
Kids goiter: case study

Iuliana MIHAİ¹, Marinela TIPISCA², Gabriela URSACHE², Oana-Irina TANASE¹,
Elena VELESCU¹

1.Facultatea de Medicină Veterinară, Universitatea de Științe Agricole și Medicină Veterinară Ion Ionescu de la Brad, din Iași; 2.Laboratorul Sanitar Veterinar și pentru Siguranța Alimentelor Iași
iuliabogdan2005@yahoo.com

Abstract

Goiter, an iodine deficiency disorder is characterized by enlargement of the thyroid glands. Goiter in neonate occurs when pregnant goats have a low iodine intake or ingest goitrogens. In this paper is noticed an outbreak of goiter in the kids. Kids came from a herd of 30 primitive Anglo Nubian goats, abortion in the last month pregnancy were recorded in 6 goats, 14 goats delivered stillborn kids and six goats delivered 12 live born kids, but 8 of them died within 12 to 72 hours after birth. Clinical, hematological, biochemical and imaging exams were performed at the newborn kids. Following the bacteriological examination for Salmonella spp., Listeria spp., Campylobacter spp., no pathogenic germs were found that cause bacterial abortion in goats. Histopathological examination of thyroid tissue is characterized by hyperplasia of follicular elements as well as of interfollicular connective tissue, intensifying the secretory activity of epithelial cells and accumulation of a considerable amount of colloid. All of the examination confirmed the diagnosis of goiter. To reduce the economical wastage, through therapeutically expenses and animal death rate, we advise all experts, that they must administrate that in the last gestation period supplementation of iodized salt ration and avoiding goitrogens feed.

Keywords: goiter, goat, thyroid, treatment

Introduction

Iodine deficiency results in the appearance of goiter, which is characteristic of the enlargement of the thyroid gland in all domestic mammals, birds and reptiles (Ricketts M.H. et al., 1985; Falconer, 1987; Rotkiewicz T. et al., 1988; Osame S. and Ichijo S., 1994; Topper M.J. et al., 1994; Schiller C.A. et al., 1995; Kaneko J.J., 1997; Corradini P. et al., 2000; Simon C. et al., 2000; Garner M.M. et al., 2002; Fyfe J.C. et al., 2003). Sometimes, iodine deficiency during pregnancy could be the cause and the kids surviving after birth develop goiter in later stages of life (Vijlder D., 2003). Goiter in utero is caused due to either primary or due to secondary iodine deficiency (Maxi M.G. et al., 2007). Among the incriminated cases in the appearance of kids goiter is the feeding of pregnant females with low iodine feed or goitrogenic compounds that interfere with thyroxinogenesis (brassica plants, soybean byproducts and water with high content of calcium and nitrates) (Blood D.C. & Radostits O.M., 2000; Radostits O.M. et al., 2007; Sing R. and Beigh S.A., 2013; Paulikova I. et al., 2002). A diet rich in calcium will reduce the absorption of iodine in the intestine. Iodine deficiency occurs due to decreased production of thyroxin (T₄), stimulation of secretion of thyrotrophic hormone (T₃) secreted by the pituitary gland with hyperplasia of the thyroid gland. Clinical signs are more severe in kids compared to lambs, showing a rise in the volume of the thyroid gland, alopecia, weakness (Radostits O.M. et al., 2007; Singh R. and Beigh S.A., 2013).

Materials and method

In this paper we note an outbreak of goiter in kids. Kids come from a herd of 30 goats primiparous of Anglo Nubian, six goats aborted last month of pregnancy, 14 were born kids dead and 6 calved 12 kids of which 8 died in 12 to 72 hours after birth. The pregnant goats were feed by the owner with goitrogenic plants such as cabbage, but there were no palpable enlargement of the thyroid glands of the dams. Clinical, hematological, biochemical and imaging exams were carried

out in live animals in the Clinics of the Faculty of Veterinary Medicine Iasi. The necropsy, histopathological and bacteriological examinations were performed within the Sanitary Veterinary and Food Safety Laboratory Iasi.

Results and discussions

A 3-day-old Anglo Nubian female goat was brought to Infectious Disease Clinic of the Iasi Veterinary Medicine Faculty with suspicion of infectious disease. Following the clinical examination, there was the presence in the upper third of the neck of a submandibular bilobata formation that overlays the trachea just below the larynx, symmetrical, united in the distal part (Liklater & Smith, 1993).

At palpation there was a high consistency, lack of local temperature, fluctuation, well delimited with the size of 5.5 x 3.3 x 1.2 cm (Length x with x height) (figure 1). Rectal temperature (39.9° C) and respiratory rate (25/min) were within normal range, heart rate (98 beats/min) was slightly increased. As a result of the clinical examination we suspect goiter.



Fig. 1 - Clinical aspect at goiter on 3 days- old kid

The ultrasound examination (figure 2) was performed and revealed an enlarged, heterogeneous and hypoechogenicity thyroid gland suggested the diagnosis of goiter.



Fig. 2 – Hypoechogenicity thyroid gland (arrows)

The ultrasound examination (figure 2) was performed and revealed an enlarged, heterogeneous and hypoechogenicity thyroid gland suggested the diagnosis of goiter.

