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Iodine deficiency in Alpine goats in some rural areas of Elbasan district

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Abstract

In the area around the former Metallurgical Combine in Elbasan for the period 1987-2018, the largest pollutant in the country has depleted the lands and has adversely affected the vegetation, animals and human beings. In addition to the high percentage of BPH in humans and animals, there is an increase in the percentage of neoplasms in humans and animals. The focus of our study will be on iodine deficiency in the alpine goats in areas near the metallurgical combine. In the last 4 years, there have been cases of fetal deaths due to iodine deficiency. This phenomenon was encountered in calves, pigs, lambs and goats. Autochthonous races have been more resistant than improved races. Of the most affected species were alpine goats. Percentage of cases of morbidity of this race was about 12% in the villages of Katundi i Ri, Brandashesh, Balldren, Vidhas, Papër, Mjekes, Bujqes, Jogodine and Muriqan. The frequency is proportional to the increase in distance from the metallurgical combine. Case mortality was around 35%. Some of the kids were killed in the first 2-3 months of life, seeing the low profitability of these individuals. Part is carried out in family conditions. These individuals, as in the following pictures, are evidence of iodine insufficiency in food and soil due to pollution and other natural factors, and sometimes the lack of technical assistance for animal nutrition

Keywords: Milk goitre, iodine deficiency, thyroid gland, triiodthyronine, tetraiodtironine, thyroxine

Introduction

The thyroid gland is an endocrine gland. It is composed of stroma and parenchyma(Fig 1). The thyroid gland is wrapped from the outside by a dense capsule of irregular connective tissues which in turn bends into very narrow septa that separate the parenchyma in thyroid follicles[4]. Thyroid parenchyma consists of two types of cells: follicular cells, which surrounds each follicle, and parafollicular cell, which is placed between the adjacent follicles[9].

The follicular cell has squamous shape, cuboid to form high column by thyroid secretion stage. It has a circular core placed in the cell base and is surrounded by acidophile cytoplasm. The cytoplasm contains the extensively extracellular endoplasmic network, Ap Golxhi, and the lysosomal system that interact together to produce tyrosine (T4) and triiodothyronine (T3) hormone.

Hypothyroidism is a disease of iodine deficiency that affects both humans and animals. As its typical clinic has gastri, while subclinical it is more difficult to be diagnosed. Hypothyroidism can be diagnosed as with hormonal blood measurement (serum), but also as a good indicator can be the measurement of iodine eliminated by milk or urine.

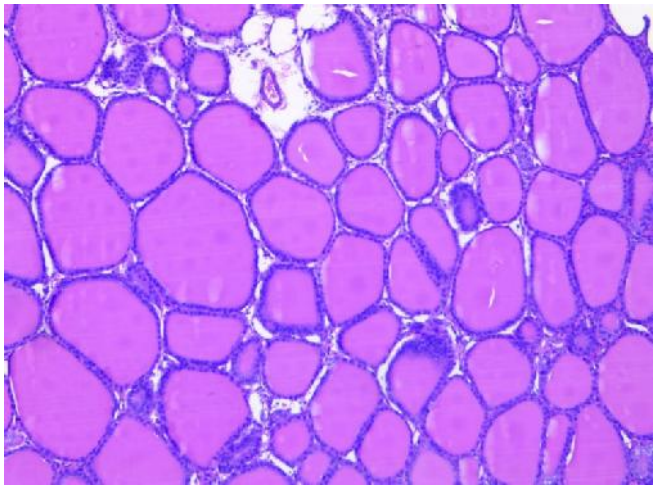

Figure 1 Thyroid follicles(H & E, X 4).

During our research, we were mostly focused on born or congenital hypothyroidism in pigs. Though the mother may not have in the present any signs of morphofunctional thyroid disorder.

Etiology

Among the major pathogens responsible for the development of hypothyroidism, thyroid hyperplasia includes the inadequacy of iodine in food.

Generally hypothyroidism is caused by inadequate iodine in the soil, feeding of animals, water, plants, etc. Sandy lands have low iodine content. The iodine content in plants varies depending on species, climatic conditions and seasonality. So, for example, cereals are poor in iodine, while straw and green meals contain enough iodine content that matches the animal's needs.

