

**Diagnosis and Treatment of Newcastle Disease of Tiger Chicken
(Local) at Upazila Veterinary Hospital, Banskhali, Chattogram.**



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Chattogram Veterinary and Animal Sciences University,

Khulshi, Chattogram- 4225.

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Abstract:

An outbreak of Newcastle disease at a poultry farm of Banskali Upazila was found with a history of drowsiness, sudden death of 15 birds out of 850 birds on 11th May 2021. The clinical sign was drooping wings, watery diarrhea. At postmortem examination, hemorrhage was found on proventriculus, button ulceration on intestine, congestion on lung and heart had been found. The treatment was given with a combine drug of Doxycycline and Neomycin Sulfate, liver tonic containing vitamin E and L-ornithine-L-aspartate (LOLA), vitamin C and saline solution. After 4 days the farm had been visited and treatment response had been observed with low mortality rate. The biosecurity of the farm was advised to upgrade which would result in eradication of diseases along with Newcastle disease in a relatively short time. In addition to this, advises regarding management and vaccination had been given that was useful for poultry farm.

Keyword:

Newcastle disease of chicken, Drowsiness, Sudden death, Postmortem examination, Hemorrhage, Treatment, Biosecurity.

Chapter 1

Introduction

Bangladesh is mainly called an agricultural country where most of the people directly or indirectly involved in agricultural related activities to earn their livelihood. Agriculture has great contribution to the Gross Domestic Product (GDP) of Bangladesh. Besides crop production, other subsectors of agriculture include livestock, poultry, fisheries etc. When these sectors attach with a lot of diseases, the economic growth of the country slow down. Poultry sectors are so vulnerable to various viral diseases that hinder the profit in this sector. The most common viral diseases of poultry are: Newcastle disease, avian influenza virus disease, lymphoid leucosis, chicken infectious anemia etc. Among all the most common poultry disease of Bangladesh is Newcastle disease of chicken.

The Newcastle Disease of poultry is commonly known as Ranikhet disease. The disease was first encountered by Kraneveld in Java and reported in 1926(William Arthur et al.). In 1927, Doyle described that the disease in a flock of chickens in Newcastle on Tyne, England and announced the cause to be a virus (Doyle, 1927). By 1940 the disease has been recognized in Asia, Australia, Africa. It's now widely scattered in US. Chicken, turkeys, pigeons, geese, ducks, crows, sparrows, guinea fowl, pheasants as well as free flying unidentified birds have been reported as affected during natural outbreaks (William Arthur et al.). It is a highly contagious viral disease which makes up to 100 percent mortality in susceptible population during outbreak.

Bangladesh is an agro based economic country where livestock is a vital component of the farming system. There are an estimated 1,50,000 poultry farms in Bangladesh (Poultry operators eye global market, 2021). The farm annually produces 70 million ton of meat and 7.34 billion eggs. Avian Influenza and New Castle Disease are the two fatal diseases threatening the poultry industries of Bangladesh. According to DLS 2015, there are 1408251 number chickens affected and 76337 numbers were death due to ND in Bangladesh (DLS 2015).

This disease is acute contagious which is characterized by sudden onset and rapid spread within the flock resulting high morbidity and high mortality. In Bangladesh poultry meat production has doubled over the past 20 years. Commercial poultry farms

are growing at a rate of 15% a year. To fulfill the growing demand, new strains have been tried to introduced that has rapid growth, disease tolerance capacity, highly prolific etc.

The tiger chicken is a newly introduced hybrid version of Sonali chicken in Bangladesh. It is from the cross of Sonali and it is a rapid growing breed. The cock weighs 7-8 kg and the hen weighs 3-4.5 kg. The daily feed intake is 100-150 gm. It's reared for 4-5 months in case of cock and 6-6.5 month in case of hen. It gives egg at the age of 2-2.5 years. It has good disease resistant capacity and grows well than other broiler strain (Krishibazar, 2019).

