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Change in the Thyroid Gland's Linear Dimensions in Sheep's Postnatal Ontogenesis in Various Natural Conditions

Allamuradov Oybek Mamasoliyevich [1], *Dilmurodov Nasriddin Babakulovich* [2]

Abstract: The peculiarities of changes in the absolute width of the thyroid gland of sheep in regions with different iodine content in postnatal ontogenesis have been studied. It was found that the absolute width of the thyroid gland, regardless of the conditions of keeping sheep, increases rapidly from 3 days to 3 months of postnatal ontogenesis, and this process proceeds in stages until the next 60 months. It was found that the absolute parameters of thyroid gland width are higher in sheep of the Ferghana region with high iodine deficiency at the stages of postnatal ontogenesis, especially after 6 months, compared with sheep of the Kashkadarya region.

Key words: sheep, thyroid gland, right lobe, left lobe, postnatal ontogenesis, growth coefficient, morphometric, absolute index.

Introduction: The endocrine system consists of interconnected structures specialized for specific functions, with organ formation, development, and functional initiation beginning in the embryonic stage and continuing through to the physiological maturity of postnatal ontogenesis. Various exogenous and endogenous factors influence the formation of endocrine glands during the postnatal development of animals. The emergence of different abnormalities not only affects endocrine glands but may also disrupt the entire organism's functions, leading to reproductive and productivity issues in animals.

According to some researchers, the thyroid lobes in Orenburg downy goats differ in shape—being elongated and oval, or bean-shaped—from those in other animal species. Measurements of the gland's dimensions (length, width, and thickness) resemble those of other animals. Authors observed rapid growth in these dimensions from birth up to 1.5 years compared to the period from 1.5 to 3 years, with the length of the left and right lobes in male animals being 2–14% higher than in females, and the thickness of the lobes in males exceeding that in females by 2–15% [5].

The writers stress that thyroid hormones affect the production of somatotropic hormones and the development of pineal and somatomedins. These hormones affect the levels of these hormones in the blood and how sensitive tissues are to them. Additionally, thyroid hormones stimulate growth and protein synthesis processes, specifically promoting tissue differentiation in young animals. They participate in the growth of bone tissue, the ossification of the epiphyses of tubular bones, and the maturation of cartilage. Synergy between thyroid hormones and somatotropin plays a critical role in this process: STH promotes growth, while TH ensures tissue growth and differentiation. Moreover, T3 accelerates the transcription of the growth hormone gene. Consequently, during this period, animals' pituitary cells lose their ability to synthesize growth hormone [1, 2, 6].

According to researchers, the thyroid gland participates in the body's adaptation to climatic factors as a result of the functional tension of the body's physiological systems and their adaptive changes. The authors assert that the blood level of thyroid hormones reflects the adaptation of animals to new climate-geographic living conditions. The amount of free triiodothyronine (13.47±2.31 pmol/l) and free thyroxine (19.35±0.58 pmol/l) in the body of imported animals during the quarantine period after importation from abroad increases sharply, and after two months it decreases[8].The research results

[1] PhD student, Samarkand state university of veterinary medicine, livestock and biotechnologies
[2] Professor, Samarkand state university of veterinary medicine, livestock and biotechnologies

indicate that thyroid hormones participate in the adaptive processes of the animal body by regulating the synthesis of adrenaline and noradrenaline in the adrenal glands. As the level of hormones in the blood decreases, the concentration of catecholamines increases [4, 7]. Currently, as a result of the development of technocivilization, the problem of global man-made pollution of the environment unites the natural forms of pathology of all living beings and has a significant effect on them, as a result of which the problem of microorganism is increasing [3].

Studying the characteristics of changes in the morphometric dimensions of thyroid glands during the postnatal ontogeny of sheep reared in iodine deficiency regions is important not only for animal morphology and physiology, but also for diagnosis, treatment and veterinary obstetrics.

Inspection methods and materials. Scientific research work was carried out on the thyroid glands of Hisori sheep bred in the conditions of Fergana and Kashkadarya regions. Thyroid glands of animals at 3 days, 3, 6, 12, 18, 24, 60 months of postnatal development were taken for scientific tests.We used generally accepted morphological methods to obtain the linear dimensions and weights of thyroid glands. We subjected all numerical data obtained from scientific investigations to mathematical processing using E.K. Merkureva's method. K.B. Svechin developed the following formula $K = \frac{V_t}{V_0}$ to calculate the growth coefficient, which reflects the dynamics of changes in the morphometric parameters of the thyroid gland according to age:

K - growth factor;

V_t - the absolute index of the width of the thyroid gland of an adult animal;

V_0 - the initial indicator of the width of the thyroid gland.

