

Effects of Methylthiouracil on the Serum Protein Fractions in Dog

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INTRODUCTION

The widespread use of the synthetic antithyroid drugs in the treatment of thyrotoxicosis have been accompanied by numerous clinical and experimental reports concerning their toxic effects (13, 14).

Knowing the role of plasma alpha globulin and albumin as the thyroid hormones carriers (thyroxine - binding - protein) to the tissues (1,3) and due to some discrepancies in the results reported so far on the alterations of the plasma protein fractions in the course of hypothyroidism (2,10) we planned to study the effects of experimentally - produced hypothyroidism by a prolonged administration of methylthiouracil on the serum protein fractions in the dog.

METHODS

A total number of 45 puppies of both sexes and weighing 3-6kg were used in our experiments 21 dogs as a control and 24 for the drug study.

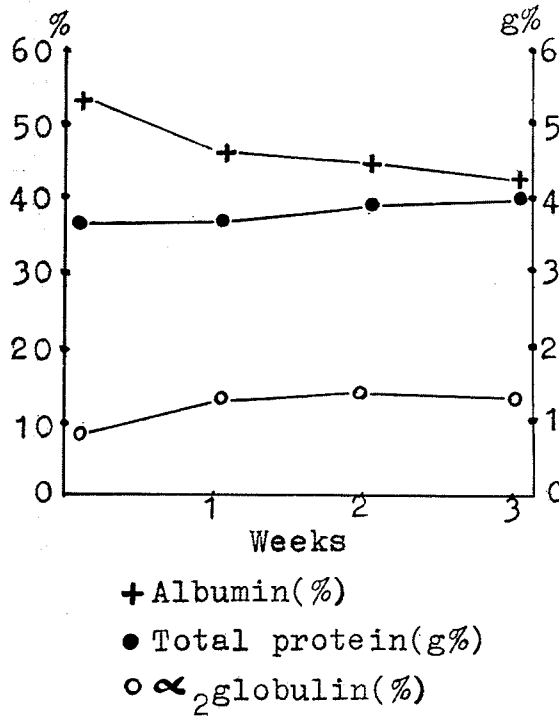
All animals were kept in metal cage and fed with ground meat, wheat bread and tap water ad libitum. The serum electrophoresis was studied before and periodically during prolonged administration of methylthiouracil until the spontaneous death of the animals.

The blood sample, was taken in a fasting state from the peripheral veins (basilic or external saphena).

The paper electrophoresis was performed according to the conventional method (12) using a veronal sodium acetate buffer (pH = 7.8). The paper strip was developed with solution of bromophenol blue and its optical density was determined by the Electronic Densitometer (Model

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Fig. I



DISCUSSION

The statistical means of the serum protein fractions obtained in our control dogs are quite in accordance with those reported by De Weal (4) but a little different from the figures given by Lewis and Groulade (5, 8).

The reactional thyroid hyperplasia, caused by inhibitory effect of MTU on the biosynthesis of the iodothyronil hormones, associated with decrease of basal metabolism rate and clinical symptoms (bradycardia, hair loss and general asthenia) indicated the drug- induced hypothyroidism (11) .

The statistically significant fall of serum albumin associated with augmentation of alpha 2 globulin from the first week seems to be a valuable experimental finding which is in agreement with the similar alterations reported in the thyroidectomized dogs (6,6a) and in the hypothyroidic patients (2,9). Whether the increase of globulin fractions is cause or effect of the decrease of serum albumin can not be judged from the present data, since the changes in both fractions have been parallel from the first week. The diminution of serum albumin can be attributed to

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the hepatic toxic lesions and to the drug-induced hypothyroidic anorexia. However the decrease of albumin was overbalanced by the increase of the total globulin and hence resulted in a significant elevation of the total serum protein and diminution of A/G ratio.

The hemoconcentration suggested by some authors (2) as the cause of elevation of total serum protein in the spontaneous hypothyroidism seems unlikely in the MTU-induced hypothyroidism where we found a significant reduction in the number of the erythrocytes at the third week ($P < 0.005$).

The increase of both globulin and albumin components associated with low or normal hematocrit has been reported in the thiouracil-treated rats (10).

SUMMARY

The effects of a prolonged oral administration of methylthiouracil was studied on the electrophoretically separated serum protein fractions in 24 dogs.

Though the statistical mean of changes in serum albumin and alpha2 globulin were highly significant but the individual alterations were not consistent and therefore on the basis of the available data there does not seem to be a characteristic electrophoretic pattern in the experimentally produced hypothyroidism in the dog. This finding is in agreement with the clinical electrophoretic pattern reported in the human spontaneous hypothyroidism.

Resumé

Nous avons étudié les effets de l'administration orale prolongée de methylthiouracil sur les fractions protéiniques du sérum sanguin par le moyen de l'électrophorèse chez 24 chiens, quoique les moyens statistiques des changements de sérum albumin et alpha2 globulin ont été significatifs mais ces changements n'ont pas été consistants dans tous les cas et par conséquent l'existence d'un type électrophorétique caractéristique de hypothyroidisme expérimental médicamenteux semble improbable.

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