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Evaluating the therapeutic potential of equine placental extract for managing canine dermatitis: A novel study

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Abstract

The integument is the largest organ of the body affected by direct and indirect means and demands specific and supplemental therapy. Hence, the current study was undertaken using an equine placental dietary supplement with the objective, to evaluate the efficacy and assessing the adverse effect of equine placental dietary supplements in dogs for the treatment of alopecia. Dogs presented with a history of alopecia of varied etiology were considered for the study by dividing them into 3 groups (16 in each) viz, group I (non-specific alopecia), group II (demodicosis) and group III (bacterial dermatitis). Further group II and group III dogs were randomly subdivided into group a and b, wherein, subgroup "a" were treated with the standard treatment protocol and subgroup "b" with additional supplementation of equine placental extract @ 2 ml/10 kg B.wt., orally, for 60 days (2 months). Following treatment, a significant improvement ($p < 0.05$) was noticed with haemato-biochemical parameters along with marked improvement in skin and coat abnormalities and hair growth score in the dogs of group I and sub-group "b" of groups II and III. Hence, the current study confirmed the role of placental extract as a supplement that helps in the quick recovery and absence of relapse.

Keywords: Bacterial dermatitis, demodicosis, dog, non-specific alopecia, placental extract

Introduction

Canine dermatology is one of the complex areas that warrants prompt investigation, treatment, long-term follow-up and prophylaxis. Further, it also necessitates supplementary therapy. Placental extract in olden times was used to heal surgical wounds, burn injuries, and chronic wounds. Even in the present scenario, in modern medicine placental extract is being used to improve collagen synthesis, and nervous, hormonal, and immune system regulation (Kondaveeti *et al.*, 2018) [6]. There was enough documentation on the efficacy of human placental extract, that was having various growth factors and cytokines along with some active substances, demonstrated for hair growth-promoting effect (Kwon *et al.*, 2015) [9]. Similarly, cow placenta extract, in murine studies showed accelerated hair growth (Zhang *et al.*, 2011) [23]. Nagae *et al.*, (2022) [12] reported the importance of equine placental extract supplements to improve human skin quality and to reduce melanin content. The effects of placental extract in canine alopecia and various types of dermatitis are largely unknown. As per recent research literature, canine alopecia warrants critical evaluation and appropriate as well as adjunct therapeutic regimen. Though there is abundant literature stating the importance of placental extracts on human skin, yet absence or inadequacy of reports on veterinary dermatology invokes to take up this work. The current study not only reveals the novelty of using oral placental extract for canine alopecia and dermatitis but also primarily focuses on its impact on canine dermatitis.

Materials and Methods

Selection of study population: The study was conducted in the client-owned dog population of above 2 years of age regardless of sex and breed presented to the veterinary medicine unit of the veterinary clinical complex with lesions and manifestations related to dermatitis and/or alopecia. The diagnosis was arrived at based on history, clinical examination, skin scrapping studies and laboratory investigation. Cases of non-specific alopecia and specific dermatitis with demodicosis and bacterial infection were diagnosed and then considered for the present

investigation. Dogs presented with generalized alopecia with or without skin and coat abnormalities were considered as non-specific alopecia but eliminating all other possible causes of dermatitis, cases of generalized demodicosis were diagnosed based on microscopic examination of deep skin scraping after processing in 10% KOH and whereas, bacterial dermatitis was diagnosed by close clinical examination of the skin by observing the presence of papules or pustules, epidermal collarettes, dry flakes with itching, subsequent culture studies to identify the specific etiological agent. Further, the culture was also subjected to antibiogram to find out suitable antibiotics.

Study design: Based on these findings all the dogs with non-specific alopecia and specific dermatitis were individually divided into three groups, i.e., group I (non-specific alopecia), group II (demodicosis) and group III (bacterial dermatitis) with 16 dogs in each group, wherein the groups II and III were further subdivided into group IIa, IIb and IIIa, IIIb respectively, with 8 dogs in each.

Placental extract protocol: Equine placental extract is available as 2 ml nebulas and was supplemented exclusively to the non-specific alopecia (group I) dogs as a dietary supplement at the dose rate of 2ml for 10 kg body weight, once in 2 days for the first 30 days followed by once in 4 days for the next 30 days (Kumar *et al.*, 2023) [8]. However, the placental supplement was also administered at the same dose rate and duration to the dogs diagnosed with demodicosis (group IIb) and bacterial dermatitis (group IIIb).

