

Clinical Signs and Pathological Changes and Differential Diagnosis Of Marek's Disease of Poultry

Akhmedov.B.N.

PhD, Veterinary Research Institute, Kashkadarya Scientific Experiment Station

Abstract:

Our study showed that 650 poultry heads were clinically examined at poultry farms in Kashkadarya region, 24 heads of chickens with suspected disease were isolated and clinical signs and pathoanatomical changes were studied. It has been observed that the disease occurs mainly in chickens aged 1-15 days, the incidence can reach 85%. The virus has oncogenic and immunosuppressive activity, which weakens the immunological protection of poultry, as well as increases the susceptibility of poultry to other diseases

The chronic form of Marek's disease manifests itself as an enzootia or sporadic condition, and the acute form as an epizootic. At the first appearance of the disease, almost all susceptible birds become ill. In stationary unhealthy farms, only unvaccinated young birds become ill.

Marek's disease occurs at any time of the year, often in combination with other infectious and invasive diseases. When effective measures to combat Marek's disease are not used, she goes to a hospital with high rates of morbidity (25%) and mortality (94%). There will be many deaths among the birds kept in cages.

Key words: Immunoglobulin, vaccine, immunity, immunophone, antigen, microorganism, receptor, serotype, epidemiology, pathology.

Relevance of the research. One of the issues facing veterinary science and practice is Marek's disease in poultry, particularly in hens. The pathologoanatomical exams of dead or murdered birds

revealed symptoms and alterations typical of the disease in their internal organs and external appearance, despite the fact that these conditions are more difficult to identify. As a result, it becomes extremely difficult to diagnose the illness accurately. The creation of pathomorphological diagnostics is thought to be one of the current problems in accurately diagnosing Marek's illness in poultry. The poultry industry's growth depends on the application of contemporary strategies for preventing viral illnesses in hens. The research, refinement, and use of methods to identify, prevent, and treat viral illnesses that affect poultry, particularly hens, and result in significant financial harm is one of the most significant issues facing veterinary science. In addition to adhering to veterinary-sanitary regulations, a more thorough and in-depth scientific evaluation of the current situation is required in order to eradicate the aforementioned issues. One of the most important goals of our study is to diagnose infectious bacterial illnesses in poultry quickly and accurately.

Research object and methods. At the Veterinary Research Institute's Kashkadarya experimental station and microbiological lab, studies were conducted. On the basis of investigations, the pathomorphological alterations associated with Marek's illness, its dissemination among hens in poultry farms, and diagnostic techniques were determined.

Adult male and female chickens of the Loman Brown classic and Loman LSL classic breeds that were naturally infected and uninfected were used in laboratory tests.

Results of the research. In this study, 650 hens from Kashkadarya region poultry factories were clinically inspected, 24 birds with illness suspicions were separated, and their clinical symptoms and pathologoanatomical alterations were investigated. It was shown that the sickness, which may affect 85% of chicks, mostly affects those that are 1 to 15 days old. Egg-laying birds are more inclined to lay eggs, while roosters are more inclined to be chickens. Due to the virus's oncogenic and immunodepressive properties, chickens' immune systems are weakened and their vulnerability to various illnesses is increased.

Marek's disease presents as either enzootic or sporadic in its chronic form and epizootic in its acute form. Almost all vulnerable birds get affected when they first come into contact with the illness. Only young birds who are not vaccinated become sick in fixed, unsanitary farms. All four seasons of the year are affected by Marek's disease, which frequently coexists with other invasive and infectious illnesses. Marek's disease has a high rate of morbidity (25%) and death (94%), and if adequate control measures are not implemented, the illness remains stationary. A significant number of birds housed in cages die.

There are two types of Marek's disease: acute and chronic. The incubation time ranges from four days to six months, depending on the aggressiveness of the viral strains. Avirulent strains infect poultry in a latent (symptomatic) state.

