Avian Pox

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Avian Poxvirus

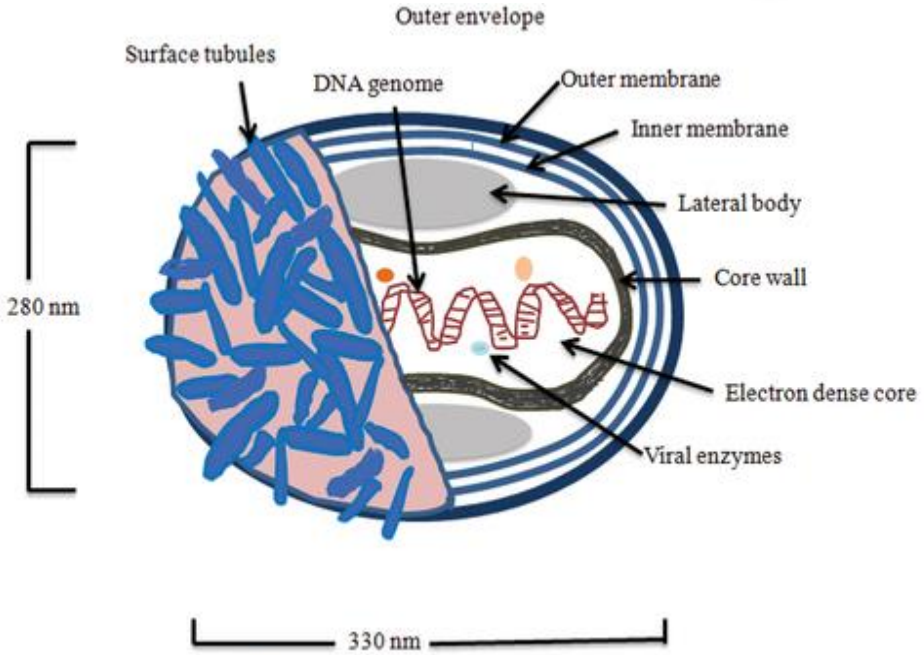
- **Fowl pox** is a worldwide viral infection of chickens and turkeys.
- Nodular lesions on unfeathered skin are common in the cutaneous form.
- In the diphtheritic form, which affects the upper GI and respiratory tracts, lesions occur from the mouth to the esophagus and in the tracheal mucosa.
- Diagnosis is by observing characteristic gross and microscopic lesions and by PCR assay to detect the fowl pox virus-specific genes. Vaccination can prevent the disease and limit spread in affected flocks.

Etiology of Fowlpox

- **The etiologic agent** of fowlpox is the fowlpox virus, the type virus of the genus Avipoxvirus in the family Poxviridae.

- **Classification of viral genome:** Fowlpox virus has a large (~ 300 kb), linear double-stranded DNA genome with a hairpin loop at each end, encoding > 200 genes (including for DNA polymerase).

- **Structure: Avipoxviruses** have complex, multilayered virions. The brick-shaped capsid measures ~330 × 280 × 200 nm and is enveloped by one or more membranes enclosing a biconcave core that contains the genome in a nucleoprotein complex

