

OVERVIEW OF INFECTIOUS ANEMIA IN CHICKEN AND ROLE OF PCR IN DISEASE DIAGNOSE

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ABSTRACT

Chicken Infectious Anemia is a viral disease in poultry caused by CAV chicken Anemia virus usually effecting chicken and other species of poultry birds. This review will show the role of PCR which is a device used to diagnose disease. In this review I also brief some sign and symptom of the disease which will help a lay men to diagnose the disease. In this review I also discuss the control method of disease by which we can control the disease and save the farmer from big loss. The objective of that review was to aware the people from risk of CIA and give possible solution to combat with disease. The review will help out scholars to understand CIA. This review also bring light toward the use of PCR as in Pakistan farmer are not using PCR and in result there is big difficulty in diagnose of disease. This study will also aware about use of vaccine to the people so people will know the importance of Vaccine.

INTRODUCTION

Chicken Anemia virus is cause of chicken infectious anemia in young chicks. Anemia is called loss of blood from body [1]. Aplastic anemia characterized by this disease and lymphoid atrophy generalized with concomitant immunosuppression. Secondary viral, bacterial, or fungal infections make this disease more complicated [2] the disease is controlled by vaccination of breeder chickens so that they can pass on the maternal antibodies to chicks and thus protect them from exposure to the virus in the field. A most common sign of chicken's Infectious Anemia is that after 14 days infected birds show Anemia. Percentage of red blood cell in the body will remain 6 to 27%.The body of chicken will be yellowish in color due to loss of blood. The time period of disease would be 2-4 weeks. [3].

LITERATURE REVIEW

Chicken anemia virus (CAV), a 25 nm, no enveloped, icosahedral virus with a very small (2.3 kb), single-stranded, negative sense, circular DNA genome, is the only recognized member of the *Gyrovirus* genus of the Anelloviridae family [4]. It was previously classified as a Circovirus, but important differences in genome organization led to its reclassification into the new Anellovirus family. The genome codes for three viral proteins (VPs) [5]. VP1, the only structural protein, is the capsid protein, but VP2 may be needed as a scaffold protein to allow proper folding of VP1. VP2 also has serine/threonine and tyrosine protein phosphatase activities, and mutations affecting these activities result in attenuation of virus replication in vivo [6]. VP3, or apoptin, is a nonstructural protein that induces apoptosis in infected cells and has other functions in viral replication. [7].

When day-old susceptible chicks are inoculated IM with CAV, viremia occurs within 24 hours. Virus can be recovered from most organs and rectal contents as long as 35 days after inoculation. The principal sites of CAV replication are hemocytoblasts in the bone marrow, precursor T cells in the cortex of the thymus, and dividing CD4 and CD8 T cells in the spleen [8]. Replication in and destruction of the hemocytoblasts leads to anemia, whereas replication in and destruction of the T cells causes immunosuppression. Neutralizing antibodies are detectable 21 days after infection, and clinical, hematologic, and pathologic parameters return to normal ~35 days after infection. Chicken anemia virus infection has adverse effects on proliferative responses of spleen lymphocytes and on the production of interleukin-2 and interferon by splenocytes. Infection can cause a marked decrease in generation of antigen-specific cytotoxic T cells and T-helper cells directed against other pathogens. In addition to T-cell defects, macrophage functions such as Fc-receptor expression, phagocytosis, and antimicrobial activity may be impaired. Because of decreased T-helper cells, antibody production after vaccination against other pathogens can be reduced.[9].

Subclinical, horizontally acquired infection with CAV in broiler progeny of seropositive parent flocks may be associated with impaired economic performance. In addition, subclinical infection of chickens older than 4 weeks of age, after maternal antibody has waned, can cause immunosuppression resulting in secondary infections and can result

in economic losses even in the absence of evidence of any disease. Syndromes involving CAV infection along with other pathogens include hemorrhagic aplastic anemia syndrome, gangrenous dermatitis inclusion body hepatitis (IBH), and IBH/hydro pericardium syndrome [10].

METHOD

TRANSMISSION

There is a common method of transmission of viral and bacterial disease as bacterial disease also transmit from environment and same viral disease transmit through this method [11]. Transmission of CIA is occur by both vertically or horizontally .Presence of high concentration of virus in feces of chickens which are infected by CAV and those feces are ingested by other chicken through water and feed or virus can be transmit to other chickens by Air. It would take near about 1-2 weeks to infect whole flock. There would subclinical signs of infection which can be observe in the whole flock after 1-2 weeks [12].

Clinical Signs

- Laziness
- Low feed intake
- Disarrange Feathers
- yellow comb, wattles, eyelids or curl up of legs under brooder
- effect the growth rate
- Skin color turns red to blue
- Weight of bird gradually decreases
- Monotony
- Stressed Condition

DIAGNOSE

- Isolation of virus technique
- Polymerase chain reaction
- Enzyme-linked immunoassay.
- By increasing Antibody Titers
- Staining of Immunoperoxidase

RESULT

TREATMENT AND CONTROL MEASURES

There is No specific treatment is available for viral diseases [13, 14]. Control is best achieved by vaccination [15, 16]. Good ventilation can also prevent the disease[17].There is no specific treatment for chicken anemia virus infection. Secondary bacterial infections may be treated with antibiotics as E.coli infection can also effect the bird because immunity of bird will not enough so antibiotic may help to prevent bacterial infections [18]. One strategy to control CAV infection is vaccination of breeder flocks with commercially available live vaccines before the start of egg production. Because only a single serotype of CAV has been identified, the vaccine does not need to be matched to regional variants [19]. Vaccine administration is by injection or by addition to the drinking water, depending on the type of vaccine available in individual countries. Many operations rely instead on natural exposure of breeders to CAV before the onset of egg production, with serological monitoring to confirm that seroconversion has occurred. In some areas, transfer of litter to no contaminated premises and the addition of crude homogenates of tissues from affected chickens to the drinking water have been used to ensure infection and seroconversion of parent flocks before they begin to lay eggs, thereby diminishing the risk of egg transmission [20]. However, these alternatives to vaccination are extremely risky because they do not ensure uniform seroconversion and are thus not acceptable. Variability in seroconversion can lead to vertical transmission and infection of progeny with suboptimal maternal antibody levels via horizontal transmission. In addition to vaccination of breeders, a vaccine is approved in the USA for vaccination of broilers as young as 7 days old; administration is by addition to the drinking water. Because of the synergism between CAV and other immunosuppressive viruses, control of the latter is also important, especially to prevent disease in chickens infected after the decay of maternal antibodies. Eradication of CAV from premises is not a feasible strategy for control because of its extreme resistance to chemical disinfectants and heat. [21].

DISCUSSION

USE OF COMPUTER TO DIAGNOSE DISEASE

The PCR is technique by which we can diagnose disease easily so computer has major role in disease diagnose.

CONCLUSION

Effect of CIA on production

Due to CIA farmer faced higher lost in past while farmer also faced loss in Covid-19 era as Covid-19 effect all industries [22,23,24] so poultry faced sever loss under these two factors.

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