The incubation time is 14–20 days for the chronic variant. When a chicken reaches three months of age, it is more likely to have ataxia, which manifests as lameness, paresis, paralysis of the legs, wings, neck, and tails, as well as rapid, high-leg running. The symptoms of an infected bird include loss of appetite, uneven feathering, liquid-colored mucous membranes, a liquid-colored crown, ear rings, and stiff, confused digits. The webbed fingers or knee joints of the bird allow it to move. Severe cases of bilateral paralysis cause ill chicks to lie in the penguin position, with one leg front and the other sideways or backwards on their breast or side. The eye gets harmed in birds that are 5–6 months old. The eye's colored membrane is known for its abrupt changes in appearance. Initially, it takes on a gray hue with patches of reddish or greenish hue. Eventually, the depigmentation patch expands to cover the whole

surface of the retina, resulting in a grayish paint job (the disease's clinical symptom is "gray eyes"). Partial or total blindness results when the pupil of the eye transforms into a pear-shaped, slit-like shape, sometimes narrows, and can be entirely closed. There is a 4–10 week illness course. The mortality rate from 1-30% is caused by emaciation and emaciation alone. Mass hen deaths can be seen during the start of the egg-laying season in the chronic type.

The following pathologoanatomical changes are seen in the chronic form of the disease: discoloration of the nerve tubes, diffuse-focal thickening (utolshenie) in the shoulder and lumbar nerve nodes, and tumors in the internal organs (up to 20%), primarily in the ovaries and testicles (yaichnikax i semennikax). The brain and spinal cord are shown to have a thick density, an uneven surface, and bulging or localized softening of their tissues due to hyperemia of blood vessels.

The disease's acute phase typically affects birds that are 1 to 5 months old. It strikes rapidly, spreads widely, and arrives out of nowhere. Nearly all 1-2-month-old chicks are sick within 5-7 days, but the fatality rate is minimal. Weakness, sadness, and thinness are not typical signs of the illness in its acute form. Although neurological symptoms of enzootic sickness are very uncommon, they might include movement restriction, mass paresis, and paralysis of the legs and wings. Wings hang down, injured legs are extended forward or backward, and there is overall weakness visible. The toes may be gripped or loose. Within two to six weeks, the mortality rate rises due to new lymphoid malignancies causing harm to the internal organs. Among infected birds, ataxia, dyspnea, dehydration, and weight loss are noted. The majority of deaths (30%) occur 1–1.5 months after the illness first manifests. Marek's disease can be quite severe when leukemia is present and is frequently made worse by respiratory mycoplasmosis, coccidiosis, and infectious bronchitis. The death rate in these situations approaches 90%.

Tumors in the tissues of the central and peripheral nerve systems, skin, muscles, and internal organs are seen in the acute stage of the illness. Damaged nerves have a yellowish swelliness and thickening. Internal organ alterations are defined by lymphoid-cellular growth of damaged organs and tissues, and they manifest prior to the identification of illness symptoms. Tumor, diffuse-focal lymphoid, and cellular infiltration of the nerve tube and its connective tissue sheath are characteristics of peripheral nerve tissues. A defining feature of this disease's progression is the retina's damage, which turns yellowish-brown at times or gray with green patches (usually, chicks' retinas are gray-blue by the time they are 4 months old). It has an orange hue. The conjunctiva's epithelial layer is penetrated by lymphoid and pseudoeosinophilic cells, as well as occasionally by plasma cells. The colorful veil often becomes one with the eyeball. There is a discovered optic nerve tube tumor. Cowdry physique type The nuclei of hair follicles, kidneys, and pancreatic epithelia include inclusions and cytoplasmic inclusions found in them.

Taking pathological material from poultry and sending it for laboratory tests

The vet performs diagnostic tests when the veterinarian suspects Marek's illness.

Every bird has its material removed individually for testing in the lab. Precautions must be taken when collecting blood, feather, and pathology samples and performing laboratory testing in order to protect humans and the environment. In this situation, adherence to the relevant laws and regulations is required.

Five to ten unwell chicks are delivered to the veterinary laboratory so that their blood may be extracted. Pathological samples include skin, muscle, wounded organs, peripheral nerve nodes (lumbar, shoulder), the bag of Fabritsiev, and the thymus. Pathological samples are utilized for

pathomorphological and virological analyses (within two to three hours of collection). In order to identify the virus's antigen, ill hens' feathers are also removed.

