Newcastle disease and Avian Influenza

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Newcastle disease

Highly contagious and fatal viral disease of most domestic fowl as well as many wild and pet bird.

Newcastle disease virus may cause conjunctivitis in humans.

Etiology:

Newcastle disease is caused by:Avian orthoavulavirus 1 (AOAV-1)Previously known as Avian Paramyxovirus type 1 (APMV-1)

Family: Paramyxoviridae

Subfamily: Avirulinae

Genus: Orthoavulavirus

spread
Aerosol from infected bird excretions.
Mechanical vectors.
Vaccinations : May cause the disease.
Wild birds.

Structural Proteins

THE VIRUS CONTAINS 6 MAJOR STRUCTURAL

proteins:NP (Nucleoprotein) – protects viral RNA

P (Phosphoprotein) – replication cofactor

L (Large protein) – RNA-dependent RNA polymerase

M (Matrix protein) – virus assembly

HN (Hemagglutinin-Neuraminidase protein)

F (Fusion protein)

Responsible

HN for:Attachment to host cell receptors

Hemagglutination of RBCs

Neuraminidase activity

F Critical for virulenceAllows

fusion of viral envelope with host cell membrane

Cleavage site determines pathogenicity

Strains of ND viruses

Lentogenic ND virus : Mild : Kills embryos in more than 90 hours.

Mesogenic ND virus : Moderate : Kills embryos in 60 -90 hours.

Velogenic : Highly virulent neurotropic or viscerotropic : Kills embryo in less than 60 hours.

Lentogenic and Mesogenic strains are used as vaccines.

Diagnosis:

Lentogenic and mesogenic :Negligible if not complicated.

Velogenic: Up to 50 % in adults and 90 % in chicks.

Exotic ND (VVND) :Up to 90 -100 % .

Forms of Newcastle disease

1-Asciatic form , Viscerotropic : 1-Doyle 's form Velogenic Newcastle Disease (VVND), Digestive form , Exotic form : Acute lethal infection of all ages of chickens.

Hemorrhagic lesions of digestive tract are present.

2- Beach's form : An acute ,often lethal infection of chickens of all ages ,characterized by respiratory and neurological signs , hence the term ,Neurotropic Velogenic Newcastle Disease (NVND) ,and pneumotropic velogenic ND .

Forms of Newcastle disease

3-Beaudette's form : Less pathogenic form of NVND , deaths are seen only in young birds..Viruses causes this type of infection are of mesogenic pathotype.

4- Hitchner's form : Causes mild or inapparent respiratory infections, caused by the viruses of the lentogenic pathotype.

5- Asymptomatic –enteric form: Gut infections with lentogenic viruses causing no obvious disease.

Clinical signs : Young

1.Respiratory signs: discharge. Gasping, coughing ,rales and nasal

2.CNS signs : Follow respiratory signs : Twisted neck ,stargazing and opisthotonus.

3.Signs of digestive system : Diarrhea , greenish diarrhe , bloody diarrhea.

4.Ocular signs: Lacrimation and conjunctivitis.

ADULT

1- Mild respiratory signs.

2- Few CNS signs.

3- Layers may cease to produce .

4- Eggs are of low quality and rough or soft shell .

Post –mortem lesion

1-Severe inflammation of trachea and air sacs.

2-Hemorrhagic ulcerations in the mucosa of gut and cecal tonsils.

3- Severe hemorrhages of mucosal surface of the proventriculus and gizzard.

Differential diagnosis and diagnosis

1. Infectious Bronchitis.
2. Colibacillosis (Airsacculitis).
3. Bird flu (Avian Influenza).
4. Marek's Disease (Nervous form).
5. Infectious Laryngotracheitis.
6. Avian Encephalomyelitis.
7. Infectious Coryza.
8. Chronic Respiratory Disease (CRD)
9. Aspergillosis.
10. Vitamin E Deficiency .

1. History .
2. HI (Hemagglutination Inhibition Test) .
3. VN (Virus Neutralization) with known ND antisera.
4. ELISA.
5. Immunofluorescence .
6. Signs.
7. Gross lesions.
8. Isolation and identification of virus.
9. Reproduction of the disease in susceptible chickens

Treatment and Prevention :

No treatment.

Broad –spectrum antibiotics for secondary bacterial infection.

:

1-Vaccination

2- Eradication.

Types of ND Vaccines

1. Live Attenuated Vaccines

Common Strains:

Hitchner B1

LaSota

Clone 30

Routes:

Eye drop

Drinking water

Spray

aerosol

2. Inactivated (Killed) Vaccines

Characteristics:

Oil-emulsion

(e.g., Montanide-based)Induce strong humoral immunity (IgG)

Long-lasting protection

No replication

Route:

- Intramuscular (breast muscle)
- Subcutaneous (neck region)

Avian Influenza { Bird flu }

Avian influenza is viral disease affecting respiratory, digestive and / or nervous system of many species of birds .

Etiology

Orthomyxovirus type A two forms :-

1- Highly Pathogenic Avian Influenza Virus {HPAIV} .

2- Low Pathogenic Avian Influenza Virus { LPAIV}.

The virus have two types of surface antigens :-

1- Hemagglutinin (H) = 15 . 2- Neuraminidase (N) = 9

Incubation period : Few hours to days .

Course of the disease :- 1 – 2 weeks .

Method of Spread :-

1- Contact . 2- Water fowl . 3- Slaughter house .

4- Live markets .

Morbidity : Variable . Mortality: Can reach 80 – 100 % .

Clinical signs

1. Soft – shelled eggs .
2. Sudden drop in egg production .
3. Cyanosis of wattles and comb .
4. Edema and swelling of head ,eyelids , comb ,wattles and hock .
5. Diarrhea .
6. Blood – tinged discharge from nostrils .
7. Incoordination ,including loss of ability to walk and stand .
8. Pin – point hemorrhages , most easily seen on feet and shanks .
9. Respiratory distress .
10. Increased death losses in a flock

Post – mortem lesions:

1. Swelling of the face and area below the beak .
2. Clear straw – colored fluid in the subcutaneous.
3. Congestion in the skin and intestinal tract .
4. The lining of the gizzard may be easily removed.
5. Sinusitis with mucopurulent to caseous exudate .
6. Fibrinopurulent pericarditis .

7-. Hemorrhage may be seen in the :

a- Trachea .

b. Proventriculus .

c. Beneath the lining of the gizzard .

d. Intestines .

e. Muscles along the breast bone .

f . Heart .

g. Gizzard fat .

H. Abdominal fat.

Diagnosis and Differential Diagnosis

Diagnosis

Isolation and identification of the virus .

Serology :

a. AGP { Agar Gel Precipitation test}.

ELISA.

HI {Hemagglutination Inhibition test }.

Differential Diagnosis

Diseases affecting :- Respiratory , Digestive and Nervous systems .

Treatment , Prevention and Control :-

Treatment :-

No treatment .

Prevention and Control :-

Strict quarantine measures .

Depopulate infected flocks .

Bury infected birds .

Prevention

Killed vaccine are available for certain approved areas.