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Pododermatitis in German Shepherd Dogs and its Management

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Abstract

German Shephered dogs of either sex with chronic recurrent pododermatitis with various degrees of clinical signs along with excerbation of pus presented at the Teaching Veterinary Clinical complex, C.V.Sc. & A.H., O.U.A.T. were selected for the present study. The culture and sensitivity test of the skin swab from the lesions of the affected dogs revealed the presence of four bacterial species namely *Staphylococcus intermedius, Staphylococcus aureus, Streptococcus agalactia, Micrococcus leuteus* with highest sensitivity to antibiotics namely piperacillin+tazobactam, clindamycin, amoxicillin+potassium clavulanate and mupirocin. There was reduced Hb concentration with leucocytosis, neutrophilia and lymphopenia in the affected animals; however the biochemical parameters of liver and kidney function test remained within the normal value. The treatment was done with piperacillin with tazobactam @ 40 mg/kg intravenously thrice daily for 7 days, clindamycin @ 11 mg/kg body weight twice daily orally for another 7 days continuously along with regular dressing and topical application of mupirocin which brought complete recovery by 21 days and dogs were quite alright with growth of hair at the affected parts by 28th day.

Key Words : Pododermatitis, Antibiotic sensitivity test, German shepherd dog.

Introduction

Lesions in the digits of dogs are more common due to physical injuries, ectoparasitic infestations, faulty managemental practices and the thinness of their stratum cornium (Gutzwiller, 2006). The lesions in the digits help in invasion of micro organisms leading to formation of pus which gets aggravated to a more severe form of pyuric lesion mainly due to continuous licking and improper pedal hygiene (King *et al.*, 2006; Bannoehr, 2007).

The treatment becomes costlier with every chance of recurrence due to inadequate and inappropriate treatment regimen, which may lead to permanent digital deformity of the dog. So a proper therapeutic regimen following isolation and identification of causative organism along with appropriate pedal management is highly essential to save the permanent digital deformity of the dog. The present study was conducted for effective management of pododermatitis with minimum chance of recurrence. The German shepherd breed was selected due to their highest susceptibility to pododermatitis (Divriese *et al.*, 2005; Stegemann *et al.*, 2006 and Takashi *et al.*, 2007).

Materials and Methods

Six number of German shepherd dogs of either sex aged between 2-4 years suffering from chronic recurrent Pododermatitis with clinical sign like difficulty in gait, offal smell, reduced appetite and reduced activity presented at TVCC during may 2015 to June 2015 were selected for the present study and kept under Group II. The history revealed that the dogs were dewormed and vaccinated regularly in past years. Haematological parameters like haemoglobin, TLC and DLC were estimated as per standard method (Brar *et al*., 2000). Superficial skin swabs from the pyuric lesions were collected and culture and antibiotic sensitivity test was conducted by routine method. The serum samples were collected for evaluation of liver and kidney function test, the serum AST, ALT, ALP, BUN & Creatinine values were estimated as per standard colorimetric methods using commercially available biochemical kits from Merck. Skin scrapings from the affected parts were examined for detection of mites by KOH digestion technique. Stool samples were collected and send to the department of parasitology for detection of endoparasites having cutaneous migration through both direct smear and floatation technique. Another six clinically healthy animals without any skin lesions with normal activity were selected as healthy control group and kept under Group I.

The haemato-biochemical alteration was studied on day zero and day 28 of the experiment. The dogs were treated with highly sensitive antibiotics both systemic and topically daily for 14 days. The clinical recovery as exhibited through alleviation of pain and inflammation, healing of wounds, gait, posture, appetite and growth of new hair was studied on weekly basis. The dressing of wounds was done daily with 1% KMnO4 with luke warm water along with topical application of highly sensitive antibiotics till healing of wounds. The clinical recovery was assessed based on the alleviation of clinical signs, recovery from pyuric lesions weekly from day 0, to day 28.