After the blood is drawn, blood serum is examined in DPR. To infect chicks with RTE, a fraction of blood is stabilized by adding 15-20 TB/ml of heparin or 5% sodium citrate solution at a ratio of 1:9.

Tumor-damaged liver, kidneys, and spleen are ground up in a sterile mortar, and a 10% suspension is made in physiological solution, Hanks' solution, or Igla's medium. The suspension is supplemented with 1000 TB/ml penicillin, 40–50 TB/ml streptomycin, and nystatin, and it is refrigerated at +4°C for 40–60 minutes. Only stabilized blood is utilized for infection when tumors in the internal organs of a sick bird cannot be seen with the naked eye.

Ten to fifteen feather tissue pieces (epithelia of feather follicles) are removed from the outside of each inspected bird's thigh in order to identify the antigen of the Marek's disease virus. Using scissors, cut the open feather tip into 1-2 mm pieces, and then crush them in a mortar or homogenizer. A 1:10 ratio of physiological solution is added to the resultant bulk. It is kept at +4°C for a day after being frozen and thawed three times. The test antigen is the supernatant.

Blood (serum) is submitted to a lab for serological testing in an effort to stop the spread of Marek's disease.

Birds are pricked in the crown or lateral wing veins, and 5-7 ml of blood is extracted and placed in sterilized glass or vacuum test tubes. A sample list is created and each tube is given a number.

By preserving blood for a predetermined amount of time, blood serum may be separated. Test tubes containing blood are kept in a thermostat for one hour at a temperature of +20 + 30°C, or for eight to ten hours at room temperature, in order to facilitate blood coagulation and serum separation. A thin metal rod is then used to remove the coagulated blood from the test tube walls, and the test tubes are then maintained at +4 + 10°C. After 20 to 24 hours, the separated blood serum in test tubes is placed into sterile dry test tubes and sent to the laboratory for examination in this state or in a preserved state.

Blood serum is conserved using the following methods:

- by thoroughly mixing 0.03 milliliters (1 drop) of 5% phenol solution with each milliliter of blood serum;
- until a little quantity of sediment forms at the test tube's bottom, using dry boric acid (2–4% of the blood serum volume).

Within 30 days, blood sera that have been preserved with boric acid or phenol can be examined. Blood sera exhibiting cloudiness, an excessive number of germs, or hemolysis are not deemed suitable for analysis.

For the sample to be delivered to the laboratory, a referral letter in the proper form must be completed.

Poultry Marek's disease diagnosis and differential diagnosis

The diagnosis of poultry Marek's disease is based on the examination of epizootological, clinical, pathologoanatomical, and laboratory data. The findings of tests (virological, serological, histological, cytological, and molecular-biological) are confirmed by analysis.

The following factors must be considered when diagnosing Marek's illness: in the wild, more hens are more likely to contract the disease. Birds of prey, including quail, turkey, pheasant, swan, and sable, are susceptible to infection and can act as viral reservoirs, aiding in the disease's spread;

The formation of lymphoid tumors in internal organs, skin, and skeletal muscles, neuropathic damage to the peripheral and central nervous systems (paralysis, paresis), pupil deformation, and alterations in

the color of the eye's membrane (depigmentation, iridocyclitis) are the primary clinical symptoms of Marek's disease.

Laboratory diagnostics include the detection of virus antigen in feather follicle epithelia, specific antibodies in blood serum using DPR and IFT, in primary culture of RTE, kidney cells, or chicken embryo fibroblasts, and, following virus isolation via biotesting in day-old chicks, identification of DPR, IFT, and immunofluorescence reaction (IFR) as well as the assessment of histological and cytological changes in poultry organs and tissues.

The diffuse precipitation reaction (DPR), IFT, detects antibodies in the blood serum and a particular antigen in the hair follicle's epithelia. The virus is recognized in DPR and IFT, and if required, it is isolated in developing chicken embryos (RTE) in sensitive cell cultures. The pathogenicity of the virus is assessed in day-old chicks. As supplementary techniques, it has been suggested to isolate the virus using various methods of infecting chicken embryos, biotest one-day-old chicks, look for specific antibodies in the blood serum of birds, do histology examinations, etc.

