TRACE ELEMEMT PROFILE AS A INDICATOR OF CANINE NON-SPECIFIC ALOPECIA

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Alopecia clinically diagnosed as non-specific in twenty dogs was refractory to conventional therapy. Biochemical investigations revealed decline in the serum levels of zinc, copper and iron in affected dogs as compared to normal healthy. But, the serum copper and iron concentrations were much below the baseline values. Multimineral supplementation effected clinical cure.

Keywords: Canine non-specific alopecia, serum, zinc, copper, iron concentration, multimineral supplementation.

Alopecia is the complete or partial lack of hair in any area of the skin where hair would normally be found. Alopecia or hair loss is associated with overwhelming majority of skin disorders in pets. Practically all domesticated animals face hair loss problems, but cats and dogs are among the most seriously affected. There are many diseases and conditions which can cause a dog to lose hair. This makes it difficult for the specialist to distinguish normal canine hair loss from that associated with a major ailment

Traditionally, dogs have been fed table scraps and left to scavenge what food they can. The nutritional requirements of a dog vary throughout its life and are governed by factors such as age, reproductive status, level of activity, state of health and environmental conditions. A number of studies have compared the nutritional analysis of home-prepared diets (Donoghue 1993) highlighted concern that many home prepared diets are deficient, excessive or unbalanced in essential nutrients. The apparent utility of serum Zinc, Iron and Copper analysis for disease diagnosis and prognosis is increasing in both human and veterinary medicine (Hartoma *et al,* 1979). Analysis of endogenous trace element concentrations may also be used for therapy evaluation, as well as for diagnosis. The purpose of the present study was to determine whether there are alopecia dependent changes existing in the dog which should be considered in evaluating clinical data.

Materials and Methods

Serum samples were harvested from peripheral blood obtained from dogs suffering with alopecia. Blood sampling was performed routinely during the same period (between 8A.M.and 10A.M.) on all test days to minimize diurnal variation. Sample collections were done in the normal OPD surroundings. Twenty dogs of either sex, between 90 days and 9 years of age belonging to various breeds were the sample population. Blood samples were obtained from the cephalic vein using vacutainers and standard needles.

One ml of serum sample was taken in a sterile glass vial then di-acid mixture containing nitric acid and perchioric acid (2:1) was added and placed on hot plate till complete white ash was formed. The digested samples were diluted to make final volume 10ml with triple glass distilled water. Standard Zinc, Copper and Iron solutions were prepared as 0, µg/ml, 0.5 µg/ml, 1.5 µg/ml, 1.5 µg/ml, 2 µg/ml and 3 µg/ml by stock solutions containing 1000 µg/ml. The calibration curve for the determination of aforementioned microminerals is prepared using a blank and working standards solution and Zinc, Copper and Iron concentrations were determined by Atomic Absorption Spectrophotometry (Gary Christian and James Reilly,1986).

Results and Discussion

Zinc is one of the essential trace mineral required in a dog's diet to maintain health and is also one of the most abundant minerals found in the body. Zinc is involved in a vast array of metabolic processes in the body; it has been identified as playing a key role in over 200 critical enzymatic metabolic pathway (Mckeever and Harvey, 1995). Given the vast array of metabolic processes that involve Zinc deficiency has wide-ranging and seriously detrimental effects on general health (White *et al*, 2001). In the present study significant decrease in serum zinc concentration was observed in dogs suffering with alopecia as compared to normal healthy.

Table 1 Mean values of serum trace minerals in dogs with hair loss.

Sr.No.	Trace Minerals	Mean values of serum trace minerals	
		Dogs with hair loss	**Normal dogs**
1	Zinc (ppm)	1.975 ± 0.169	0.70- 2.00
2	Copper(ppm)	0.82 ± 0.043	176 - 384
3	Iron (ppm)	2.17 ± 0.103	209 - 540

This significant decline in zinc can be attributed to maintenance of dogs on diets high in plant material. Plant contain a product called phytate, which binds zinc and reduces its absorption. The common symptoms noticed were hair loss and scaling and crusting of the skin. The findings were in agreement with those of Watson (1998). The mean serum copper level in dogs presented with a complaint of hair loss was much below the normal level. Copper is necessary for a number of body processes including development of pigment in hair. Dogs should receive 3.3mg of copper daily for every pound of dog food they eat (on a dry matter basis)(Watson, 1998). The extreme low level of copper recorded in the present study is believed to be due to the fact that all the dogs were maintained on home made diets that are lower in meat. In the event of copper deficiency, an anaemia developed with resultant hair loss. Interestingly, in this study, we observed that the serum values for iron were far below the normal level. The explanation for this observation lies in the fact that low serum copper level impaired absorption of iron and low iron caused problems with hair loss. Iron is an essential part of haemoglobin, a part of the red blood cells that carries oxygen throughout the body. And this iron deficiency must have triggered hair loss.

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