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## The Dysfunction of the Thyroid Gland and Opportunities for the Homeopathic Treatment of Dogs

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**Abstract:** The low levels of T<sub>4</sub> (thyroxine) and T<sub>3</sub> (triiodothyronine) can be observed in the dogs with hypothyroidism, but it could also reflect some other illness, in which the function of the thyroid gland is not disturbed. This phenomenon is called "sick euthyroid syndrome" (SES) and it is mainly associated with the existence of the other endocrinopathies (Cushing's syndrome, hyperestrogenism). The other endocrinopathies could be clinically manifest by very similar chronic changes in the skin and hair as those manifested in hypothyroidism. There are two cases of German shepherd dogs which were manifested by obesity, lethargy, infertility and chronic dermal findings. The level of T<sub>4</sub> in the blood serum was very low in the first bitch T<sub>4</sub> = 4.53 n mol l<sup>-1</sup> and in the second bitch T<sub>4</sub> = 12.84 n mol l<sup>-1</sup>. Diagnostic biochemical blood examination revealed results indicating the possibility of hypothyroidism, but at the same time also the possibility of another non- thyroid disease. Homeopathy can help to solve the problem of therapy in such complicated cases. After homeopathic therapy the results of the biochemical and endocrinological examinations repeatedly showed the restored conditions of the patient. The level of the T<sub>4</sub> in the blood serum was in the first bitch T<sub>4</sub> = 27.31 n mol l<sup>-1</sup> and in the second bitch T<sub>4</sub> = 26.28 n mol l<sup>-1</sup>. This study presents the possibility to use homeopathic treatment in chronic dermatologic cases.

**Key words:** Hypothyroidism, chronic skin diseases, homeopathic treatment

### Introduction

The majority of chronic skin diseases are closely related to the occurrence of the low thyroid hormone levels in the blood serum of dogs. Low levels of thyroxine (T<sub>4</sub>) and triiodothyronine (T<sub>3</sub>) indicate the decreased function of the thyroid gland-hypothyroidism that is the most frequent endocrinological disease in dogs, manifesting itself in skin and hair lesions (Rudas *et al.*, 1994). The most common causes of hypothyroidism are autoimmune lymphocytic thyroiditis (ALT), idiopathic atrophy of the thyroid gland and neoplastic destruction.

Dermal disease, related directly to the pathological damage to thyroid gland (TG) is called hypothyroidism proper. The problem occurs when low levels of thyroid hormones in the blood are induced by the diseases of other organs (adrenal gland, pancreas, liver, kidneys) that are not connected with the thyroid gland.

This phenomenon is called euthyroid sick syndrome. In such euthyroid dogs, dermal diseases are caused by non-thyroid diseases, but concentrations of T<sub>3</sub> and T<sub>4</sub> are as low as in hypothyroidism (Ramsey, 1997; Scott-Moncrieff *et al.*, 1998). The differentiation of euthyroid sick syndrome from hypothyroidism proper plays a key role in

the therapy of chronic dermatoses in dogs. Dermal disease caused by hypothyroidism can be treated by a supplement of missing hormones in substitute hormonal therapy. With euthyroid sick syndrome the administration of substitute hormonal therapy may be contraindicated, because the thyroid gland is not impaired. It should be noted, that no other biochemical or haematological examination can reveal the symptoms of other non-thyroid diseases, especially in its early stage (Rosychuk, 1997). These complications can be prevented by using homeopathic drugs that do not induce any side effects. The choice of homeopathic drug should be done on the basis of clinical, biochemical and endocrinological examinations, as well as the individual character of the patient.

So, aim of this study was to indicate the opportunity of using homeopathic therapy for chronic dermal diseases in dogs with low levels of thyroid hormones.

### Materials and Methods

This study was focused on the deeper analyses of dermatological diseases, which we monitored for seven years (1992-1998) at the 1st. Internal Clinic of University

of Veterinary Medicine in Košice. We observed 270 dogs of 42 breeds. The dogs were divided into three groups according to their weight: small breeds up to 12 kg, middle breeds from 12-27 kg and large breeds over 27 kg. In the individual groups, there were both males and females and both clinically healthy animals and patients with dermatological lesions. For all the animals a complete physical and laboratory examination (haematological, biochemical and endocrinological) was performed. In the patients with skin diseases, bacteriological, mycological and parasitological examination of skin was carried out. Skin tests and TRH stimulating tests were performed when needed (Ramsey, 1997). The levels of thyroid hormones were in all weight groups of dogs observed at regular intervals throughout one year. This enabled us to obtain a comprehensive picture of the physiological range of  $T_3$  and  $T_4$  depending on the season. Concentrations of  $T_4$  and  $T_3$  were assessed using commercial radioimmunoassay (Ramsey, 1997). Biochemical assays were carried out using Bio-La tests (Lachema Brno, Czech Republic).

