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## World Journal of Biology and Medical Sciences

Published by Society for Advancement of Science®

ISSN 2349-0063 (Online/Electronic)

Volume 2, Issue- 4, 17-19, October to December, 2015



WJBMS 2/04/43/2015

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A Double Blind Peer Reviewed Journal / Refereed Journal

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### SHORT COMMUNICATION

Received: 27/07/2015

Revised: 31/08/2015

Accepted: 01/09/2015

## Chicken Infectious Anemia: A Review on its Potential Threat to Poultry Industry Worldwide

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### ABSTRACT

*It is caused by a virus belonging to the genus Gyrovirus of family Circoviridae. The virus is a 25nm in size and has a negative ssDNA circular molecule of approximately 2,300 nucleotides with three open reading frames (Nulty et al., 1990). The three reading frames encode for VP1, VP2 and VP3 proteins (Natesan et al., 2006). VP1 is the major capsid protein, VP2 is required for viral assembly and VP3 for disease pathogenesis (Miller et al., 2005). The virus is resistant to pH 3 and temperature 175 F for 30 min and so more difficult to eliminate them from affected farms. CIA is much important due to its frequent outbreaks in commercial poultry industries and is considered as one of the emerging diseases of poultry at global level.*

*Keywords: Chicken infectious anaemia, Virus and Poultry disease.*

## INTRODUCTION

Poultry industry is one of the fastest growing segments in Agricultural sector. In present scenario egg and meat production is increasing in both developed and developing countries. The major economic losses due to mortality, morbidity and production losses come from various infectious diseases. One of the dreaded infectious diseases affecting poultry industry is Chicken Infectious Anemia (CIA). It was first reported in Japan in 1979 (Yuasa *et al.*, 1979).

### Occurrence and transmission

Although all age groups are susceptible to CAV chickens younger than 2 weeks are more prone to be affected. Both broiler and layer breeder chickens are affected by this virus. CAV is transmitted both by horizontal and vertical routes. Faeco-oral route is responsible for horizontal transmission as they are found concentrately in faeces of infected chickens up to 5-7 weeks. Other routes like through vehicle, persons in the farm and used premises can transmit the virus from one farm to other (Tamizharasan *et al.*, 2006). Vertical transmission occurs when the chicken is infected during the laying period and the eggs hatched from these infected eggs can act as source of horizontal transmission.

### Pathogenesis

The virus adsorbs and penetrates to hematopoietic and thymic precursor cells. It then replicates in nucleus by rolling circle mechanism and damage them (Dhama *et al.*, 2008). CAV mostly affects the cells expressing CD4, CD8 and CD1 molecules on their surfaces (Hu *et al.*, 1993). Although the antibodies released by B cells provide the age related resistance CAV can persist as latent infections along with the neutralizing antibodies (Miller and Chat, 2004).

### Clinical signs

Due to multiplication of CAV in bone marrow it causes severe anemia, bone marrow aplasia and hemorrhages in proventriculus and skeletal muscles and death occurs in 2-3 weeks old chickens. (Taniguchi *et al.*, 1982). Also it causes atrophy of spleen, thymus and bursa and generalized lymphoid atrophy leading to immune suppression. The disease is complicated by secondary infections by bacteria, virus and fungus. Latent infection causes decrease in productivity.

### Lesions

Anaemic condition causes the organs of body to appear pale in colour. The bonemarrow is replaced by fatty deposits and becomes yellow in colour. Thymus, bursa and spleen become small in size. Hemorrhages are seen under the skin, muscles and organs. Secondary infections sometimes aggravate the primary lesions in wings due to CAV and cause gangrenous condition giving its name as blue wing disease.

### Diagnosis and treatment

Diagnosis of CAV infection is done by detecting the viral agent, antigens and viral specific antibodies (Chettle *et al.*, 1989). Isolation of virus is done either in MDCC-MSB1 or MDCC-147 (lymphoblastoid cell line derived from Marek's disease tumor) or using day old chicks (Tamizharasan *et al.*, 2006). Serological test like ELISA and molecular test like PCR are used for confirmative diagnosis. Treatment can only be done to check the secondary infections. But vaccinations can check their occurrences.

### Control and prevention

As prevention is better than cure steps should be taken to minimize their risk of occurrence. The following steps can control and prevent their chances of occurrences'.

- a) To check the vertical transmissions the breeder stocks should be vaccinated prior to their egg production.
- b) The affected bird should be diagnosed and isolated earlier to prevent the horizontal transmissions.
- c) Bio security measures should be taken into care to check the entry of infections in the flock.
- d) Proper hygienic and sanitation conditions in the farm and persons working in the farm can reduce the horizontal transmission of viruses from farm to farm.
- e) To check the immune suppression and secondary infections the flocks should be vaccinated with other viral and bacterial vaccines.

#### ACKNOWLEDGEMENTS

The authors are thankful to the Librarian, Arawali Veterinary College, Sikar for providing the necessary books and literature as demanded which supported immensely in the preparation and layout of this work of review of immense importance.

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