Therapeutic protocol: Group I dogs with non-specific alopecia were managed exclusively with placental extract for 60 days and whereas, dogs of group IIa were treated with oral ivermectin @ 0.6 mg/kg once a day until three negative successive scrapings (Delayte *et al.*, 2006) [3] and whereas, the group IIIa dogs with bacterial dermatitis were treated with the specific antibiotic based on the antibiogram for 21 days (Bajwa, 2016) [1]. Further, groups IIb and IIIb dogs were additionally supplemented with placental extract for 60 days period.

Therapeutic assessment: The therapeutic efficacy was assessed based on the time taken for clinical improvement and improvement in haemato-biochemistry, along with hair growth score (score 0 - no improvement; score 1 - mild improvement; score 2 - moderate improvement; score 3 - significant improvement) in non-specific alopecia cases and whereas, additional negative skin scraping and culture examination were considered for demodicosis and bacterial dermatitis, respectively.

Results and Discussion

Prevalence of dermatitis: In the present study, dermatitis was more prevalent in females (58.33%) than in males (41.66%) was in agreement with Sarma *et al.* (2013) [19]. German Shepherd (25%), Labrador (20.83%) followed by Pug (18.75%) were widely affected by dermatitis of various aetiology were partially in accordance with Khoshnegah *et al.* (2013) [4] who reported a higher prevalence in German Shepherds, after Spitz and Terrier. The variation in the prevalence of different breeds might be attributed to the presence of breeds in the geographical area where the research was carried out. Whereas, the highest prevalence of non-specific alopecia was recorded in German Shepherd

(31.25%), bacterial dermatitis in Labrador (31.25%) and demodicosis in Pug (37.5%). The details were given in table - 1. Further, the complaint was highly prevalent in 2–5-year age group (52%), followed by less than 2 years (31.25%) and above 5 years (16.67%).

Clinical manifestations: Alopecia of varied intensity was noticed among the dogs of the present study. Focal alopecia on the face, around the eyes, dorsum, thighs and base of the tail with or without pruritus was reported among 20 (41.67%) dogs, generalized alopecia was reported in 8 dogs (16.67%), patchy alopecia along with erythema, hyperpigmentation, pustules and scabby lesions were noticed in 12 dogs (25%). Few dogs were also presented with bilateral symmetric alopecia (10.41%) and moist oozy lesions with an offensive odor (6.25%), described various dermatological alterations in accordance with Scott *et al.* (2001) [20] and Salem *et al.* (2020) [18] who reported erythema, itching, and alopecia in demodicosis along with inflammation and irritation of the skin. Besides Rafatpanah *et al.* (2020) [16] confirmed the presence of crusty lesion along with epidermal collarettes, erythema and papular eruptions with/without hyperpigmentation in bacterial dermatitis. Various dietary factors and nutritional deficiencies contribute to significant aetiology for rough dry coat and alopecia. Normal skin keratinization needs several micronutrients and essential fatty acids like omega 3 and n-6 fatty linoleic acid (Watson, 1998; Muller *et al.*, 2013) [22, 11]. Further, the skin growth score was considered as 0 among all the recruited cases on day 0.

Specific aetiology: Presence of mites, *Demodex canis* and their ova in the skin scrapings that were identified microscopically was considered positive for canine demodicosis (Muller *et al.*, 2012) [11]. Specific treatment expedites quick recovery of canine demodicosis cases (4-6 weeks), rarely extended up to 13 weeks of therapy (Kumar *et al.*, 2018 and Rahman *et al.*, 2021) [7, 14]. Similarly, *S. pseudointermedius* and *S. aureus* were the predominant common bacteria isolated from pyoderma cases of bacterial dermatitis (75%) in dogs was in accordance with Rafatpanah *et al.* (2020) [16], followed by *Proteus mirabilis* (12.5%), *E. coli* (6.25%), *Pseudomonas* spp., (6.25%) (Summers *et al.*, 2014) [21].

Haemato-biochemical analysis: There was no significant variation among the major haemato-biochemical parameters in the dermatitis dogs of the present study (Kumar *et al.*, 2023) [8]. The haemoglobin and PCV values were within the normal range. Whereas, an increased leukocyte count (29.75±0.94) along with eosinophilia and neutrophilia was encountered in dogs of specific dermatitis of group II and group III, respectively. The basic haemato-biochemical alteration that was observed in the present dermatitis cases i.e., neutrophilic leukocytosis and eosinophilia showed a marked improvement by 60 days of therapy and reached the normal range in group IIb (11.01±0.34) and group IIIb (11.59 ± 0.89), that was significantly ($p<0.05$) different when compared to the dogs of group IIa (13.11 ± 0.11) and group IIIa (16.82 ± 1.02), that received only conventional therapy.

