for dogs having only superficial infections and 4 to 12 weeks for dogs having deep infections. Two dogs (25%) reported recurrence of the disease within 1.5 months of post treatment. Among the 18 dogs (group 2) treated with the combination drug, 14 dogs (77.77%) showed excellent responses (complete resolution of the infections), 3 dogs (16.66 %, two deep and one superficial pyoderma cases) showed 40% improvement, and 1 dog (5.55%, superficial and deep pyoderma cases) did not show any improvement. Treatment periods ranged from 3 to 8 weeks for dogs having only superficial infections, 8 to 12 weeks for dogs having deep infections, and 10 to 15 weeks for dogs having mixed infection (superficial and deep). Two dogs (14.28%) reported recurrence of the disease within 1 month of post treatment. The success rate of the therapy in dogs with pyoderma treated with combination drug increased by 11.11% compared to the antibacterials treatment alone. Recurrence of pyoderma was 10.72% less in combination drug-treated group as compared to the antibacterials-treated group. The decrease in the number of recurrent cases in combination-drug treated group indicates the positive effect of immunomodulators on the long-term stabilization of immunity status.

The rationale behind antibacterial regimens includes preventing re-infection, whereas the rationale for immunomodulatory therapy includes the stimulation of enhanced immune surveillance, an altered response to bacterial allergen leading to diminished recurrence (Ihrke, 2005). The immunomodulatory activity of Immunol liquid might be due to the synergistic action of various ingredients in the formulation.

***Tinospora cordifolia*:** Administration of T cordifolia stem methanolic extract to BALB/c mice (200 mg/kg IP daily for 5 days) increased the total white blood cell count (WBC) significantly (P<.001). It also increased bone marrow cellularity (18.16 × 106/femur) and a-esterase positive cells (1423/4000 cells) in bone marrow, indicating increased maturation of stem cells. Its extract administration significantly increased the humoral immune response, as seen from the increase in plaque-forming cells in the spleen (1575 plaque-forming cells [PFC]/106 spleen cells), circulation in antibody titer (256), and an enhancement (129%) in macrophage activation (Mathew and Kuttan, 1999).

***Withania somnifera*:** Treatment with five doses of Withania somnifera root extract (20 mg/dose/animal IP) in Balb/c mice shown a significant increase in the total WBC count (17,125 cells/mm3). Bone marrow cellularity (27 × 106 cells/femur) and a-esterase positive cell number (1800/4000 cells) also increased significantly (P<0.001) after the administration of Withania extract. Withania extract treatment along with the antigen (SRBC) showed an improvement in the circulating antibody titer, the number of PFC in the spleen, and the phagocytic activity of peritoneal macrophages (76.5 pigmented cells/200) when compared to nontreated mice (31.5/200 cells) (Davis and Kuttan, 2000).

***Boerhaavia diffusa*:** Oral administration of the fraction (25–100 mg/kg) in mice significantly inhibited SRBC-induced delayed hypersensitivity reactions, which were observed during the postimmunization drug treatment. No effect during preimmunization drug treatment was observed. A significant dose-related increase in antibody titer was observed during pre- and postimmunization treatments (Mungantiwar et al., 1999).

***Asparagus racemosus*:** Oral administration of test material at a dosage of 100 mg/kg/d for 15 days showed a significant increase (p=0.0052) in antibody titers of Bordetella pertussis as compared to untreated (control) animals (Gautam et al., 2004).

***Trigonella foenum-graecum*:** Mice were treated with three doses of extract (50, 100, and 250 mg/kg body weight per os) for 10 days. PFC assay, hemagglutination titer (HT), phagocytosis, and lymphoproliferation were studied in various groups of animals. Humoral immunity as measured by PFC showed an elevated response at a dosage of 100 mg/kg. However, no significant effect was observed when administered at a dosage of 50 and 250 mg/kg. In the HT test, plant extract showed a modulatory effect at all the doses. Plant extract elicited a significant increase in the phagocytic index and capacity of macrophages. Stimulatory response of plant extract was also observed in lymphoproliferation assay, but the response was weak (Bin-Hafeez et al., 2003).