### Results

Results of the  $T_3$  and  $T_4$  concentrations in the blood serum of dogs confirmed the fact that the levels of triiodothyronine ( $T_3$ ) in the blood could be more affected by non-thyroid diseases and thus they are a very weak criterion of the thyroid function in dogs.

However, we can agree with Peterson *et al.* (1997) who supposes that measurement of basal levels of thyroxine ( $tT_4$ ) is a valuable test at detection of the thyroid function in dogs suspected of hypothyroidism on condition that anamnesis, clinical symptoms and pathological findings are combined in this disease. In the patients with dermal diseases, the following skin changes were manifested: dry, coarse, thick, inelastic skin with apparent hair loss, alopecia, hyperpigmentation and seborrhoea. The follicular cells of the thyroid gland were characterized by the destruction and degeneration of follicular lumens. We could observe in the thyroid parenchyma an infiltration of lymphocytes, plasma cells and macrophages (Fig. 1).

Despite unchanged feed intake, obesity is often manifested. The animals were lethargic and most of the bitches were sterile. It is important to note that diseases untypical of endocrine dermatoses, such as recurrent otitis, mycosis, demodicosis, recurrent purulent dermatitis have their origin in most cases in low levels of thyroid hormones.

The concentration of thyroxine in the blood serum of dogs was found to change depending on the season. Physiologically the highest level of  $T_4$  was found in autumn and the lowest in summer. This is evident not

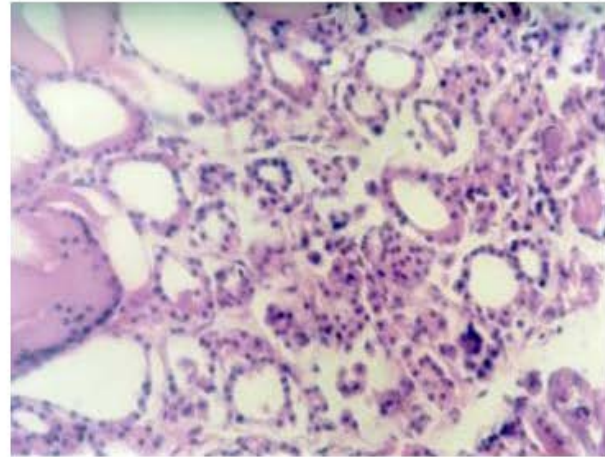


Fig. 1: Histological picture of thyroid parenchyma with infiltration of lymphocytes, plasma cells and macrophages

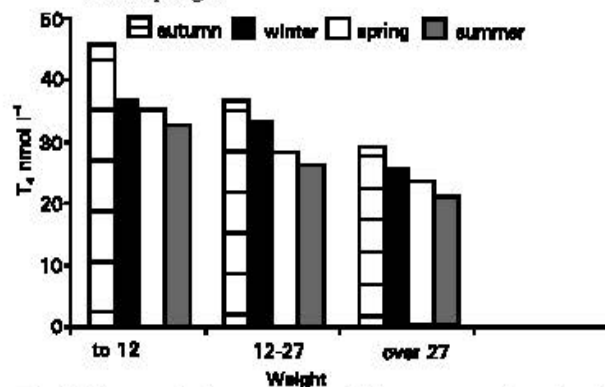


Fig. 2: Seasonal dependence of  $T_4$  concentration in the blood serum of healthy dogs

only in all the weight groups of clinically healthy dogs, but also in the dogs with skin affections and decreased levels of thyroid hormones (Fig. 2).

Hypothyroidism often affects large breeds of dogs, especially, German shepherd dogs. The results of our observations clearly confirmed the fact that smaller breeds have physiological levels of serum thyroxine higher than those in large breeds (Fig. 2).

Panciera (1997) admits differences in the physiological values of thyroxine depending on the size of breeds. Therefore, it was decided to judge the results of  $tT_4$  according to the weight and size of the breed.