Therapeutic efficacy: Dogs with non-specific alopecia (group I) which received only equine placental extract, showed clinical improvement with appreciable reduction or complete absence of alopecia, improvement in the overall health of skin and coat condition along with hair growth score

from score 0 to score 2 from day 0 to day 30 and complete clinical recovery by day 60. Group IIb dogs that received an additional supplement showed improvement in clinical signs with respect to pruritus, alopecia, and reduction of erythema from day 14 with complete clinical recovery by day 30 and complete absence of Demodex mites in skin scrapings by day 60, which was relatively faster when compared to those dogs that received only conventional therapy (IIa), which demonstrates the importance of placental extract in the early and successful management of dog demodicosis. Similarly, group IIIb dogs with pyoderma, also showed faster clinical recovery between day 7-14 with complete alleviation of signs along with improvement in hair growth score by day 30, when compared to the dogs of group IIIa which took 45-60 days for complete recovery which exhibiting the importance of placental extract supplementation in bacterial dermatitis cases. The details were presented in table 2. Widely prescribed antibiotics in bacterial dermatitis cases were amoxicillin-clavulanate, cefalexin, clindamycin and cefovecin, however, the selection of antibiotics was based on antibiogram (ABST) was reported to be rationale in treating

bacterial dermatitis (Summers *et al.*, 2014; Bajwa, 2016; Oliveira *et al.*, 2018) [21, 1, 13] with 14 - 21 days of minimum recorded recovery period. In the current study, the antibiotic therapy advised 7 days beyond the recovery period to eliminate residual infection (Miller *et al.*, 2013) [10]. In general, the present study placental extracts supplemented groups showed faster and highest recovery rates than dogs that received only conventional protocol. Placental extracts had vitamins, amino acids, trace elements, many bioactive molecules, and nutrients along with antioxidant, anti-microbial, and hair growth promoters which helped in tissue regeneration (Pan *et al.*, 2017) [14]. Nonspecific alopecia dogs supplemented with placental extract showed clinical response within 30 days of therapy, which could be due to the availability of active ingredients in the placental extracts, which helped to rejuvenate and revitalize the skin (Pan *et al.*, 2017) [14] and helps to increase follicle density (Zhang *et al.*, 2011) [23], further human placental extract proved to have effective against chemotherapy-induced alopecia (Kim *et al.*, 2020) [5].

Table 1: Breed-wise prevalence of dermatitis

S. No	Breed		Demodicosis		Bacterial dermatitis		Non-specific dermatitis	
	Name	No.	No.	%	No.	%	No.	%
1.	German Shepherd	12	4	25%	3	18.75%	5	31.25%
2.	Labrador	10	2	12.5%	5	31.25%	3	18.75%
3.	Pug	9	6	37.5%	3	18.75%	-	
4.	Spitz	7	1	6.25%	2	12.5%	4	25%
5.	Mongrel	4	2	12.5%	1	6.25%	1	6.25%
6.	Huski	2	1	6.25%	-	-	1	6.25%
7.	Lhasa apso	2	-	-	1	6.25%	1	6.25%
8.	Bull dog	1	-	-	1	6.25%	-	
9.	Chihuahua	1	-	-	-	-	1	6.25%

Table 2: Placental extract effectiveness assessment based on the dermatological score

Days	Group Ia	Group Ib	Group IIa	Group IIb	Group IIIa	Group IIIb
Day 0	Invariably scored as Zero (Score '0')					
Day 30	Score 1	Score 3	Score 2	Score 3	Score 2	Score 3
Day 60	Score 2	Score 3	Score 3	Score 3	Score 2	Score 3

Score 0 – as of day 0, Score 1- mild improvement, 2 – moderate improvement, 3 – a significant improvement

Conclusion

In the present study, the equine placental dietary supplement used in non-specific alopecia and specific dermatitis cases among dogs evidenced its effectiveness on hair growth without any adverse effects and proved its efficacy. Hence, it may be concluded that the placental extract that was taken from healthy mares with spontaneous labour was found to be safe and readily acceptable by dogs, with no adverse effects, further that are highly effective, and efficacious in treating various causes of alopecia. Besides, this study forms a torchbearer for the researchers to proceed further to identify the active ingredient and make use of placental extracts as routine feed supplement in dogs.

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