تأثير يودور البوتاسيوم على الصورة الدموية ومكونات النيتروجين والكلستيرول الكلى فى الماعز

الباحثـــون

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تم دراسة تأثير يودور البوتاسيوم (٥ ميلجرام لكل حيوان يوميا لمدة ثلاثة شهور متتالية) على الصورة الدموية وبعض مكونات سيرم الدم فى الماعز وقد تبين للباحثين الآتى :

١ – ليس لهذا المركب تأثير على العدد الكلى لكرات الدم البيضاء ولكن لوحظ زيادة معنوية فى الخلايا الحمضية والليمفاوية بينما لم تتأثر بقية الخلايا البيضاء .

٢ – حدثت زيادة ملحوظة فى كمية الهيموجلوبين وعدد كرات الدم الحمراء كما وأن سرعة ترسيب الكرات الحمراء قد زادت زيادة معنوية خاصة فى نهاية الشهر الأول من اعطاء المركب .

٣ – ظهرت زيادة ملحوظة فى مكونات النيتروجين فى سيرم الدم خاصة فى نهاية الشهر الثالث من اعطاء المركب .

٤ – حدثت زيادة مرضية فى كمية الكولستيرول الكلى فى الدم تبعها نقص معنوى بعد ذلك .

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THE EFFECT OF POTASSIUM IODIDE ON THE BLOOD PICTURE, BLOOD UREA, NON-PROTEIN NITROGEN AND TOTAL SERUM CHOLES-TEROL IN GOATS.

(With 2 tables)

By

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SUMMARY

The effect of administration of potassium iodide on the blood picture and the level of some blood and serum constituents was studied in twelve goats given daily doses of 5 mg of the drug to each animal for 3 months.

No change was detected in the total leucocytes count, but there were significant increase in eosinophils and lymphocytes. The other cell types showed only slight variation.

A marked rise was observed in both haemoglobin and erythro-cyte count. The sedimentation rate showed a significant decrease especially one month after giving the drug.

A marked rise was observed in blood urea and non-protein nitrogen, especially at the end of the third month. A transient increase, followed by a highly significant fall was seen in total serum cholesterol.

INTRODUCTION

Iodine is an essential trace element that is necessary for the formation of thyroxine. The minimum idoine requirement of various species of animals is not known, but the amount of iodine required in the ration to prevent goitre in all species of animals is 0.001 mg/lb body weight (JONES, 1969).

The daily requirement of potassium iodide to calves of 4 months or more is 1.2 microgram (EVDOKIMOU and ARTEMEU, 1967). The prophylactic dose of potassium iodide needed by lambs to prevent goitre is 0.11 mg/kg. dry ration (OLL, 1967).

KALININ (1962), BOYTRIN and RATNIKOVA (1970) and DADASHEF (1970) stated that the functional state of the thyroid gland had marked effect on the blood picture, The level of serum cholesterol varies inversely with the degree of thyroid activity (WERNER and INGBAR, 1971) and considerable reliance has been placed on serum cholesterol determination as a parameter of thyroid activity (CORNELIUS and Kaneko, 1963). The wide range and variety of factors infiuencing the cholesterol level limits its usefulnese as an aidfor the asessmentof thyroidfunstion, and this test should be employed in combination with other tests for thyroid function.

The purpose of our investigation was to study the ffeet of daily administrationof large dosesof potassium iodide on some blood constituentsin goats.

(MATERIAL AND METHODS)

The iuvestigation was carried out on twelve clinically healthy male goats fed on dry ration, which was cosntant in quantity and quality threughout the experiment. The daily ration for each animal was 400 gm cottonseed cake, 250 gm bran and 1.5 kg tibn. The animals kept on this ration for one month before giving potassium iodide. Two blood samples at a two weeks interval were collected before.

The administration of KI. 0.5 gm of KI was dissolved in a litre of water and 10 ml (5 mg of KI) was given daily by mouth to each animal for three successive months. Blood samples were collected at the end of each month.

At each collection, two blood samples were obtained, one with EDTA and the other to provide serum. The anticcagulant blcod samples were used for blood cytology, sedimentation rate and haemoglobin determination (COLES, 1967). Blood urea was estimated by diacetylmonoximum and serum N.P.N. by nesslerization as described by RAITSKA (1970) . Total serum cholestcerl wasestimated by the method of ILCA (1962) . The result were statistically analysed and the "T" test was carried out.

RESULTS AND DISCUSSION.

The total white blood cell count remained within the normal limits but lymphocytes and eosinophils showed significant increase (Table, 1). The increase in the lymphocytes is in agreement with the findings of KLINISKI and KARNOVA (1961) and OLACAIEVITSH (1957) in hyperthyroidism in birds, bulls, sheep and calves. Hyperthyroidism has been reported to have an accompanying lymphocytosis (COLES, 1967). The lymphocyte leive l

TABLE 1. The leucocytic pattern of goats before and after administration of potassium iodide,