With the use of the fluorescent antibody technique (FAM), the virus may be found and identified in original pathology material and cell culture, and certain antibodies can be found in the blood serum of poultry.

Five to ten hens who are clinically sick are submitted to the lab for a final diagnosis. They are given blood, and during pathologo-anatomical dissection, diseased samples (damaged internal organs, nerve fibers, and skin) are obtained. Furthermore, 10–15 feathers are removed from the outside of each bird's thigh, along with follicular epithelia. Pathological samples are employed for pathomorphological and virological investigations within two to three hours of collection.

Differential diagnosis: B, E-avitaminosis, viral encephalomyelitis, and lymphoid leukemia should be ruled out. Marek's disease has to be differentiated from other illnesses such as lymphoid leukemia, infectious encephalomyelitis, influenza, pasteurellosis, listeriosis, vitamin B, E, and D insufficiency, and some poisonings.

Lymphoid leukemia is a chronic, asymptomatic disease with a low contagiousness. The afflicted birds are primarily 6–12 months old; no skin or peripheral nervous system abnormalities are seen. The death rate for poultry is no more than 3-5%. While infiltrates in the wounded organs of lymphoid leukemia are mostly made up of lymphoblasts and a little quantity of both big and small lymphocytes, infiltrates in the injured organs of Marek's disease are exclusively made up of lymphoid, histiocytic, and plasma cells. B-lymphocytes predominate in tumor tissue in lymphoblastic leukemia, whereas T-lymphocytes predominate in Marek's disease. The primary characteristic that sets Marek's illness apart from lymphoid leukemia is the preservation of differentiation in lymphoid growth cells. However, the primary distinction between Marek's illness and leukemia is the presence of pathogens with distinct biological characteristics and taxonomic groupings.

Only chicks aged 6 to 20 days are susceptible to viral encephalomyelitis. Peripheral nervous system abnormal anatomical alterations do not exist. In the central nervous system and internal organs, there is a minor quantity of lymphoid aggregates, localized proliferation of glia (nerve fibers), and an inflammatory process. Tumors will not occur.

B, E: In avitaminoses, no internal organ cancers are seen; only dystrophic alterations in the central nervous system are found. Characteristics include catarrhal inflammation of the digestive system and fatty dystrophy of the liver. Only 3–7-week-old chicks are susceptible to vitamin E deficiency; symptoms include brain and subcutaneous tissue enlargement and visible necrotic foci in the brain.

Infection is confirmed by virus isolation and polymerase chain reaction (PCR) of leukocyte membranes from recently drawn blood or wounded organs.

Conclusions: Considering the high incidence of Marek's disease in poultry and the significant financial losses to poultry farms, hatching eggs and 1-day-old chicks should be purchased from farms with a clean record in order to prevent the introduction of the Marek virus into the farm. Additionally, all transportation should be done on a regular basis. 3–4. Timely immunization for preventive and formalin disinfection are essential.

Practical recommendations were provided to farm specialists and veterinarians regarding the identification of the epizootic situation of Marek's disease, accurate diagnosis of the disease, disease prevention, and treatment of sick chickens based on clinical information, pathomorphological changes, and the immunoenzymatic analysis (IFT) examination method.

References:

1. Axmedov B.N., Niyazov F.A., Ashurov S.A., Deystvie immunostimulyatora kavitona na tsipliyat. // Veterinariya. – M. 2001.-№9. – S.22-23.
2. Axmedov B.N. Juja o'stirishning asosiy omillari.// Kashkadaryo fermeri gazetasi. 27 –fevral.- 2009.
3. Axmedov B.N., S.Mavlonov., Parrandachilik va qorako'lchilikda yukori samaradorlikka erishmokchimiz. // Kashkadaryo gazetasi. 8 – yanv. -2010.
4. Axmedov B.N.. Naslli va soglom jo'jalar olishga erishish nimalarga bog'lik. // Kashkadaryo gazetasi. 6 – apr. -2010.
5. Axmedov B.N., Murodov X.U., Abdalimov S.H., Parrandalar Marek kasalligi diagnostikasi va unga qarshi kurashish chora-tadbirlari bo'yicha ilmiy asoslangan tizim-2019.