

CIRCOVIRUS INFECTION

CHICKEN INFECTIOUS ANEMIA

(CIA)

by

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- The disease affect chickens aged 2- 4 weeks ch. by: aplastic anemia, generalized lymphoid atrophy, decreased hematocrit values and immunosuppression.
- The virus plays a major role in the etiology of a number of multifactorial diseases associated with hemorrhagic syndrome and/or aplastic anemia syndromes termed “*hemorrhagic syndrome , anemia-dermatitis, or blue wing disease.*”

ECONOMICAL IMPORTANCE:

- **Retarded growth.**
- **Decreased weight.**
- **Mortality 10-20% and can reached 60%.**
- **CAV constitutes a serious economic threat, broiler industry and the SPF eggs producers.**
- **Immunosuppression: Subclinical infection reduces the development of antigen-specific catatonic T lymphocytes (CTL).**
- **Contamination of live poultry vaccines.**

VIRUS:

CIAV is the only member of the genus **Gyrovirus** of the **Circoviridae**, nonenveloped, icosahedral ssDNA with 3 viral proteins.

CIAV replicates in hemocytoblasts in bone marrow and T cell precursors in thymus and in other organs with i.n. Inclusions.



Replication of the virus results in cell death.

CIAV is resistant to most treatments, but 10% iodine or hypochlorite are effective and require 2 hours at 37°C .

All strains are belong to one serotype without antigenic differences .

Recently there is a MINOR DIFFERENCES have been noted in sequencing amino acids of VP1, VP2 and VP3.

Minor differences in virulence were found in comparing virus strains in inoculated 7 days chicks.

LABORATORY HOST:

- 1. Cell Cultures:** CIAV can be propagated and assayed in T cell lines and the B cell line.
- 2. 1-day-old Chicks:**
Day-old chicks free of MDA used to isolate and propagate CIAV. Positive chicks develop anemia and gross lesions after 12-16 days. Mortality occurs between 12-28 days PI..
- 3. Chicken Embryos:**
In y.s of chicken embryos, where some strains may cause embryo mortality between 16-20 days of incubation with small, hemorrhagic, and edematous.

TRANSMISSION

- 1. Horizontal infection by direct or indirect contact via the oral route.
- 2. Vertical transmission of virus occurs when antibody-negative hens become infected or by semen of infected cocks.

After the development of immune responses , egg transmission of virus could not be demonstrated.

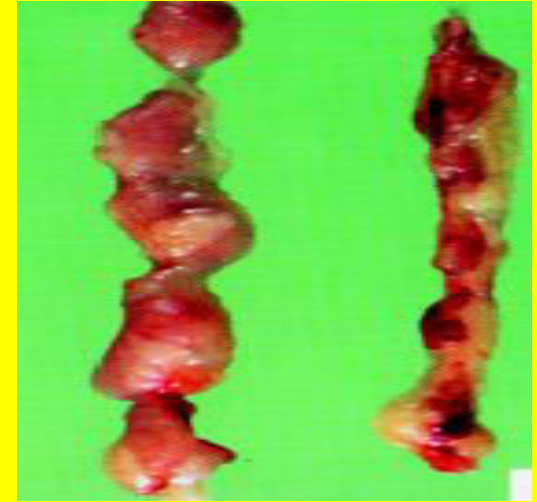
The duration of egg transmission depends on the rate of spread of infection and development of immunity to CIAV.

SIGNS

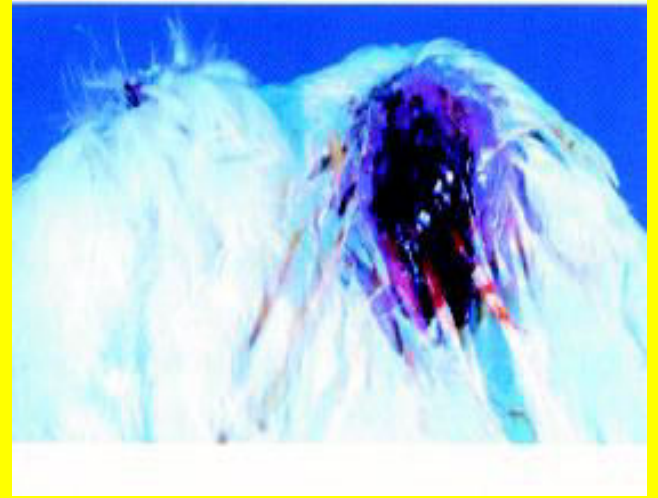
- **Congenitally infected chicks show clinical signs and increased mortality at 10-12 days of age, with a peak at 17—24 days. In heavily infected flocks, a second peak of mortality at 30-34 days, due to horizontal infection.**
- **The specific sign is anemia, with a peak at 14-16 days. Anemia is characterized by hematocrit values ranging from 6-27%. Affected birds are depressed and can become pale. Weight gain is depressed. Affected birds may die between 12-28 days.**
- **Mortality does not exceed 30%. Surviving chicks completely recover from depression and anemia by 20-28 days.**
- **Retarded recovery and increased mortality may be associated with 2nd bacterial or viral infections.**

LESIONS

- **Thymic atrophy** sometimes resulting in an almost complete absence of thymic lobes.
- **Affected bone marrows** become fatty and yellowish or pink .
- **Bursal atrophy** may be occurred.



•Hemorrhages: from wing, in the proventricular mucosa , subcutaneous and muscles with severe anemia.



N.B

- **AGE RESISTANCE:**

Age resistance develops rapidly during the first week of life and becomes complete by 3 weeks.

- **MATERNAL ANTIBODIES:**

MDA to CIAV confer virtually complete protection against the disease.

DIAGNOSIS

1. Clinical signs, lesions, blood testing are suggestive to CIAV.

2. Isolation and Identification of CIAV

VIRUS CAN BE ISOLATED FROM MOST LYMPHOID TISSUES, WHOLE BLOOD , BUFFY COAT CELLS, AND RECTAL CONTENTS

3. Bioassay: by i.m or i.p inoculation of susceptible 1-day-old chicks is the most specific method available for primary isolation of CIAV.

3. Detection of CIAV DNA :by PCR in infected cell cultures, chicken tissues.

4. Serology: ELISA, indirect immunofluorescence , and the virus neutralization (VN) tests.

DIFFERENTIAL DIAGNOSIS

Anemia induced by:

- Erythroblastosis,
- Inclusion body hepatitis,
- Aplastic anemia syndrome,
- Intoxication with sulfonamides, or mycotoxins.

PREVENTION:

- Improve management and hygiene to prevent early exposure to CIAV.
- Monitoring of breeder flocks for CIAV antibody to avoid vertical TRANSMISSION or to test the efficacy of vaccinations.

- **VACCINATION:**

- Vaccine strategies are based on the prevention of vertical transmission of virus by immunization of breeder flocks to give MDA to reduce incidence of anemia in young chicks.
- live vaccines via drinking water or by injection with adjuvants at 13-15 weeks of age, but never later than 3-4 weeks before collection of hatching eggs to avoid spread of vaccinal virus through eggs.
- Recently, an inactivated vaccine was tested.
- Recombinant vaccines expressing VP1 and VP2 are certainly possible

TREATMENT

No specific treatment for chickens affected by CIAV infection, but treatment with broad-spectrum antibiotics to control bacterial infections usually associated with CIA might be indicated.

Thank

you

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