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Pathomorphological Changes in the Femu Bone in Disorders of Calcium and Phosphorus Metabolism in Egg-Laying Chicken

Hamroqulov Nuriddin Shokir o`g`li
Veterinary scientific research institute, independent researcher

A B S T R A C T
In the article, macroscopic and microscopic changes in femur bones in disorders of calcium and phosphorus metabolism in laying hens are presented.

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Introduction.

Currently, there are highly productive poultry breeds and crosses in our country. However, deficiencies in poultry nutrition: low-quality food, lack of vitamins, macro- and microelements and other biologically active supplements in the diet cause a decrease in their productivity, reproductive ability and resistance to diseases, as well as deficiencies in the hatching of chicks from eggs. Deficiencies of several mineral substances in the body of birds at the same time in the case of mixed pathology are accompanied by ambiguous symptoms. Therefore, in the diagnosis of metabolic disorders in chickens, along with clinical examinations and zootechnical analysis of feed rations, biochemical, pathologoanatomical, organoleptic and physical examinations of blood, bone, egg yolk and egg yolk are required [3.5].

In order for physiological processes to take place in the bone tissue at a normal level, the body needs a constant supply of proteins, minerals, vitamins and other biologically active substances. The mineral substance participates in the structure of structural elements of chicken cells and tissues, and enzymes, hormones, vitamins, pigments are part of protein compounds [1,6].

One of the most important processes in bones is their mineralization. This process takes place initially with the synthesis of organic matrix-collagen, and later with the synthesis of mucopolysaccharides, protein-carbohydrate compounds and ATF. Enzymes secreted by osteoblasts affect collagen and protein-carbohydrate compounds and enhance the mineralization process. Simultaneously with mineralization processes in bones, a hydroxyapatite crystal lattice is formed from the combination of mucopolysaccharides with sodium, calcium, magnesium, phosphorus, and potassium ions [2,4].

Research and methods. Pathological changes in the secret exchange of calcium and phosphorus in chickens are observed first of all: thinning of the egg shell, brittleness and loss of luster of feathers, loss of luster of the horn of the legs and beak, and lastly next, pathology develops in the tubular bones of the legs and other bones of the body.

In order to study dystrophic changes in bone tissue in diseases of mineral metabolism in chickens, we found it necessary to study the amount of calcium and phosphorus substances in it, as well as their pathomorphological changes. For this purpose, femurs of 30 chickens forcibly slaughtered with disorders

of calcium and phosphorus metabolism were first separated from tendons and muscles and subjected to pathologoanatomical examinations by organoleptic method. Bone weight was measured using FEJ-1000B (Japan) scales, bone length, bone diameter, bone cavity diameter and bone thickness were measured using a barbell device.

Due to the demineralization of the hip bone tissue, it atrophies, becomes brittle and is covered with osteoid, cartilage, connective or fatty tissue, so the bone tissue becomes soft, brittle and flexible.

The femur is lightened, the shape is changed, the diaphyseal part is absorbed and thinned, brittle, the osteon spaces are widened, gray, the shape of the epiphyseal part of the bone is changed, and the periosteum is rough and thickened, some fibrous tissue has grown in places, it is easy to cut, the cut surface is hollow, oily, reddened, the cortical layers are thinned, in the places where they are joined, the connective tissue has developed, in some places of the connective tissue, erosion points are visible, the gloss of the joints is reduced and thinned.

The following pathomorphological changes were detected in femurs:

Femur length of 24-week-old chickens owned by "Dargom Parranda Fayz" LLC is 8.8±0.1 cm, weight is 10.8±0.2 g, bone diameter is 8.8±0.1 mm, bone the diameter of the porous part was 5.6±0.4 mm, and the thickness of the solid bone part was 3.2±0.3 mm. Accordingly, the femur length of 52-week-old chickens is 9.6±0.3 cm, weight is 11.5±0.1 g, bone diameter is 8.3±0.2 mm, and the diameter of the pore is 5.3± 0.1 mm, the thickness of the solid part of the bone is 3.0±0.2 mm, the length of the femur of 67-week-old chickens is 10.2±0.2 cm, the weight is 13.2±0.3 g, the bone diameter is 7 ,9±0.1 mm, the diameter of the pore is 5.1±0.3 mm, and the thickness of the solid part of the bone is 2.8±0.5 mm (Table 3.1.5.1).

