



Outline

- Introduction
- Causitive agent(s)
- Economic Impact
- Transmission
- Clinical Signs
- Diagnosis and Treatment
- Prevention and Control



Chicken infectious anemia (CIA)

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Introduction

- Frequently complicated by secondary infection.
- CIA and closely associated syndromes have commonly been termed :
 - Haemorrhagic syndrome
 - Anaemia-dermatitis
 - Blue wing disease .



Introduction

- First described in 1979 in Japan
- Occurs in meat and egg-type chickens .
- Worldwide in distribution .
- CIA is characterized by:
 - Aplastic anaemia
 - Generalized lymphoid atrophy
 - Retardation of growth
 - Immunosuppression
 - Increased mortality (10 – 60 %)
 - Impaired immune response to vaccines





Etiology



• **Resistance to chemical and physical agents**

- resistant to ethylether and chloroform
- stable at pH3
- resistant to 70°C for 1 hour
- resistant to 80°C for 15 minutes
- inactivated by 50% phenol (5 minutes)
- resistant to lipid solvents
- resistant to 5% quat. ammonium compound



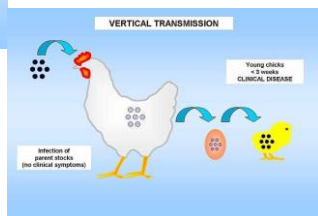
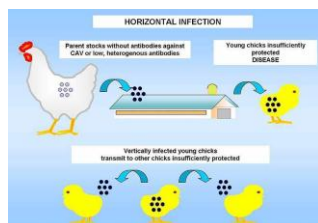
Etiology



- Small non-enveloped virus (25 nm)
- Family Circoviridae:
 - Genus girovirus
 - Single stranded DNA virus
- The virus replicates in haematopoietic precursor cells (bone marrow) and in thymic precursor cells (thymus cortex).
- All strains belong to one serotype.
- The virus is very resistant to a wide range of physical and chemical factors



Transmission



Susceptibility



- Chickens is the only known host
- All ages are susceptible to Infection.
- Maternal immunity protect chicks during the first 1-3 weeks .
- In immunosuppressed chicks maternal immunity to CIAV could be overcome
- Outbreaks in chicks correlate with absence of maternal immunity .



Clinical signs

- **Apparent form** (follow vertical transmission)
 - Depression
 - Paleness
 - Anaemia (haematocrit less than 27 %)
 - Increased mortality (up to 60 %)
 - Reduced weight gain
 - Focal skin lesions (blue wing disease)
 - Survivors recover 20 -28 days P.I.



Clinical signs



In congenitally infected chicks :
10 -12 days

In horizontally infected chicks :
30 – 34 days



Clinical signs

- **Apparent form** (follow vertical transmission)



Clinical signs



- **Apparent form** (follow vertical transmission)





Clinical signs



- Factors influencing morbidity and mortality
 - Virulence of CIAV
 - Dosage
 - Route of infection
 - Environmental factors
 - Age of the birds
 - Concurrent infection
 - Other immunosuppressive factors
 - Genetic constitution .



Clinical signs



- **Subclinical form** (follow horizontal transmission)
 - May go unobserved
 - May cause:
 - Slight increased mortality
 - Transient poor performance
 - (Av.B.W, Feed Conv.Ratio)
 - Detection of antibodies in clinically normal chicks .



Immunosuppressive effects



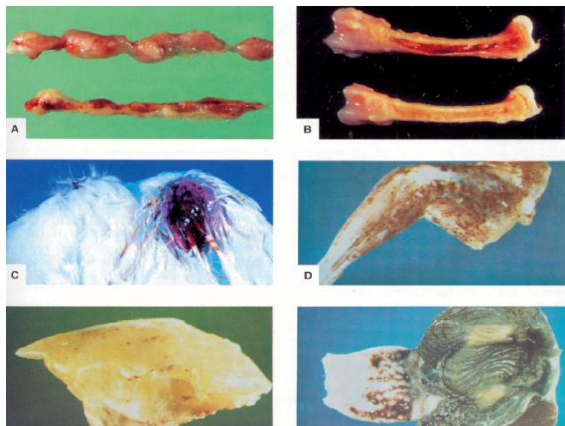
- CIAV infection up to 14 days of age depresses:
 - Immune response to Marek,s disease and inactivated ND vaccines
- Immunosuppression in anaemic bird is indicated by:
 - Increased susceptibility to other infections
 - Enhanced pathogenicity of:
 - Adenovirus
 - Reovirus
 - Live attenuated NDV .



Immunosuppressive effects



- CIAV is highly immunosuppressive in susceptible young chicks
- CIAV immunosuppression result from
 - Damage to haematopoietic and lymphopoietic tissues
 - Generalized lymphoid depletion
 - Transient decrease in:
 - Macrophage functions
 - Cytokine production



Postmortem lesions



- Thymus atrophy
- Bone marrow atrophy
- Watery blood
- Hemorrhagic lesions in skin and skeletal muscles
- Discoloration and swelling of liver and spleen



Postmortem lesions



Postmortem lesions



• *Microscopically*

- Almost all the hematopoietic tissue is replaced
- by adipose tissue in the bone marrow of
- CAV infected chickens



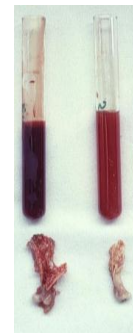
Diagnosis

- Flock history & Clinical signs
- Haematological, Gross and microscopic
- Isolation and identification of the virus
 - Samples
 - whole blood and buffy coat.
 - rectal contents
 - liver homogenate (preferred)
- Methods:
 - Isolation in day old chicks (most specific)
 - Isolation in cell culture



Hematology

- Decrease in red blood cells
- Decrease in white blood cells
- Decrease in thrombocytes which leads to: Watery blood
- Haematocrit values as low as 6%
- Increased clotting time



Differential diagnosis

- Sulfonamide intoxication & mycotoxicosis can result in aplastic anaemia and haemorrhagic syndrome
- MDV and IBDV : induce atrophy of lymphoid tissues
- Adenovirus : a major cause of previously designated Inclusion Body Hepatitis



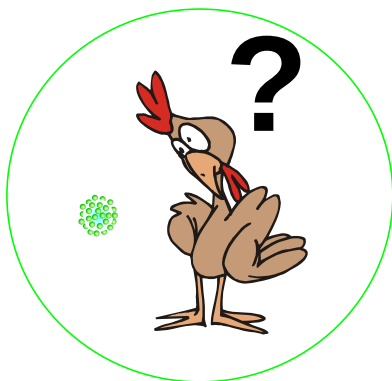
Diagnosis

- Detection of viral antigens in tissues (thymus is preferred) using FAT and IP
- Detection of viral nucleic acid using DNA probes and PCR
- Detection of specific CIAV antibodies:
 - Neutralization test
 - Indirect FAT
 - ELISA and indirect IP .





Prevention and control



- Improve management and hygiene to:
 - Prevent immunosuppression
 - Prevent or minimize early and heavy exposure to CIAV
- Immunization of parent flocks several weeks before egg production
- Good vaccination programs against MD, IBD & Reovirus to minimize immunosuppression
- Pathogen free vaccines!!!!