The original reference range for  $tT_4 = 20-80 \text{ n mol l}^{-1}$  (Ramsey, 1997) was divided according to the size and weight of breeds:

- Large breeds of dogs over 27 kg  $tT_4 = 20 - 40 \text{ n mol l}^{-1}$
- Middle breeds from 12 to 27 kg  $tT_4 = 25 - 50 \text{ n mol l}^{-1}$
- Small breeds to 12 kg  $tT_4 = 40 - 60 \text{ n mol l}^{-1}$

**Table 1: Results of laboratory examinations and therapy**

Date	T <sub>4</sub> n mol l <sup>-1</sup>	ALT ukat/l	ALP ukat/l	Chol. mmol/l	Tot.lip g/l	Therapy
7.5.96	6.32	0.92	2.87	1.78	4.82	Am oksiklav
28.5.96	21.35	0.58	1.93	2.89	4.31	Ars. album
8.6.96	25.39	0.42	1.67	3.41	4.73	15 CH
28.6.96	28.05	0.28	1.03	3.57	5.01	Arsenicum
16.8.96	26.32	0.41	0.84	3.91	4.82	Album
16.9.96	27.73	0.38	0.43	3.85	4.68	15 CH

**Table 2: Results of laboratory examinations and therapy**

Date	T <sub>3</sub> n mol l <sup>-1</sup>	T <sub>4</sub>	Chol. n mol l <sup>-1</sup>	Tot.lip g/l	Therapy
6.6.95	0.23	12.84	4.78	4.60	Antiseptic shampoo
26.6.95	0.68	25.11	3.79	4.25	Am oksiklav tbl.
19.7.95	0.61	25.01	3.99	4.71	Ars. album 15 CH
15.8.95	0.92	26.28	4.01	4.72	Arsenicum Album 15 CH

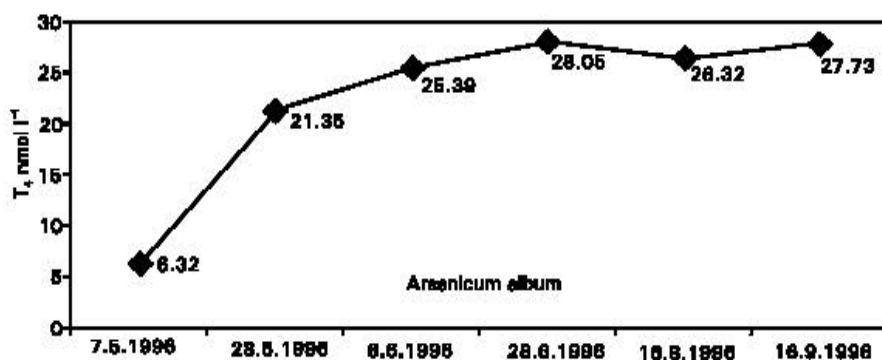


Fig. 3: The curve of T<sub>4</sub> in dependence on treatment (patient No. 1)



Fig.4: Patient No.1 before therapy



Fig.5: Patient No.1 after therapy

It has to be remembered that puppies have a level of tT<sub>4</sub> 2-3 times higher than adult individuals of the same breed. For the correct differentiation of euthyroid dermatosis from hypothyroid dermatosis it is necessary to use the TRH stimulating test or therapeutic test with L-thyroxine.

In the treatment, the hormonal substitute therapy (Thyreoidin tbl. Spofa, Thyreotom tbl. Gerned, Eutyrox tbl. Merc, L-thyroxine tbl. Henning) was used or it was combined with homeopathic drugs. In some patients only the homeopathic therapy was used.



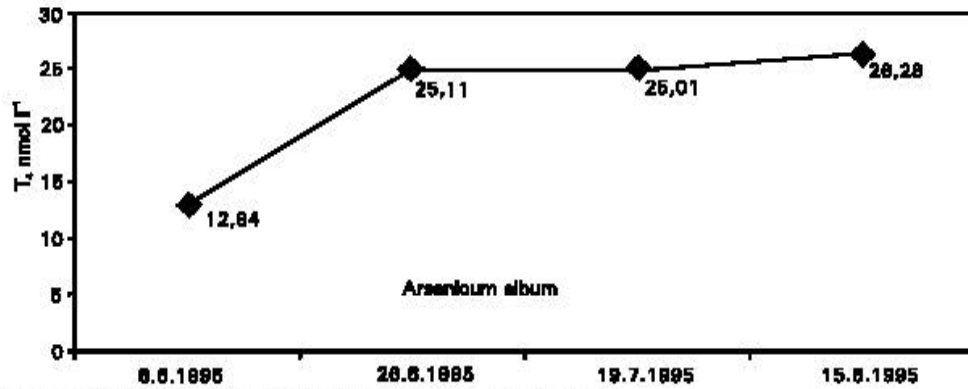


Fig. 6: The curve of T<sub>4</sub> in dependence on treatment (patient No.2)



Fig.7: Patient No. 2 before therapy



Fig. 8: Patient No. 2 after therapy

#### Homeopathic therapy

**Patient 1- German shepherd dog, 1.5 year-old female initial clinical finding in May 1995:** Almost without hair, hair undercoat is absent, erythematous to purulent dermatitis on the abdomen, erythematous otitis externa, without pruritus, weakness of limbs and leg trembling when walking, anorexia, emaciation and exhaustion, infertility, leucocytosis, hyperpyrexia.

