FOWL POX
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Causative agent

Group : Group I (dsDNA)
Order : Unassigned
Family : Poxviridae
Genus : Avipoxvirus
Species : Fowlpox virus

Host : chickens, turkeys, quail, canaries, pigeons, & many species of birds
Viral Enzymes  Core  Outer Membrane  inner Membrane

Core Wall  Lateral Bodies  DNA Genome
Fowl pox virus is a slow spreading viral disease of various avian species.

All age groups are at risk and distribution of this disease is worldwide. Except in newly hatched chickens

The incidence of disease is variable depending on climate, management, hygiene, biosecurity, and use of a regular vaccination program.

Causes: skin lesions (dry pox) or diptheritic lesions (wet pox).
Avipoxvirus possess brick-like shape, enveloped, in large size compared to other viruses (up to 200 nm in diameter) ---- for isolation can be filtered using special water filter: *Large Volume Water Sampler* (LVWS).

4 strains:
- Fowl pox virus
- Turkey pox virus
- Pigeon pox virus
- Canary pox virus
The large DNA virus (an avipoxvirus in the Poxviridae family) is resistant and may survive in the environment for extended periods in dried scabs.

Photolyase and A-type inclusion body protein genes in the genome of fowlpox virus appear to protect the virus from environmental insults.

The disease tends to persist for extended periods in multiple-age poultry complexes because of slow spread of the virus and availability of susceptible birds.

Sensitivity: 50°C heating 30 min
60°C in 8 min
in dry scabs for months/years
pH 5-9 resistant
phenol & formalin 1:1000 for 9 days
sensitive to KOH 1%
The cutaneous form of fowlpox is characterized by:

- nodular lesions on various parts of the unfeathered skin of chickens
- on the head
- upper neck of turkeys.
- generalized lesions of feathered skin may also be seen.

The lesion is initially a raised, blanched, nodular area that enlarges, becomes yellowish, and progresses to a thick, dark scab. Multiple lesions usually develop and often coalesce. Lesions: papules, vesicles, scabs.

Lesions in various stages of development may be found on the same bird. Localization around the nostrils may cause nasal discharge. Cutaneous lesions on the eyelids may cause complete closure of one or both eyes.
Dry pox results in scabs and lesions around the comb, wattle, ear lobes, and eyes.
**Wet pox** lesions are associated with the oral cavity and the upper respiratory tract, especially the larynx and trachea. Wet pox is more serious, results in higher mortality, and is a source of current industry problems.

Tracheas can appear:
- Reddened or hemorrhagic during certain stages of the disease, clinically similar to an ILT infection.
- The trachea wall is thickened with proliferative, inflamed, often patchy lesions on the interior surface.
- Mortality occurs when the lesion totally occludes the larynx or the upper part of the trachea.
Diphtheritic lesions look like whitish or yellowish plaques that are deposited and grown on the mucous coats of the buccal and nasal cavities, the sinuses, the larynx, the pharynx, the trachea or the oesophagus (arrows).
Wet pox, tracheal patchy lesion
Wet pox lesions in trachea, similar to infections laryngotracheitis (ILT)
Wet pox in trachea, thickened wall with necrotic tissue.
Occlusion of the larynx; typical of wet pox or infectious laryngotracheitis (ILT).
In some cases, lesions are limited chiefly to the feet and legs.
Transmission

The virus contained in the scabs contaminates the environment and remains infective for many months.

Mechanical transmission is considered the primary method for dissemination of the virus, and infection can occur through injured or lacerated skin.

The first is spread by biting insects (especially mosquitoes, flys) and wound contamination and causes lesions on the comb, wattles, and beak. Birds affected by this form usually recover within a few weeks.

The second form is spread by inhalation of the virus and causes a diphtheritic membrane (wet pox) to form in the mouth, pharynx, larynx, and sometimes the trachea. The prognosis for this form is poor.
Diagnosis

Dry pox (cutaneous form)
Dry pox can be identified visually by the characteristic scabs on the featherless areas of the bird. Nodular (proliferative) lesions on the comb, wattle, eyelids, other non feathered areas
Histopathology may be required for conclusive diagnosis.

Wet pox (diphtheroid form)
Diagnosis of wet pox can be complicated by similar appearing lesions of other respiratory diseases. Nodules on mucosal membranes of pharynx, trachea, oesophagus
The only conclusive way to confirm wet pox is by using histopathology on suspect lesion tissue fixed in formalin.

Systemic form: affected to some organs internal
Special histopathological changes

The presence of eosinophilic intracytoplasmic inclusion bodies (Bollinger bodies) is diagnostic for pox virus infection.

Borrell bodies: particles of fowlpox virus; aggregates of Borrel body's in infected cells result in the formation of Bollinger's bodies or granules: relatively large, spheroid or ovoid, usually somewhat granular, acidophilic, intracytoplasmic inclusion body's observed in the infected tissues of birds with fowlpox virus; when body's are ruptured large numbers of fowlpox virus particles are released.
The virus can be isolated by inoculating chorioallantoic membrane of developing chicken embryos, susceptible birds, or cell cultures of avian origin. Chicken embryos (9–12 days old) from an SPF flock are the preferred and convenient host for virus isolation.
Prevention & Treatment

Where fowlpox is prevalent, chickens and turkeys should be vaccinated (a live-embryo or cell-culture-propagated virus vaccine).

The most widely used vaccines are attenuated fowlpox virus and pigeonpox virus isolates of high immunogenicity and low pathogenicity.

In high-risk areas, vaccination with an attenuated vaccine of cell-culture origin in the first few weeks of life and revaccination at 12–16 wk is often sufficient. Health of birds, extent of exposure, and type of operation determine the timing of vaccinations.

Because the infection spreads slowly, vaccination is often useful in limiting spread in affected flocks if administered when <20% of the birds have lesions.
Passive immunity may interfere with multiplication of vaccine virus; progeny from recently vaccinated or recently infected flocks should be vaccinated only after passive immunity has declined.

Vaccinated birds should be examined 1 wk later for swelling and scab formation/mild lesion ("take") at the site of vaccination. Absence of "take" indicates lack of potency of vaccine, passive or acquired immunity, or improper vaccination. Revaccination with another serial lot of vaccine may be indicated.
Check "takes" (a small swelling or scab at the inoculation site) 6 days post vaccination. Vaccination "takes" should be seen in 99 to 100% of vaccinated pullets. Vaccine reaction or "take." About 6 days post vaccination.
In high challenge areas, birds may need 2 vaccinations in the pullet stage; an early vaccination at 3 to 6 weeks of age and a second at 8 to 14 weeks of age. Additional vaccinations can be added, depending on the degree and time of challenge.

Naturally infected or vaccinated birds develop humoral as well as cell-mediated immune responses. Humoral immune responses can be measured by ELISA or virus neutralization tests.
Control

- Virus particles can be found in the environment and debris found in the poultry houses, thus dust control and disinfection of the environment are important. An effective insect control program should be in place.

- A biosecurity program to prevent the movement of equipment that could be contaminated with pox should be implemented.

- Vaccination is practiced based on history of exposure—revaccination, if necessary, can be done in the face of an outbreak because pox infections are usually slow spreading.
In the event of an outbreak, liquid iodine disinfectant (used for disinfecting water lines) added to the water appears to aid in reducing mortality.

Create a stock solution by adding 30 to 45 mL/L (4 to 6 oz/gallon) iodine disinfectant to water.

Add the stock solution to the water line through a medicator at a concentration of 8 mL/L (1 oz/gallon) drinking water.

Spray or fog the house with a disinfectant to reduce exposure.