Newcastle disease was first found in Newcastle, United Kingdom in 1926. Newcastle disease virus belongs to the family of avian paramyxoviridae. Avian Paramyxoviruses are signal stranded, negative sense RNA viruses with helical capsid symmetry. Nine serotypes are recognized and are termed APMV-1 to APMV-9. APMV-1 is synonymous with Newcastle disease virus (NDV). The RNA has molecular weight of about 5×10^6 . The nucleotide sequencing of NDV genome has shown it to consist of 15,156 nucleotides. There are two functional virus glycoprotein in the envelope of the virus: One is hemagglutinin and neuraminidase (HN) and another one is Fusion protein (F). During the infection process the HN Protein is responsible for attaching the virus to the cell and the F protein brings about fusion between the cell and virus membrane that allows the genetic material to enter the cell (Swayne et al., 1998). Virulent NDV is an Official International des Epizooties (OIE) List A disease and subject to international regulation (Dennis, Alexander).

Newcastle disease viruses are by far the most important pathogens for birds of all types. The effects of this virus is most significant in domestic poultry. Chickens are the most and waterfowl the least susceptible of domestic poultry. This is because of the high susceptibility and the potential for severe impacts of an epizootic on poultry industries.

In human, the NDV causes mild flu like symptoms or conjunctivitis or laryngitis. Therefore, it has a zoonotic significance. The virus infects the host cell and uses those cell to replicate itself.

In research purpose, the virus is being studied as a treatment for cancer because it replicates itself more quickly in human cancer cells and it can kill the host cells (Newcastle Disease Virus (PDQ®))

Newcastle disease virus is synonymous with avian paramyxovirus serotype-1 (PMV-10) is an RNA virus. This virus is important of the 11 known PMV serotypes. NDV has been classified into one of three virulence groups by chicken embryo and chicken inoculation as virulent (velogenic), moderately virulent (mesogenic) or of low virulence (lentogenic) has been abbreviated for regulatory purpose. Velogens and mesogens are classified as virulent NDV which is the cause of reportable infection. In case of infections with lentogens, the low virulence NDV widely used as live vaccines (MSD Veterinary Manual).

Newcastle disease virus strains and isolates have been grouped into five pathotypes; these are-viscerotropic velogenic NDV, neurotropic velogenic, mesogenic NDV, lentogenic NDV and asymptomatic enteric NDV. In viscerotropic NDV, the hemorrhagic lesions are prominent in the gut; the neurotropic reveals respiratory and nervous sign with high mortality (Swayne et al, 1998)

Virulent NDV strains are endemic in poultry in most of Asia, Africa, and some countries of North and South America. USA and Canada are free of those strains in poultry and maintain that status with import restrictions and eradication by destroying infected poultry.

In Bangladesh, new castle disease is one of the main constraints for village chicken production. Village chicken may provide with rudimentary housing and occasional supplementary feed. ND in local scavenging chickens are very common.

The transmission of NDV infection can take place by virus inhalation, ingestion or contact with mucous membrane. Infection can spread from one infected bird to another. Birds that shows respiratory disease presumably shed virus in environment. Ingestion of contaminated feces, contaminated feed & water are also the way of transmission of

infection. At an intensive broiler house rapid spread of virus is very common (Alexander and Capua, 2009)

Incubation period: 2-15days (average 5-6 days). The disease has been discovered in 2 days old chicks

The clinical signs in birds infected with NDV vary widely and are also dependent on some factors such as virus strain, host species, age of host, presence of other organism, environmental stress and immune status of the host. The disease usually begins with respiratory symptoms. Within 10 to 12 days after onset of the disease the respiratory sign symptoms subside in recovering fowl. Rapid spread of infection, respiratory distress (gasping), Nervous sign symptoms may show lately like weeks after onset of respiratory symptoms. Very young chicks may show stupor, head pressed, eye closed; ataxia, torticollis, opisthotonus and posterior propulsion may also be seen. In case of adults, the disease also begins with respiratory symptoms. In laying flocks drops of egg production is the most characteristic features (William et al.)