**Description of character features:** Manifestations of extreme fear, anxiety states, worse in the night, looking for her owner, restlessness and insecurity in a foreign environment.

**General symptoms:** The bitch looks for warmth that improves her clinical status, often drinks water in small doses.

TRH stimulating test showed an increase in the thyroxine level in the blood from T<sub>4</sub>=4.53 n mol l<sup>-1</sup> to T<sub>4</sub>=6.22 n mol l<sup>-1</sup>. Regarding the high level of leucocytes (Le = 28.8 T/l) it was necessary to administer antibiotics for 3 weeks-Amoksiklav tbl. together with the homeopathic drug *Arsenicum album* 15 CH daily 3 granules. For the next 4 months the bitch was given only the homeopathic drug.

Results show that the increased levels of thyroxine had already occurred over two weeks of therapy (Table 1). An immunological examination during the homeopathic therapy confirmed the increased phagocytic activity of leucocytes. In August, a marked oestrus lasting 2 weeks occurred.

*Arsenicum album* appeared to be a suitably chosen drug that during 4 months of its daily using improved the overall health status and biochemical parameters of the internal organs. In September her hair was satisfactory, thick and glossy. The bitch was agile and without manifestations of fear and insecurity (Fig. 3).

The case is documented with the photos (Fig. 4, 5).

**Patient 2 - German shepherd dog, 2.5 years old female**

**initial clinical finding:** Erythematous dermatitis with an abundance of abscesses and pustules with yellow secretion, over the entire body; further findings on the skin: erosions, crusts, furunculosis, alopecia and hyperpigmentation; a large number of fleas and pruritus; hyperkeratosis of auricle margins; erythematous otitis externa with yellow discharge; leucocytosis.

**Description of character features:** Extreme fear shown in the foreign environment; sharp and noisy watch dog; restless and nervous, worse in the night.

**General symptoms:** Likes lying in warm places; prefers warm and fatty meals; during the day often drinks water in small doses. The whole process testified to the fact that it was a case of deep pyoderma of German shepherd dogs caused by an immunodeficient status, which was confirmed by immunological examination. After cutting the hair off the entire body, the owner washed the bitch with antiseptic shampoo for 6 weeks. Antibiotics Amoksiklav tbl. were administered for 20 days. They helped to mitigate the inflammation and decrease the high leucocytosis. Bacteriologically *Staphylococcus aureus* was cultivated from the skin. The ears were treated with antibiotic eardrops. The homeopathic drug *Arsenicum album* 15 CH 3 granules were administered for 3 months from the beginning. It was very interesting that during the 3 weeks the thyroid hormones doubled to the level of the reference values (Table 2). Since antibiotics do not stimulate the thyroid gland function, this effect was ascribed to *Arsenicum album* (Fig. 6). Immunological examination during the homeopathic therapy confirmed an increased phagocytic activity of leucocytes. Over the 3 months, the abscesses on the entire body were completely healed and the clinical status of the skin was improved. The bitch started to grow thick hair of good quality (Fig. 7, 8).

The case is documented with the photos (Fig. 7, 8).

**Discussion**

Insufficient production of thyroid hormones causes a slower metabolism and changes in the physiological functions of many organ systems (Rios *et al.*, 1990; Merchant and Taboada, 1997; Rosychuk, 1998). Hypothyroidism therefore does not have to manifest itself only in various dermal diseases, but it is connected with the occurrence of other symptoms (lethargy, obesity, infertility, cardiovascular diseases, neuromuscular diseases). A combination of several symptoms in one patient increases the suspicion of this diagnosis more than the occurrence of only one symptom (Panciera, 1997).

Besides dermal symptoms in the patients, there was also obesity, lethargy and infertility. In patient 1 - the German shepherd dog, 1.5 year-old bitch, there were slight motor-neuron symptoms manifested by leg tremor and overall muscular weakness. Jaggy (1994) also described clinical findings in 29 dogs with neuromuscular disease associated with hypothyroidism.

To make a correct diagnosis of hypothyroidism proper, it is necessary to select the thyroid functional tests carefully (Nelson, 1996; Dixon and Mooney, 1999). Ramsey (1997) reported 13 functional tests for making a diagnosis of the thyroid gland function. None of these tests is considered as final or ideal. Peterson *et al.* (1997) recommends the use of a combination of more functional tests, which is however demanding.

