

Chicken infectious Anemia (CAV)

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Chick Anemia Virus (CAV)

- Chicken infectious anemia (CIA) is a disease characterized by aplastic anemia, generalized lymphoid depletion, subcutaneous and intramuscular hemorrhages, and immunodepression.

Etiology

- Chick anemia virus (CAV) is a small, circular DNA virus belonging to family Circoviridae.
- It was first isolated by Yuasa and his coworkers in 1979 from Japan and subsequently reported as an important pathogen from all over the world including India. In 1991 the disease was extensively studied by McNulty who contributed greater knowledge on this virus.

Transmission

- Vertical transmission of CAV occurs when breeder flocks, with no previous exposure to the virus, become infected as they come into egg production. The eggs that are laid during the infection carry the virus to their progeny of hatched chicks that cause an acute onset of disease with clinical signs appearing from 10 to 14 days of age with peak mortality within third week of life. Infection is observed among chicks hatched from eggs laid over a period of 3 – 6 weeks after which the breeders develop sufficient immunity to CAV the antibodies of which stop transmission of virus through the eggs


- Horizontal transmission occurs among the older chickens lacking MDA to CAV from the virus surviving in poultry houses between flocks, from virus excreted by a small number of vertically infected hatch-mates, or from externally induced virus. Clinical symptoms do not develop, but the growth and health of the birds are affected severely.

Pathogenesis

- Chickens are highly susceptible to this virus (CIV).
- However clinical disease is seen during first 2 to 3 weeks. CIV persist only for 3-4 weeks in chicken with an intact immune system.
- Age resistance to clinical disease caused by CIAV develops rapidly and becomes complete by 2 to 3 weeks of age. Maternal antibodies from immune hens prevent clinical disease in young chicks. Because of passive immunity and age resistance, most infections with CIAV are subclinical.

Symptoms

- Mortality is variable, usually about 10%, But it may be as high as 60%
- At the onset there will be depression, weakness, anorexia, and stunting.
- Anemia and extreme paleness of carcass with thin, watery blood and reduced cellular components of blood

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- Affected chicks are pale and stunted.
 - Gangrenous dermatitis of the extremities (“blue wing”) is noted. Marked anemia may be observed with corresponding hematocrit values below 15%.

Gross lesions

- Hemorrhages on the wings which are prone to secondary bacterial infection leading to gangrenous dermatitis and hence called as 'blue-wing disease'
- Hemorrhages throughout the skeletal muscles and subcutaneous tissue
- Intense atrophy of lymphoid organs including thymus, bursa and spleen.

- Bone marrow of the femur can be fatty and yellowish due to severe anemia. Moderate to severe thymic atrophy is one of the most consistent lesions seen in chicks affected with CIA. Atrophy of the bursa of Fabricius can also be seen.
- Enlarged and mottled livers, hemorrhages in the proventriculus , subcutaneous and muscular hemorrhages are often seen in association with severe anemia. Secondary bacterial infections can cause airsacculitis, pericarditis, pneumonia,

Microscopic lesions

- Bone marrow is aplastic, with replacement of hemopoietic tissue by adipose tissue which looks yellow to white colour.
- Hypoplasia of both erythroid and myeloid series cells is seen in the bone marrow.
- Severity of the disease may be related to the interaction of CAV with other infectious agents like MDV and IBDV

Diagnosis

- Clinical and gross pathological findings
 - Immunofluorescence &
 - Serological tests like serum neutralization, ELISA
- Polymerase chain reaction are important to identify CAV T-cell and B-cell lymphoblastoid cell line tissue cultures can be used to isolate the agent in suitably equipped laboratories.

Prevention

- Immunization of breeder flocks during the age period 12-15 weeks using an attenuated vaccine. Either vaccination or natural exposure will confer immunity to progeny through maternal antibody transfer.
- Appropriate management procedures can reduce the effects of primary CA infection. Control of respiratory infections and other immunosuppressive agents is essential to reduce the impact of CA.



Wing of 14-day old broiler showing edema, subcutaneous hemorrhage, and transudate due to chick anemia virus.



- Pale bone marrow indicating immunosuppression associated with chick anemia virus or mycotoxicosis.

Thank You