24-week-old chickens belonging to "Agro Lingt Parranda" LLC, femur length 8.2±0.2 cm, weight 9.8±0.2 g, bone diameter 8.2±0.1 mm, bone g the diameter of the bone part was 5.0±0.2 mm, and the thickness of the solid bone part was 3.2±0.2 mm. Accordingly, the length of the femur of 52-week-old chickens is 9.0±0.1 cm, the weight is 11.2±0.1 g, the bone diameter is 8.1±0.2 mm, the diameter of the pore is 5.1± 0.5 mm, the thickness of the solid part of the bone is 3.0±0.1 mm, the length of the femur of 67-week-old chickens is 9.7±0.3 cm, the weight is 12.8±0.2 g, the bone diameter is 8 ,0±0.2 mm, the diameter of the pore is 5.1±0.3 mm, and the thickness of the solid part of the bone is 2.9±0.3 mm (Table 3.1.5.1).

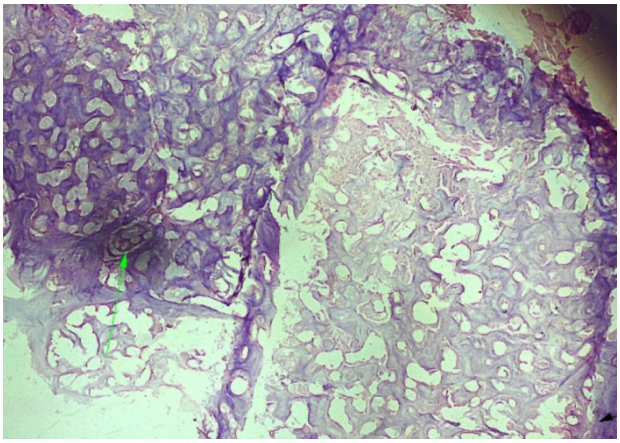
By carrying out pathomorphological examinations of bones, we came to the conclusion that the disorders of calcium and phosphorus metabolism in chickens are mainly in the form of osteodystrophy, thinning of the egg shell, loss of luster, brittleness of feathers, loss of luster of legs and beak. "swelling" and "swelling" due to the growth of fibrous tissue in the upper part of the femur, deformation of the bone and mineral dystrophy of the femur, changes in shape, thinning, brittleness , characterized by being brittle.

Results of organoleptic examination of femur of chickens. (n=15)

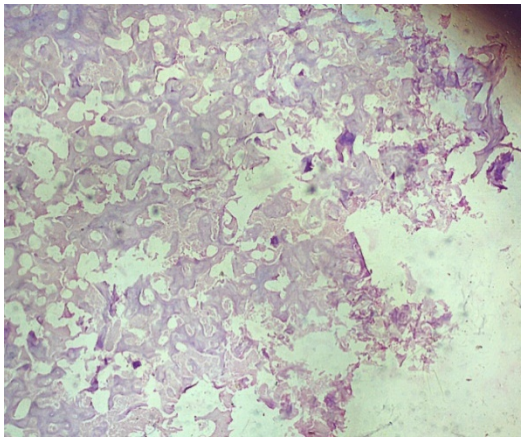
Households	**Age of chickens**	**The length of the bone (sm)**	**Bone weight (gr)**	**The diameter of the middle part of the bone (mm)**	**The diameter of the porous part of the bone (mm)**	**The diameter of the solid part of the bone (mm)**
Dargom bird is a fayz	24	8,8±0,1	10,8±0,2	8,8±0,1	5,6±0,4	3,2±0,3
	52	9,6±0,3	11,5±0,1	8,3±0,2	5,3±0,1	3,0±0,2
	67	10,2±0,2	13,2±0,3	7,9±0,1	5,1±0,3	2,8±0,5
Agro-Lingt bird	24	8,2±0,2	9,8±0,2	8,2±0,1	5,0±0,2	3,2±0,2
	52	9,0±0,1	11,2±0,1	8,1±0,2	5,1±0,5	3,0±0,1
	67	9,7±0,3	12,8±0,2	8,0±0,2	5,1±0,3	2,9±0,3

