

The Menace of Marek's Disease in Poultry

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Abstract

Marek's disease is one of the concerns for poultry farmers, mostly affecting young chicks. It spreads from feather dust and once it gets in the poultry house, it doesn't go easily. Less feed intake, dullness, and death are some of the symptoms. Farmers face financial loss due to death of birds, improper growth or less production of eggs. Sometimes it's observed that even after giving vaccine the outbreak will be there due to various reasons. This write-up narrates about how this disease spreads clinical signs, and the control and prevention.

Keywords - Feather dust transmission, Marek's disease, Poultry economic loss, Tumor in chickens, Vaccine failure

1. Introduction

Marek's disease (MD) is a viral disease caused by Marek's disease virus (MDV). It is an important neoplastic disease of poultry and cause economic loss for poultry farmers. This DNA virus belongs to alpha-herpes virus group and is related to the human Herpes Simplex Virus (HSV). Marek's disease virus (MDV), or Gallid herpesvirus 2 (GaHV-2), target avian species (*Gallus gallus domesticus*) and it establishes chronic infection (Boodhoo et al., 2016).

Even vaccinated birds are getting sick, which indicates that the virus is overtaking current vaccines. The virus is mutating, and each new version is more damaging than the last. There's a need to update the diagnosis and management of Marek's disease (Tuli et al., 2023).

2. Epidemiology

Marek's disease spreads fast among chickens, mostly through, air borne, feather dust. Once it's in the poultry farm, it stays in the air and litter making difficulty in control. Young birds are most susceptible. If the poultry shed is not cleaned properly, or if feed has fungus like aflatoxin, or if space is less then virus spreads more easily.

3. Economic losses faced by the farmers' world wide

Marek's disease causes serious money loss in poultry farms. This loss is due to less laying, poor growth and mortality. These losses increase slowly day by day, and many farmers don't notice at first. Diagnosing the disease early can lessen the burden (Dejyong et al., 2023).

In the market, the disease affected chickens will be rejected due to presence of

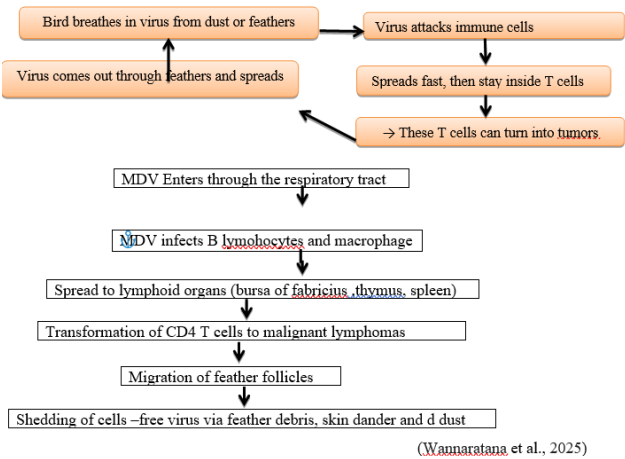
tumour. The losses will be more for the small and medium-scale farms (Bertzbach et al., 2020)

4. Transmission

Marek’s disease spreads through the air. The dust from the infected bird contains the virus. After a period of incubation period, the virus comes out from the feather follicle cells and spreads more. The disease spread by contact with sick birds directly and also through in contact with litter, and tools. There is no vertical spread (from hen to chick through eggs) (Piriaei et al., 2023).

5. Pathogenesis

(McPherson et al., 2016)



6. Clinical symptoms

Birds that get it usually affected stop eating, grow slowly, and may even go lame or blind. Some may lay eggs or smaller ones. Lumps develop on their skin or inside their body, especially on organs like the liver, spleen, kidneys, heart, or ovaries are seen on affected birds and on nerves, like the sciatic or wing nerves. Abnormal proliferation of T lymphocytes causes lymphoma development. Most cases were easily seen in hens between 20 to 30 weeks of age (Das et al., 2018).

In Marek’s disease in poultry show signs like leg or wing paralysis, which results from nerve damage known as neurolymphomatosis. Some birds may develop cloudy or grey eyes or pearl eyes (ocular lymphomatosis) which lead to vision loss. Disease weakens the immune system and the bird will be susceptible to other infections. Most of these symptoms are caused by Serotype-1 (MDV-1), the highly virulent, tumor-producing strain. Serotype-2 and Serotype-3 (HVT) don’t cause illness and are used in vaccination programs (Poonam et al., 2017).