Time of Sampling	W.B. Cs. X10³/C.mm	ifferential leucocytic count					
		Stab.%	Seg. %	Eee. %	Bas. %	Lymph.%	Mon. %
Before .	8.5∓0.42	1.0∓0.22	36.3∓2.53	2.3∓0.4	0.48∓0.07	56.5∓2.4	3.1∓0.71
After 1 month	8.8∓0.52	1.7∓0.31	28.1∓3.81	3.8∓0.2	0.45∓0.02	63.9∓2.3	2.0∓0.62
After 2 months	8.6∓0.54	1.7∓0.28	27.6∓4.62	3.0∓0.6	0.0 ∓0.0	65.6∓2.1	2.1∓0.51
After 3 months	8.9∓0.48	1.7∓0.42	26.0∓4.51	4.2∓0.3	0.4 ∓0.05	64.4∓2.2	3.1∓0.52

was apparently not related to the raised basal metabolic rate but lymphocytosis was often found with lymphocytic infiltration of the thyroid (BISTROM, 1946). The reason for lymphocytosis in hyperthyroidism is not known. The lymphocyte count has been shown to be higher in the thyroid vein than in the thtyroid artery., as result of diffuse lymphoid hypoplasia or even of the definite lymph follicle formation commonly found in the hyperplastic gland (WERNER and INGBAR, 1971).

The significant increase in eosinophils was in accord with the findings of OLACAIEVITSH (1965) who gave KI to calves in a dose of 0.1 mg/kg. B. Wt. for 3 months. The relative adrenocortical hypofunction would explain the occasional moderate eosinophilia observed in hyperthyroid human patients (WERNER and INGBAR, 1971). No significant change was seen in the other types of leucocytes.

An insignificant fall was noticed in the percentages of segmented neutrophils and basophils and a slight change in the percentage of immature neutrophils. A transient decrease was detected in monocytes on the 30*th*. and 60*th*. day after dosage. The abrupt development of agranulocytosis in our animals was probably a result of drug sensitization. On the other hand, the gradual granulocytopenia was perhaps due to the chemical effect of the KI on the metabolism of granulocytopoietic tissues (WERNER and INGBAR, 1971).

Table 2 showas a marked increase in both erythrocytes and haemoglobin content. Such arise is in agreement with those reported by SHUPIN and SHUPINA (1961) and BOYTRIN and RATNIKOVA (1970) in cows, and DADASHEF (1970) in sheep when giving different doses of KI. It was explained on the basis that administration of iodide compounds activates the haemopoiteic system (DADASHEF, 1970).

TABLE 2. Haemoglobin, erythrocytes, sedimentation rate, blood urea, non-protein nitrogen and total serum cholesterol in goats before and after adminstration of potassium iodide.

Time of Sampling	Hb gm %	R.B.Cs. XIO^6/C.mm.	S.R. MM./24 h	Blood urea mg %	N.P.N. mg%	Cholesterol mg %
Before	8.8+0.5	10.18+0.45	3.5+0.21	12.30+0.80	16.10+0.72	71.2+5.6
After 1 month	10.9+0.6+	11.7 +0.23+	2.4∓0.13^{+++}	11.38∓0.63	16.5 ∓0.63	83 9∓4.7
After 2 months.	9.5+0.5	10.07+0.24	3.3+0.22	13.03+0.41	16.6 +0.62	82.5+8.2
After 3 months.	9.6+0.5	11.7 +0.22^{+}	2.5+0.17	15.4 +0.51^{++}	17.72+0.22^{+}	43.1+4.2^{++}

+ Stand. error. + $P < 0.05$ ++ $P < 0.01$ +++ $P < 0.001$

The sedimentation rate decreased with an increasing number of red cells (SCHAIM, 1965).

The most obvious changes in both blood urea and serum N.P.N. occurred at the end of the third month in our experlment, with a significant rise in both. Our results agree with the findings recorded by GADJIEV (1965) and ODENTS, TOKOBAIEV, AITVGANOV and DEDOVA (1971). They aitributed the rise in N.P.N. to the fact that giving iodine compounds to animals increases nitrogen metabolism through thier activating effect on the proteolytic enzymes in blood and tissues. Experimental thyrotoxicosis in laboratory animals may also lead to increase in both urea and non-protein nitrogen (ApACEV, 1938; DJAFAROVA, 1962 and GACANOV and ARCLANOV, 1967). Recent work by KACHANA (1968) showed that experimental hyperthyroidism in animals cause an increase in the N.P.N., EPSTEIN, REEDMAN and LEVITIN (1958) claimed that the slight increase in blood urea in human cases of hyperthyroidism was due to renal dysfunction.

After three months of our experiment there was a marked fall in total serum cholesterol. A temporary but not significant, rise was recorrded in the first two months after administration of the drug. The level of serum cholesterol is affetced by thyroid activity, and in generlal it varies invesrely with the degree of activity. It is elevatde in most patients with hypothyroidism (WAYNE, 1960) and is somewhat depressed in hyperthyroidism (MAN, GILD A and PETERS, 1940; and KLINISKI, BASHKEV and DAROVSKIX, 1967).

The mechanism responsible for the lipid changes found in thyroid disease has not been precisely defined. Thyroid hormone administration enhances cholesterol biosynthesis, although at the same time, and to a relatively greater degree, it accelerates the rate of cholesterol degradation and excretion with a resultant tendency for the serum level to fall (KRITCHEVSKY, 1960). It has been found by FLETCHER and MYANYT (1962) that in hyperthyroid patients, hepatic glycogen and adenosine triphosphate (ATP), decrease, these substances being considered as important co-factors in cholesterol biosynthesis. The lowered serum cholesterol level therefore, probably represents a continuing disparity between the catabolic and excretory processes on one hand and the anabolic process on the other.

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