***Tylophora indica*:** Tylophora indica, Aconitum

Table 1. Clinical Data of 30 Dogs with Staphylococcal Pyoderma

Cases	Breed	Sex	Age (Yrs)	Skin lesions	Duration of infection (Months)
1	German Shepherd	M	2	Erythema, suppuration, crusted papules	5
2	Labrador Retriever	M	5	Erythema, exudation, cellulitis, crusted papules	18
3	Mongrel	F	7	Erythema, suppuration, crusted papules, cellulitis, fistulae	12
4	Boxer	M	2	Erythema, suppuration, crusted papules, cellulitis, fistulae	18
5	Dachshund	F	3	Erythema, suppuration, crusted papules	5
6	Mongrel	F	2.5	Erythema, suppuration, crusted papules	4
7	German Shepherd	M	7.5	Erythema, exudation, cellulitis, crusted papules	12
8	German Shepherd	F	8	Erythema, exudation, cellulitis, crusted papules	5
9	Golden Retriever	M	5	Erythema, suppuration, crusted papules, cellulitis, fistulae	11
10	Doberman Pinscher	F	3	Erythema, suppuration, crusted papules	5
11	Labrador Retriever	M	4.5	Erythema, suppuration, crusted papules, cellulitis, fistulae	10
12	Golden Retriever	M	6.5	Erythema, exudation, cellulitis, crusted papules	15
13	Mongrel	M	8	Erythema, suppuration, crusted papules	4
14	Doberman Pinscher	F	9	Erythema, exudation, cellulitis, crusted papules	12
15	Golden Retriever	M	7.5	Erythema, suppuration, crusted papules, cellulitis, fistulae	15
16	Boxer	F	6	Erythema, suppuration, crusted papules	5
17	Dachshund	F	4	Erythema, suppuration, crusted papules	6
18	Doberman Pinscher	M	1	Erythema, suppuration, crusted papules	8
19	German Shepherd	M	1.5	Erythema, exudation, cellulitis, crusted papules	14
20	Dachshund	F	3	Erythema, exudation, cellulitis, crusted papules	4
21	Labrador Retriever	M	7	Erythema, suppuration, crusted papules	7
22	Golden Retriever	M	5	Erythema, suppuration, crusted papules, cellulitis, fistulae	15
23	Mongrel	F	3	Erythema, suppuration, crusted papules	3
24	German Shepherd	M	2	Erythema, exudation, cellulitis, crusted papules	12
25	Labrador Retriever	F	6	Erythema, suppuration, crusted papules	1
26	Golden Retriever	M	9	Erythema, exudation, cellulitis, crusted papules	3.5
27	German Shepherd	M	6	Erythema, exudation, cellulitis, crusted papules	5
28	Mongrel	F	5	Erythema, exudation, cellulitis, crusted papules	12
29	German Shepherd	M	2.5	Erythema, exudation, cellulitis, crusted papules	14
30	German Shepherd	M	4.5	Erythema, suppuration, crusted papules, cellulitis, fistulae	14

heterophyllum, and Holarrhena antidysenterica appeared to stimulate phagocytic function while inhibiting the humoral component of the immune system (Atal et al., 1986).

***Terminalia chebula*:** The immunomodulatory activities of Triphala (Terminalia chebula, Terminalia belerica, and Emblica officinalis) were assessed by testing the various neutrophil functions such as adherence, phagocytosis (phagocytic index [PI] and avidity index [AI]) and nitro-blue tetrazolium reduction in albino rats. Neutrophil functions were significantly enhanced in the Triphala-immunized group, with a significant decrease in corticosterone level (Srikumar et al., 2005).

Conclusion

From the above findings, it can be concluded that antibacterial combination with immunomodulator is very effective in the treatment of superficial and deep staphylococcal pyoderma in dogs. The study did not report any side effect, even with the prolonged therapy that is often necessary in these cases.

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Table 2. Group Allotment of Different Pyoderma Cases

Groups	Superficial pyoderma	Deep pyoderma	Superficial + deep pyoderma
Group 1	8	4	-
Group 2	3	8	7
Total	11	12	7

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