In order to study the changes caused by disturbances of calcium-phosphorus metabolism in bone cells, samples were taken from femurs and histological examinations were carried out. When sections were taken from the prepared glasses and observed under a microscope, changes such as thinning of the outer

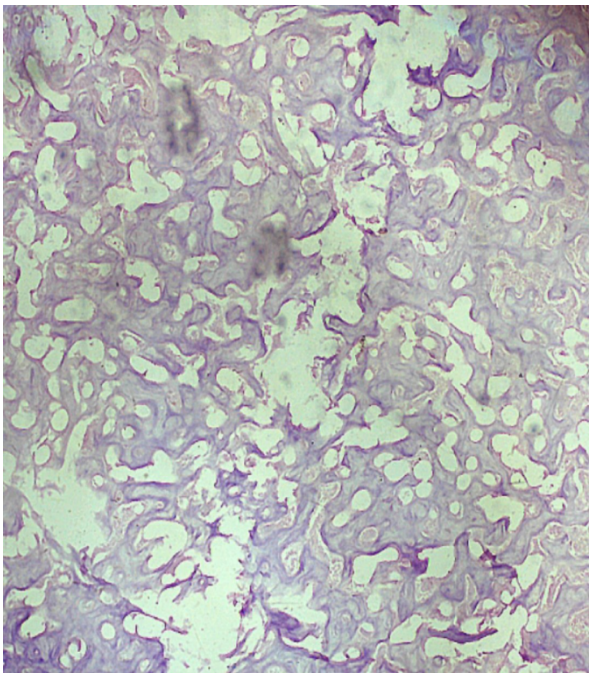
bone plates to 6-12 microns, dystrophy of parallel bone plates, distinct separation of bone plates, and atrophy of bone cells were observed.



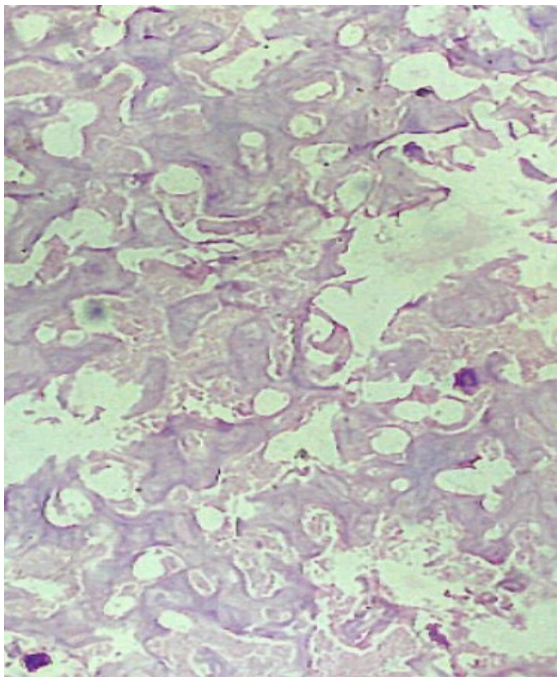
4.4.2.5-picture. Dystopia of osteocytes was observed, periosteum heterophilic infiltration was observed



4.4.2.6-picture. It can be seen that the degeneration process has increased in the cells of osteocytes and osteoclasts



4.4.2.7-picture. Disruption of the regeneration of osteocytes and osteoclast cells of the bone surface



4.4.2.8-picture. Arthritis is atrophy of reticular structures and necrosis of osteocyte cells

Conclusion.

As a result of increased productivity in egg-laying hens, the need for calcium and phosphorus increases, if the body does not get it with food, it was found in the experiments that it leads to thinning of the distal part of the bone and a decrease in bone mass, due to the increase in the reabsorption of calcium from the long porous bones into the blood.

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