Serotype	Virulence & Characteristics	Associated Clinical Symptoms
Serotype-1 (MDV-1)	Oncogenic, very virulent (vv, vv+),	Paralysis of wings and legs, gray eye (ocular lymphomatosis), tumors

	tumor-causing	in visceral organs (kidney, liver, lungs), skin nodules, CNS lesions, immunosuppression
Serotype-2 (MDV-2)	Non-oncogenic, non-pathogenic	Generally no clinical symptoms, used in vaccines
Serotype-3 (MDV-3/HVT)	Avirulent, non-oncogenic, turkey herpesvirus	No disease symptoms; used as vaccine strain for protection

7. Diagnosis

Symptoms and laboratory techniques and post-mortem lesions help in arriving at a diagnosis. Advance molecular techniques like Fluorescence microscopy and bioluminescence assays are used in laboratory diagnosis.

Differential diagnosis for Marek’s disease (MD) (Kozdruń et al., 2021)

Disease condition	Key differentiating features
Lymphoproliferative Syndrome (Turkeys)	Slight liver enlargement with gray-white necrotic lesions; significantly enlarged marbled spleen.
Lymphocytic Leukemia	Neoplastic tumors in liver and spleen; bumps vary in size and have solid or lard-like consistency; may fill body cavity in hens.
Myelogenous Leukemia	Yellow-gray or yellow-white diffuse tumors; rarely single lesions.
Reticuloendotheliosis	Enlarged liver and spleen with multiple necrotic foci.
Tuberculosis	Emaciation, tubercles in GIT, liver, spleen; necrotic lesions; severe deterioration in condition.
Histomonosis	Yellow/green necrotic liver lesions; high mortality in young birds
Avian Encephalomyelitis (AE)	Nervous signs: leg paralysis, head tremors; may mimic Marek’s in older birds.
Vitamin B1 (Thiamin) Deficiency	Growth inhibition, ataxia, leg/wing/neck paralysis; "star-gazing" (head back) posture.
Vitamin B2 (Riboflavin) Deficiency	Cachexia, stunted growth; birds sit on legs, support on wings; chronic cases

	lie down with stretched legs.
Newcastle Disease (ND)	Apathy, facial swelling, conjunctivitis, body weight disparity; velogenic/mesogenic strains affect nervous and respiratory systems.
Fowl Pox (FP)	Skin tumors in face and abdomen; resembles skin lesions seen in broilers.
Coligranulomatosis (Hjarre's Disease)	Chronic disease; cocci visible in liver, lungs, kidneys, and reproductive organs.
Botulism	Apathy, flaccid paralysis of neck/wings; "limber neck" posture.

8. Control and prevention

Vaccines have helped reduce Marek's disease in chickens for many years. Stronger and more resistant strains have developed over time. The CVI988 (Rispen) vaccine is an effective vaccine (Reddy et al., 2017). Other than vaccination, strong farm hygiene should be followed. Using an "all-in, all-out" system letting the flocks place clean and disinfect properly between flocks and break or reduce the cycle of infection. Remove old litter and clean the sheds to avoid build-up of the virus. Avoid exposing chicks to contaminated areas before they're fully immune. Insect controlling must be done as they carry the virus (Dima et al., 2021).

9. Conclusion

Marek's disease is a viral disease affecting chicken and it weakens the immune system. The disease causes tumour development in visceral organs. It causes economic losses for poultry farmers by lowering egg and meat production. Some of the stronger and more dangerous forms of the virus have been found in many countries which can affect all types of chickens viz, layers, broilers, and breeders. The disease can spread quickly and lead to losses if not properly managed. Vaccinating chicks, keeping the farm clean, using good management practices like "all-in, all-out," and following strict biosecurity measures can make a huge difference and save the farmer from the losses. The way vaccines are stored and given is also very important. Keep the farm clean and follow strong biosecurity practices to avoid the virus from coming in. Always follow a proper vaccination schedule for rearing birds.

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