The problems also appear in the interpretation of results, which may often be controversial (Greene, 1997). Nelson (1996) and Ramsey *et al.* (1997) reported in their studies their experience with using TSH and TRH stimulating tests, in which the resulting thyroxine level in the blood in a certain range is considered to be undiagnosable. There is a question: To what extent is it possible to differentiate reliably a hypothyroid dog from a euthyroid one and how can we treat a dog with undiagnosable results of thyroid functional tests?

In our case, the TRH test in the first German shepherd bitch confirmed a decreased function of the thyroid gland. There were increased levels of hepatic enzymes and decreased levels of total proteins. The increased values of cholesterol and total lipids, which some authors consider to be auxiliary parameters of hypothyroidism, were not found in the first patient. By contrast, the cholesterol values were low and the levels of total lipids on the lower limit of the standard. Diagnostic examination revealed results indicating the possibility of hypothyroidism, but at the same time also the possibility of another non-thyroid disease. Homeopathy can help to solve the problem of therapy in such complicated cases.

In homeopathy, diagnostic examinations are necessary, but controversial results are not an obstacle to the determination of suitable and effective therapy. Homeopathic therapy considers individually anamnesis, all clinical symptoms as well as individual signs in the animals behaviour (Macleod, 1997; Issautier and Calvet, 1993). In traditional medicine, the immediate application of hormonal therapy is not recommended especially if the results of diagnostic examinations are not clear. It is recommended that the patient waits for 3-4 weeks and then repeats the examinations. It is important to remember the fact that the use of antibiotics, potentiated sulphonamides and corticosteroids is limited. The reason is in the fact that potentiated sulphonamides and

corticosteroids decrease the concentration of thyroid hormones, which may lead to subsequent complications of the pathological status (Ramsey, 1997). Recently, chronic dermal diseases may be induced by multiple endocrinopathies. In such cases, Addison's disease, diabetes mellitus, or dysfunction of the sex glands may be associated with a decreased function of the thyroid gland, which is a basic disease (Siliart, 1995; Chandoga and Kozak, 1999). The problem of multiple endocrinopathy could occur not only in the first patient, but also in the second German shepherd bitch, in which the dermal disease and decrease in the thyroid hormone levels, occurred after parturition. Situations, when it is necessary to treat disorders of more endocrine glands at the same time in one dog, cause complications in the use of hormonal therapy. By contrast, in homeopathic therapy, these complications do not exist, because this therapy uses a holistic approach to the patient and treats according to the symptom summary (Hahnemann, 1993). The common finding of more endocrinopathies enables us to suggest their common etiology which probably arises from disorders in the immune system. It has also to be remembered that autoimmune lymphocytic thyroiditis (ALT) belongs to the immune-mediated diseases (Thacker, 1997). Animals disposed to ALT can become predisposed to the onset of other immune-mediated diseases intervening in other target tissues and organs, especially bone marrow, liver, adrenal gland, pancreas, skin, kidneys, intestine and CNS (Dodds, 1997).

Attenuation of the immune system can be expected in the both German shepherd bitches, the decreased phagocytic activity of leucocytes was also confirmed (Freake and Oppenheimer, 1995). After homeopathic therapy this activity had clearly increased.

Autoimmune diseases affecting more endocrine glands can occur together with non-endocrine autoimmune diseases such as e.g. malabsorptive syndrome. Disorders in the resorption of nutrients from the gastrointestinal apparatus into the organism occur and the biochemical values of total protein, cholesterol and total lipids are under the reference values. This state could be expected in the young German shepherd bitch (patient 1). Her emaciated state, hair of bad quality, reduced appetite and decrease levels of cholesterol and total proteins in the blood could testify to that. Concentration of total lipids in the blood persisted at the lower limit of the standard.

By using two patients as examples we wanted to show the possibility of the homeopathic therapy of chronic dermal disease, manifested in low levels of thyroid hormones. In each bitch there was a very similar complex of symptoms at the physical level (skin symptoms, decreased levels of

T<sub>4</sub> and T<sub>3</sub>, infertility) but for the choice of homeopathic remedy their behaviour was decisive. The German shepherd bitches were emaciated, extremely fearful and without appetite. Their skin had a tendency to purulence and scaliness. The bitches drank often and liked warmth. *Arsenicum album* was administered. We have tried to match the homeopathic drug in our therapy to the complete range of symptoms manifested by the patient, according to the law of similarity (Hahnemann, 1993). Evaluation of all the clinical and laboratory examinations led us to the opinion that it is a case of complicated endocrinopathy, where hormonal therapy could be contraindicated. Therefore the homeopathic therapy was used and it has brought positive results.

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