Therapeutic regimen

The selected dogs were treated with antibiotics with highest (100%) sensitivity for 14 days continuously, out of which Piperacillin and Tazobactam (Pipzo) at the dose rate of 40 mg/kg was given intravenously thrice a day for 7 days followed by clindamycin (Clindapet) @ 11 mg/kg body weight twice daily orally for another 7 days. The mupirocin ointment was selected on the basis of sensitivity report and applied daily topically till healing of wound. The lesions were dressed with 1% $KMnO_4$ with luke warm water daily till the absence of exacerbation of pus i.e 5^{th} day. The NSAID *meloxicam* (melonex) @ 0.4 mg/ kg body weight was given once daily through intramuscular route for 2 days. The wounds were washed and cleaned daily with topical therapy for 7 days. The selected dogs were kept under observation till 28 days.

Results and Discussion

The mean Hb concentration (gm%) in pododermatitis affected dogs of Gr-II on day 0 (8.65±1.2) was at a statistically non significant ($P \leq 0.05$) lower level than Gr-I (10.62±0.87) (Table 1). Which may be due to chronic bacterial infection (Shyama and Vijay kumar, 2011). The mean TLC count on day 0 in Group II (14.21±1.32 x 10^3) was significantly ($P \leq 0.05$) higher than Group I (7.82±1.71 x 10^3).This may be attributable to the bacterial infection stimulating the phagocytosis which increases the white blood cell count along with neutrophilia. The bacterias like *Staphylococcus* stimulates hypersensitivity reaction due to Protein A in its cell wall and inhibits phagocytosis. The mean lymphocyte count (%) of Group II (14.06±6.47) on day 0 was significantly ($P \leq 0.05$) lower than Group I (37.52±4.13) showing lymphocytopenia. The lymphocyte count reduces relatively as the neutrophilia occurs. The increased TLC count along with neutrophilia and lymphocytopenia as detected on the 0^{th} day of present study is in agreement with the findings of Shyama and Vijay kumar (2011); and Kumar *et al* (2006). The treatment with specific antibiotics had killed the causative organism so also their deletorius effect as well as potentiated the phagocytosis and scavenging action, for which there was significant reduction in TLC count, neutrophill count and increase in lymphocyte count to the normal range by day 28. The reduction in Hb concentration may be attributed from chronic

Table 1: Haematological changes during Pododermatitis in German Shepherd Dogs

[Group I: Healthy control group, Group II: Dogs affected with pododermatitis. Values are expressed as Mean± S.E. values. Parenthesis denotes range. Mean values with different (a, b & c) differs in a row between the groups significantly at Pd≤0.05]

Table 2: Biochemical changes during Pododermatitis in German Shepherd Dogs

ALT (units/L)	28.32^{a}±6.80	30.58^{a}±4.15	30.53^{a}±6.16	31.37^{a}±3.14
AST (units/L)	29.58^{a}±5.28	30.43^{a}±3.73	31.27^{a}±3.21	29.94^{a}±4.17
ALP (units/L)	42.82^{a}±7.36	45.19^{a}±5.41	38.95^{a}±6.84	43.37^{a}±4.53
BUN(mg/dl)	10.74^{a}±3.03	23.26^{b}±2.1	13.06^{a}±2.18	21.27^{b}±3.72
Creatinine(mg/dl)	0.61^{a}±0.24	1.43^{b}±0.47	0.59^{a}±0.15	1.29^{b}±0.24

[Group I: Healthy control group, Group II: Dogs affected with pododermatitis. Values are expressed as Mean± S.E. values. Parenthesis denotes range. Mean values with different (a, b & c) differs in a row between the groups significantly at Pd≤0.05]

inappetance or from the toxaemic conditions which was enhanced nearer to normal range by eradication of bacterial infection through specific antibiotics.

The mean serum concentration of liver enzymes Aspartate Amino Transferase (AST) and Alanine Amino transferase (ALT) on day 0 of selected animals in Group II were within the normal range, reflecting the normal functioning of the liver. On day 0, the mean serum BUN (mg/dl) concentration (27.26±2.1) and mean creatinine (mg/dl) concentration (1.43±0.47) in Group II was at significantly (P≤0.05) higher level than that of Group I (Table 2). The increased BUN and creatinine may be attributed from tissue damage, toxaemia and affections of kidney tubules. The selected antibiotic therapy in Group II though reduced the BUN and creatinine level by day 28, but the reduction was at a statistically non significant level.