Following the biochemical blood test performed to determine the serum value for thyroid hormones T₃ and T₄, the following results were obtained: 0.35 nmol/l for T₃ and 47.62 nmol/l for T₄. Iodine concentration in the blood serum of kids was significantly lower in comparison of adequate value such as 4.66±2.26 and 182.93±2.59 nmol/l, respectively (Bires J. et al., 1996). Low values of T₃ and T₄ are characteristic in hypothyroidism, goiter.

Examination of indicators of the internal environment in the blood serum showed in erythrocyte counts, hemoglobin, hematocrit value, leucocyte counts, revealed a moderate normochromic anemia that is associated with clinical signs of hypothyroidism as well as anisocytosis and polychromasia. Following the hematological examinations we performed, we suspected goiter on kids.

The necropsy exam was performed on an Anglo Nubian male goat weighing 2.4 kg. Removing the skin from the swelling in the neck showed two massive lobes of thyroid gland. These were firm, of moderate consistency and color reddish brown to dark red. The right lobe measured 4.10 x 7.0 cm, while the left lobe was 4.5 cm x 7.6 cm in size. Normally, the thyroid gland accounted for 20% of the body weight of an animal (Kaneko J.J., 1997), in the adult goat it weighs between 5 and 7 grams, the weight was 39 grams of the right lobe and 41 grams of the left lobe. Goiter was diagnosed on the basis of necropsy.

Following the bacteriological examination for *Salmonella spp.*, *Listeria spp.*, *Campylobacter spp.*, no pathogenic germs were found that cause bacterial abortion in goats.

Histopathological examination of thyroid tissue is characterized by hyperplasia of follicular elements as well as of interfollicular connective tissue, intensifying the secretory activity of epithelial cells and accumulation of a considerable amount of colloid (figure 3). However, hyperplasia and large quantities of colloid in epithelial cells confirms the diagnosis of goiter in kids (Ozmen O. et al., 2005).

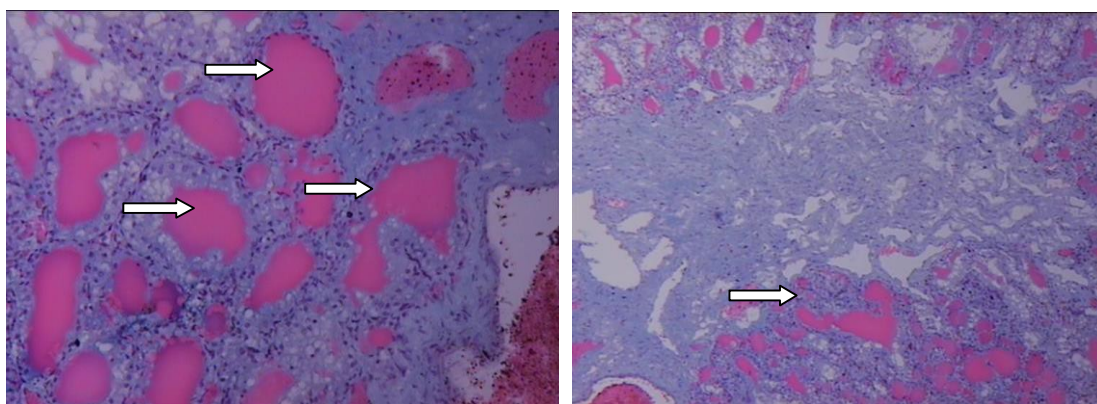


Fig. 3 - Thyroid follicles with accumulation of colloid (arrows)

Our clinical and pathological observations indicate those kids have goiter.

The daily requirement for iodine for goats specialized in milk production is 0.8 mg/kgDM (dry matter) and 2 mg/kgDM for rich feed containing goitrogenic plants (www.bienvivredulaitdechèvre.fr), so specialists recommend treating kids with goiter aged 4 - 6 months with Levothyroxine sodium, iodized salt and mineral supplements and trace elements (Hassan N. et al., 2013; Vivek J. et al., 2017).

Because of the too small age, it was not possible to Levothyroxine sodium dosing, so the clinical case of goiter in a 3 days-old kid was successfully treated by local application on the neck skin, to the region of thyroid gland, with aqueous solution of iodine concentration of 100 mg/ml once every two days. The swellings started to regress almost spontaneously and after two weeks of treatment, the size of thyroid was reduced by almost half and iodine applications were made twice a week until the goiter disappeared, that is, four months. It should be noted that iodine can have toxic effects at high levels. It is easily absorbed through the skin especially if repeated over large areas of intact skin or to absorptive mucous membranes (Inchem.org). The kid was fed with healthy animal milk and was administered from the tenth day of life, monthly, per os, 2 ml Selevit (a complex of vitamins and minerals recommended for absorption disorders, growing needs, changes in environmental conditions, changes in feed ration or deficient vitamins and minerals ratios).

Conclusions

The most common cause of goiter in animals is a deficiency of iodine. Many feedstuffs have goitrogenic effects, and inhibit the activity of the thyroid.

In order to reduce the economical wastage caused both the therapeutic expenses and an increased mortality rate, we recommend supplementing the iodized salt fodder ration as well as avoiding the goitrogenic feeding of goats in the last months of gestation.

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