Mathematical-statistical analysis was performed using Student's and Fisher's criteria in Microsoft Excel computer spreadsheet.

The obtained results and their discussion. The study discovered that the shape and size of sheep's thyroid glands change in different ways in areas with varying amounts of iodine deficiency and at different physiological stages of postnatal ontogenesis.

The absolute index of the width of the right lobe of the thyroid gland of sheep in the conditions of Fergana region increased rapidly from the first 3 days to 6 months of postnatal ontogenesis, and from 3 days to 3 months it increased from 0.56±0.013 cm to 1.01±0.028 cm (K=1.78; r<0, 02) and reached 1.43±0.056 cm (K=1.41) at 6 months. This indicator of the thyroid gland slightly increased in the 12-month stage of postnatal ontogenesis compared to younger age (1.59±0.048, K=1.12; p<0.03), and remained almost unchanged until the next 60 months, that is, at 18 months – 1.6± It was observed to be 0.054 cm (K=1.0), at 24 months - 1.6±0.052 cm (K=1.0), at 60 months - 1.76±0.053 cm (K=1.1). It was noted that the coefficient of growth of this index of the right lobe of the thyroid gland increases up to 3.11 times during the period from 3 days to 60 months of postnatal ontogeny of sheep.

In the conditions of Kashkadarya region, the absolute index of the width of the right lobe of the thyroid gland increased rapidly from 3 days to 3 months of postnatal development of sheep in proportion to its length, from 0.56±0.011 cm to 0.96±0.02 cm (K=1.71; r<0 .03), it was noted that it remained almost unchanged at 6 months (1.03±0.032 cm, K=1.07), and at 12 months, this process accelerated imperceptibly and equaled 1.25±0.029 cm (K=1.22). . This indicator of the thyroid gland at 18 months of postnatal ontogeny did not change significantly compared to 12 months (1.2±0.029; K=0.95), at 24 and 60 months, respectively: 1.27±0.029 cm (K=1.06) and It was observed that it reached 1.43±0.037 cm (K=1.13; r<0.03). From 3 days of postnatal ontogeny to 60 months, the coefficient of growth of the absolute indicator of the width of the right lobe of the thyroid gland increases up to 2.54 times. In the conditions of Fergana region, the absolute index of the width of the left lobe of the thyroid gland is a rapid increase from 3 days to 3 months of postnatal ontogeny of sheep, that is, from 0.69±0.015 cm to 1.0±0.021 cm (K=3.91; r<0.02). the gradual continuation of this process until the next 60 months and at 6 months - up to 1.28±0.027 cm (K=1.27), at 12 months - 1.39±0.036 cm (K=1.09; r<0.03), at 18

months - up to 1.47±0.036 cm (K=1.06; r<0.02), at 24 months - up to 1.66±0.051 cm (K=1.13), at 60 months - 1, It was found to increase to 94±0.05 cm (K=1.16; r<0.03). We observed an increase of up to 2.81 times in the coefficient of growth of the left lobe of the sheep thyroid gland from the first 3 days of postnatal ontogenesis to 3 months.

The absolute index of the width of the left lobe of the thyroid gland of sheep in the conditions of Kashkadarya region from the first 3 days to 3 months of postnatal development is from 0.69 ± 0.017 cm to 1.05 ± 0.023 cm, or during this period its coefficient increases to 1.51 times, and until the next 18 months of this process slightly slowing down and at 6 months - by 1.09±0.022 cm (K=1.03; r<0.02), at 12 months - by 1.04±0.033 cm (K=0.96), at 18 months - by 1, It was found to be equal to 08±0.031 cm (K=1.03). This indicator of the thyroid gland was higher (1.34±0.036 cm, K=1.24) at the 24-month stage of postnatal ontogeny than at younger ages, and did not change significantly at 60 months (1.22±0.026 cm, K=0.91). It was observed that the coefficient of growth of the absolute indicator of the width of the left lobe of the thyroid gland increases to 1.77 times from 3 days to 60 months of postnatal ontogeny of sheep.

Therefore, until the first 3 months of postnatal ontogeny in sheep, the absolute index of the width of the right and left lobes of the thyroid gland increases slightly. At 60 months, the size of the left lobe surpasses that of the right lobe.

Summary:

Regardless of the sheep's living conditions, researchers observed a rapid increase in the absolute index of the width of the right and left lobes of the thyroid gland from 3 days to 3 months of postnatal ontogeny, a process that continues gradually over the next 60 months;

- it was determined that the absolute size of the thyroid gland width is higher in the sheep of the Fergana region, where iodine deficiency is high, especially in the stages of postnatal development after 6 months, compared to the conditions of the Kashkadarya region.

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