At post mortem examination, infected bird often shows mucus in trachea, petechiae may be seen on the serous membranes, hemorrhage on proventriculus, necrotic hemorrhagic areas on mucosal surface of the intestines (button ulceration) (MSD Veterinary Manual). In case of loNDv strains stains mucoid exudates may see in respiratory tract with opacity and thickening of air sacs. Secondary bacterial infection may increase the severity of respiratory lesions.

This disease is very common in Bangladesh and reports on this are not available. The objective of this study is to learn about the diagnosis method of Newcastle disease of chicken, treatment response on it and the managerial default that elevate the disease occurrence. Thus it will pave the way for future study.

Chapter-2

Materials and Methods

Study area:

It was at Upazila Veterinary Hospital, Banskhali, chattogram. A farmer from Sadanpur brought his diseased chicken to the hospital at 11th May, 2021.

Clinical history collection:

At first the owners complain had been note down. The size of the flock was 850 with the age of 1 month 10 days. The history was sudden death of 15 birds from the flock and drowsiness of birds, less feed intake. The postmortem examination was performed and photos of the organs had been taken to diagnose the disease condition. The presumptive diagnosis was Newcastle disease of chicken and treatment had been given to improve the condition.

Treatment:

The following treatment had been prescribed to the birds such as: Quinidine Sulfate, combine drug of Neomycin Sulfate & Doxycycline Hydrate, saline solution, Vitamin C preparation, liver tonic Hepatoforte. The condition of the birds was improved gradually and the occurrence of the death of the birds had been stopped. At 15th May the farm had been visited and some advice had been given to the farmer such as- supply of clear drinking water, proper ensure of strict biosecurity measures such as keeping water bath in front of farm, limited people entrance etc. w limit the disease exposure in the flock.

Case follow up:



After 4 days the Farm at Sadanpur had been visited to see the improvement of the disease condition. The treatment response was satisfactory, the owner informed that the mortality rate had come to zero. The flock size was 835 with the area of 800sqft. The space requirement and feeder, drinker supply was not sufficient. The biosecurity of the farm was not ensured, easy exposure of crows and other birds at the farm zone.

Chapter 3

Results

ND is a highly contagious disease and exhibits a range of pathogenicity in birds. The appropriate vaccination measure, proper treatment can reduce the intensity of the disease. The diagnosis of the Newcastle disease of chicken had been performed at 11th May 2021 at Upazila Veterinary Hospital, Banskhal, Chattogram. Clinical sign, postmortem examination findings and their pictures were collected and treatment effectiveness had been observed as well.

Clinical sign:

The general examination of the birds that were brought to the hospital had been done. The clinical sign was watery diarrhea, drowsiness of the bird, drooping wings.

$$\begin{aligned}\text{Morbidity rate} &= \frac{\text{No of infected Chicken}}{\text{No of Total Chicken}} \\ &= \frac{130}{850} \\ &= 15.29\%\end{aligned}$$

Morbidity rate of this tiger chicken farm is 15.29%

$$\begin{aligned}\text{Mortality rate} &= \frac{\text{No of dead chicken}}{\text{No of infected Chicken}} \\ &= \frac{15}{130} \\ &= 11.54\%\end{aligned}$$

Mortality rate of this tiger chicken farm is 11.54%

Postmortem examination findings:

There was congestion in lung (Fig 1.1). There was clotted blood at heart suspecting heat stress (Fig 1.2). The proventriculus, gizzard, liver, spleen, intestine was examined. At the tip of proventriculus the hemorrhage was distinctive (Fig 1.3), at another bird thickening of proventriculus had been observed. Hemorrhage at intestine had also been seen (Fig 1.3). The liver was congested; spleen was enlarged (Fig 1.1,1.4)

List of figures:



Fig 1.1. Congested lung and liver



Fig 1.2. Clotted blood on heart

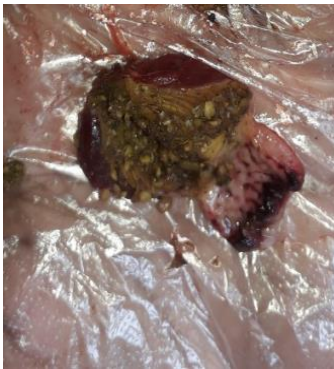


Fig 1.3 Hemorrhage at proventriculus & intestine



Fig 1.4. Swollen spleen

By following prescribed treatment, the condition of the birds was improved gradually. The occurrence of the death of the birds had been stopped. At 15th May the farm had been visited and some advice had been given to the farmer such as- supply of clear drinking water, proper ensure of strict biosecurity measures such as keeping water bath in front of farm, limited people entrance etc. would limit the disease exposure in the flock

Chapter 4

Discussion

In this study, the disease had been diagnosed at the basis of clinical sign and postmortem examination. It is possible that the clinically sick or dead birds in most of the ND suspected cases can suffer from infection with other agents or other virus strain which were undetectable by the diagnostic method used in this study. (Dimitrov et al., 2016). The level of antibody titer gives a confirmation about protection level from developing ND. During this study period, serological test to determine the exposure of that flock to Newcastle disease virus infection or to test the efficacy of vaccination in chicken under intensive system were not available.

For instance, majority of the commercial farmers quarantine the sick birds and seek advice from the veterinarians on treatment option compared to some cases where farmers slaughter sick birds before they die. In this study, the case had been followed up to see the treatment response.

Morbidity and Mortality rate vary depending on the virulence of the strain. In case of mesogenic viruses the mortality rate is approximately 10% where as in lentogenic it is negligible. Concurrent illness may increase the severity of illness and result higher death rate. In velogenic strain, the morbidity and mortality is as high as 100%. It depends on same factor as rapid onset of disease, grouped housed flocks. In this study the morbidity and mortality rate of this flock is 15.29% and 11.54% respectively. In China some velogenic strains have an average morbidity rate of 17.5% and an average mortality of 9% in geese. (2021).

The finding of mortality under the intensive system points to additional problems associated with poor biosecurity condition which may influence disease outbreak (Njagi et al., 2012). Sudden weather changes could influence virus transmission thus timing and intensity of disease outbreak, which correlate with alternations of elevated temperature and humidity.

In this study, combination of Neomycin Sulfate and Doxycycline had been prescribed as symptomatic treatment, there is no discussion found on specific medication of

Newcastle disease virus. During follow up period, the death of the birds had come to halt and bird's condition had been improved gradually. The study may help other to know about the treatment guideline as well as response to treatment to treat the Newcastle disease case in future.

NDV vaccination is a must measure to induce antibody against the virus. The Mass vaccination methods are less labor intensive but if not applied properly may lead to <85% of the flock being immunized that is needed for herd immunity (MSD Veterinary Manual). Chicks will be vaccinated at the age of 3-4 days. In associate with this, adaptation of strict biosecurity measures can help in preventing morbidity and mortality in the poultry flocks and in turn enhancing the productivity of the birds.

Chapter 5

Conclusion

Newcastle disease of chicken is a significant affliction at poultry sector both at commercial and backyard farming. The appropriate vaccination measure, proper treatment can reduce the intensity of the disease. Management is an important factor that can minimize the occurrence of disease prevalence and loss. Poor hygiene practices increase the risk of disease occurrence in the farm. This study has been conducted to learn the diagnostic procedure along with the treatment method of Newcastle disease of chicken in a flock. The case has been followed up to see the treatment response and the necessary advice has been provided to prevent the reoccurrence of the disease in the farm. Thus the study would help for further study in future.

Limitation

This study has been conducted on only one farm on a population of 850 chickens. The diagnosis had been done based on post mortem examination. The serological test was not possible to conduct due to lack of diagnostic facility in Upazila veterinary hospital. Therefore, the treatment and case follow up had been done to observe the response of treatment.

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