Maturing and cutting stages affect the level of iodine in food. Even excessive use of chemicals in agriculture such as DAP reduces iodine recovery[8]. However, these are the primary causes of hypothyroidism.

Secondary causes include proliferative triggers that interfere with thyroxigenogenesis, iodine deficiency in food and genetic enzymatic fission in the thyroid biosynthesis. Even the triggering agents are divided into two subdivisions.

The first subdivision has to do with the fact that with the addition of iodine salts in animal feed, hypothyroidism can be recovered. That being the case, plants such as cabbage, soybeans etc.

The second subsection includes other plants within the Brasiccae spp family such as green cabbage, etc. But unlike the first subdivision, hypothyroidism can not be recovered even with the addition of iodine salts in the food ration because the mechanism of action consists in inhibiting the synthesis thyroid hormone.

All of these factors mentioned above lead to insufficient inhibiting or synthesis of thyroxine and to reduced levels of thyroxine and triiodothyronine. This is caught by the hypothalamus and pituitary that leads to increased secretion of TSH, which in turn leads to follicular cell hyperplasia. The cause of rapid death is due to dyspnea caused by hypertrophic and hypertrophic thyroid gland pressure on the trachea.

It is worth mentioning that from an anamnesis obtained from an animal owner it has been obtained livestock feed in the areas of Lushnja where large amounts of chemical fertilizers were used as DAP.

Materials and methods

Our research methodology consists in analyzing the histopathological changes of the left and right thyroid glands of the dead goats a few hours after birth with the typical swollen gland mark. Thus, in cooperation with the private veterinarian covering the area where the research is being conducted, we have taken thyroid glands and large and small brains in the goats so as to look at the embryonic development disorders that hypothyroidism and changes may have come to histopathologjike. This is because the development of fetal brain is directly dependent on the function of the thyroid gland.

Once samples have been taken, they are stored in refrigerated conditions to be sent to the Food and Veterinary Safety Institute for preparation.

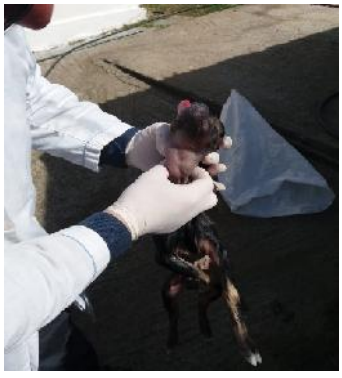

Figure2 Taking thyroid gland for preparation

Figure 2 Length measurement of extra and sinister thyroid glands

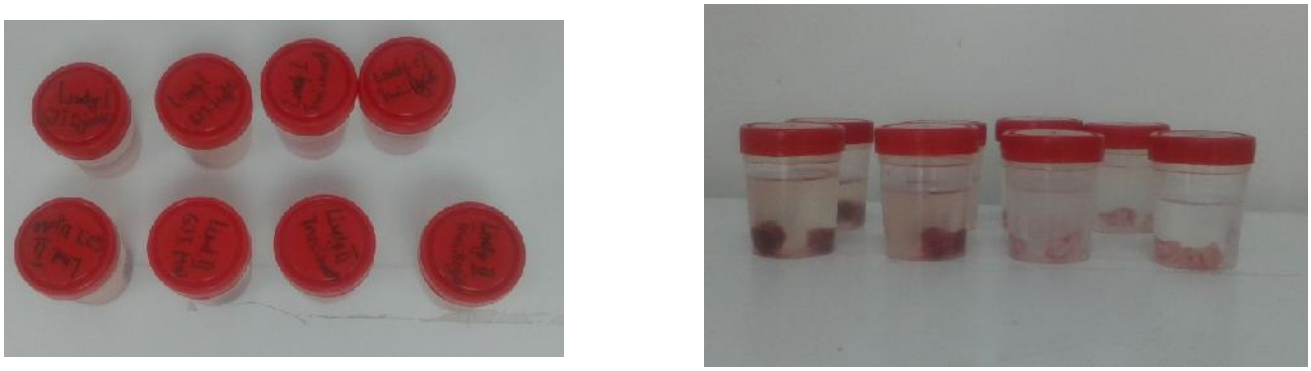

Figure 3 Slides preparation from sample of thyroid glands

Figure 4 A new kid born with congenital goiter

At the Food and Veterinary Security Institute were prepared and colored with Hematoxylin-Eosin. Presently histopathological preparations have been produced in order to make their interpretation.