Culture and sensitivity test:

The superficial skin swabs from the selected cases were sent to the bacteriological laboratory of C.V.Sc & A.H. for culture and sensitivity test (Saridomichelakis *et al.*, 2004). The predominant bacteria isolated from the morphological characteristics like size of colony, pigment production and swarming growth in nutrient agar were *Staphylococcus intermedius, Staphylococcus aureus, Streptococcus agalactiae* and *Micrococcus leuteus* (Table-3).

Table 3. Antibiotic sensitivity of bacterial isolates from skin swabs:

Piperacilin/Tazobactam(100/10 mcg/disc)	6/6	100
Clindamycin(2 mcg/disc)	6/6	100
Amoxicillin/Clavulanic acid (20+10 mcg/disc)	6/6	100
Amikacin(30 mcg/disc)	5/6	83.3
Ampicillin(10 mcg/disc)	4/6	66.6
Chloramphenicol (30 mcg/disc)	4/6	66.6
Azithromycin(15 mcg/disc)	3/6	50
Ceftriaxone (30 mcg/disc)	5/6	83.3
Enrofloxacin (10 mcg/disc)	5/6	83.3
Tobramycin (10 mcg/disc)	4/6	66.6
Gentamycin (10 mcg/disc)	5/6	83.3
Mupirocin (5 mcg/disc)	6/6	100

*[*6/6 means highest sensitivity in six cases out of six selected cases. ** Percentage calculated from number of cases found highly sensitive to that antibiotic out of total number of cases.]*

The highly sensitive antibiotic (with 100% sensitivity) were found to be Piperacillin+tazobactam, Clindamycin, Amoxycillin+potassium clavulanate, mupirocin, followed by other antibiotics (Table-3) which has some similarities with the earlier findings of Senthil kumar *et al.* (2010).

Results of faecal sample and skin scraping examination:

Faecal samples and skin scrapings collected from all selected cases sent to the department of Parasitology C.V.Sc & A.H. for detection of endo-parasites and mites respectively. The faecal samples were found to be negative for presence of any endoparasitic ova in both direct smear and floatation technique. The examination of skin scrapings by KOH digestion method revealed absence of mites in all the selected cases.

Study of clinical recovery:

Fig 1. 0th day of treatment

Fig 2. 14th day of treatment

The clinical recovery was observed on the basis of recovery from altered clinical signs like alleviation of pain and inflammation, healing of wounds, gait, posture, appetite and growth of new hairs. The animals were studied on weekly basis.

Day 0: Dogs were unable to walk, reluctant to touch their foot pads, exacerbation of pus from all affected foot pads, inflammation, swelling, complete alopecia, discolouration, continuous licking, offal smelling and reduced appetite. These signs are in agreement with Hiller *et al.* (2014). (Fig-1)

Day 7: Absence of licking, appetite apparently normal, animal became able to walk with certain difficulties, absence of exacerbation of pus, inflammation and swelling subsided. The exacerbation of pus was undetectable after 4±2 days and intensity of offal smell was reduced.

Day 14: Normal appetite, able to walk quite normally, scar tissues were found at an average of 12±2 days, normal body smell, allowing to touch the pads, growth of new hairs started. (Fig-2)

Day 21: Animals were quite normal, running normally, hairs came up abundantly in foot pads, nails

Fig 3. 21st day of treatment

Fig 3.4. 28th day of treatment

were in normal apposition, absence of pain on palpation, complete healing, on 21±2 days onwards with normal gait. The similar findings were reported earlier by Hiller *et al.* (2014). (Fig-3)

Day 28: foot pads were completely normal with normal activities of the dog marked without any recurrence. (Fig-4)

Conclusion

The treatment of pododermatitis with highly sensitive antibiotics through both systemic and topically for 3 weeks along with proper dressing for an appropriate period brings complete recovery without any recurrence.

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Conflict of Interest: All authors declare no conflict of interest.

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