Clinic

From the newborn goats clinic, it was noted that the period of stroke may be prolonged

considerably, large strains in the fetus can cause distocation and tend to hold the bed. The affected goats are extremely weak and most of them die within a few hours of birth. Thyiroids may be only slightly enlarged. As a consequence of dystocia, even piglets without the sign of swollen thyroid gland[2].

Interpretation and histopathological diagnosis

Diagnosis as mentioned above was decided by the clinic, histopathological changes found in the microscopic images of the thyroid gland preparations. Hyperplastic goitre is a typical sign of hypothyroidism, although the case of kids born from the same goat was seen not all the goats clinically manifested it.

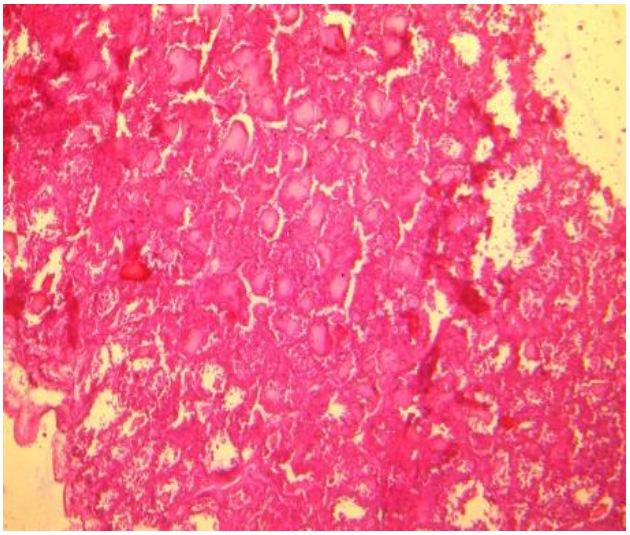

Figure5 Left thyroid gland with partial depletion of follicles and thyroglobuline(H&E X4)

What was noticed was distocia or difficulty in giving birth, generally poorly born, can not drink the colostrum and show no interest in drinking, no hair even though in our cases they have been well developed.

The histopathological changes observed by the microscopic images of the preparations showed signs of hyperplasia of the follicular cells of the thyroid gland(Fig 5). Also in some cases and follicular cell destruction, reductions in colloid.As the follicles were depleted of thyroglobulin, the lining epithelial cells were elongated and moved towards centre of the follicle, giving it a collapsed appearance[1].

Treatment

The surviving newborn goat is treated with proteomyx added in food and intake injections such as Vitamin B12, 2cc, s / c as well as Selenium or E2cc, s / c year.This is the case for a newborn with hyperplastic goiter which was treated last year and that this year has born two kids with the same clinic and also has appeared in the same clinic itself.

Pathogenesis

Congenital hypothyroidism in the goat is almost exclusively associated with the hyperplastic goiter, although the mother may not show any signs of functional thyroid disorder.

Insufficient iodine in foods leading to diffuse thyroid hyperplasia has been severely reduced by the introduction of iodine salts into animal and human nutrition. On the other hand, from the content in foods and triggering agents, this can cause severe thyroid hyperplasia and clinical signs of the gut. In young animals born from mothers who are fed with iodine insufficiency, it is more likely to develop severe thyroid hyperplasia and to show clinical signs of hypothyroidism.

Conclusions and recommendations

Considering the above mentioned it can be said that the causality is multifactorial until the moment when we can not do further hormonal analysis or epidemiological studies aiming at the exclusion of factors. This comes from the fact mentioned above where the cause may be due to iodine insufficiency on the ground, inadequacy in foods, or presence of goitrogene plants or foods.

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