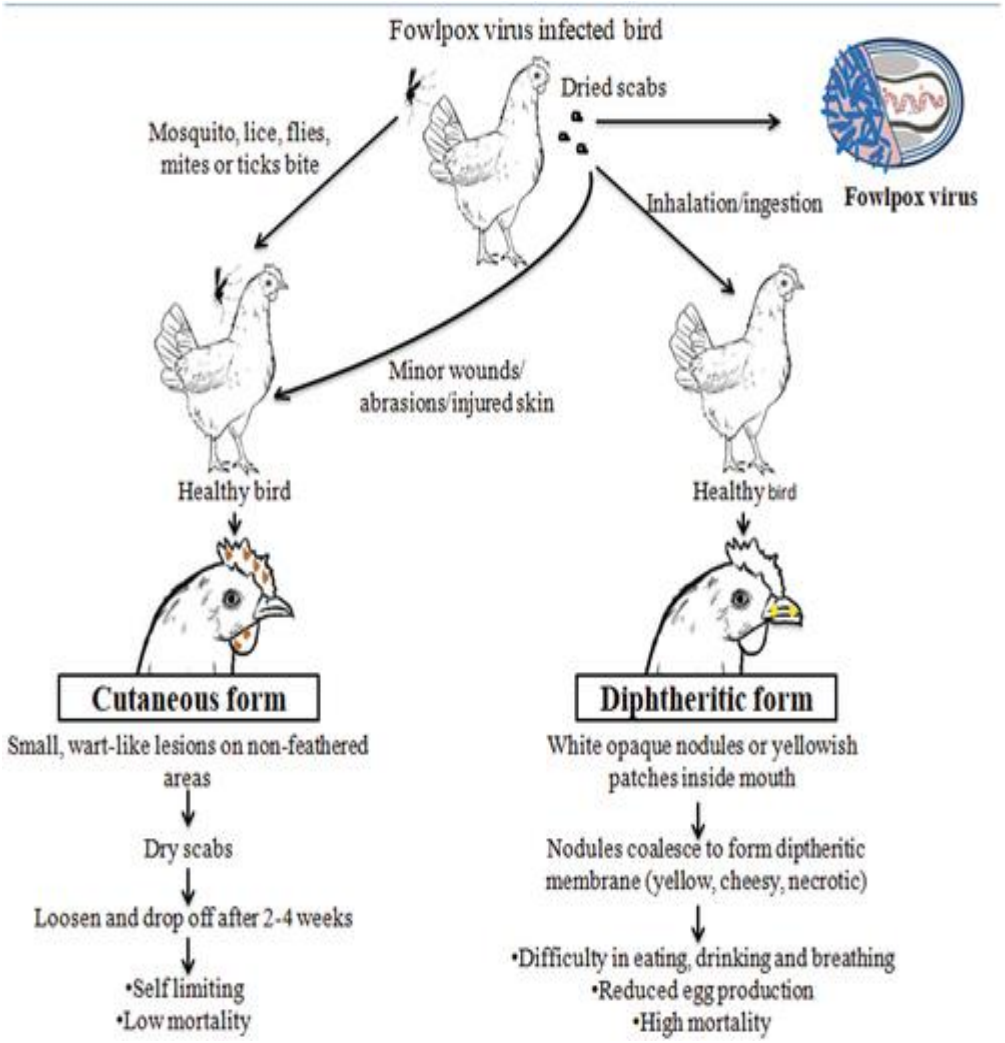


Epidemiology of Fowlpox

- **Incubation period:** The incubation period for fowlpox in chickens and turkeys is typically 4–10 days.
- **Morbidity and mortality:** Cutaneous infections alone ordinarily cause low or moderate mortality rates, and these flocks generally return to normal production after recovery. Mortality rates are usually high in diphtheritic or systemic infections by some virulent strains.
- **Geographic distribution:** Fowlpox is present worldwide.
- **Host range:** Fowlpox virus affects mainly chickens and turkeys and has been reported to infect ducks, geese, and canaries. Mammals are not susceptible to natural infection with fowlpox virus or any of other avipoxviruses.
- **Transmission:** The virus is usually transmitted by contact through abrasions of the skin.
- Skin lesions (scabs) shed from recovering birds in poultry houses can become a source of aerosol exposure for susceptible birds. Mosquitoes and other biting insects may serve as mechanical vectors. Transmission within a susceptible flock is rapid when mosquitoes are plentiful.
- 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.

Clinical Findings of Fowlpox

- Fowlpox occurs in different clinical forms. Fowlpox in chickens and turkeys is characterized by
- Proliferative lesions in the skin that progress to thick scabs (cutaneous form).
- Lesions in the upper GI and respiratory tracts (diphtheritic form).
- Virulent strains may cause lesions in the internal organs (systemic form).



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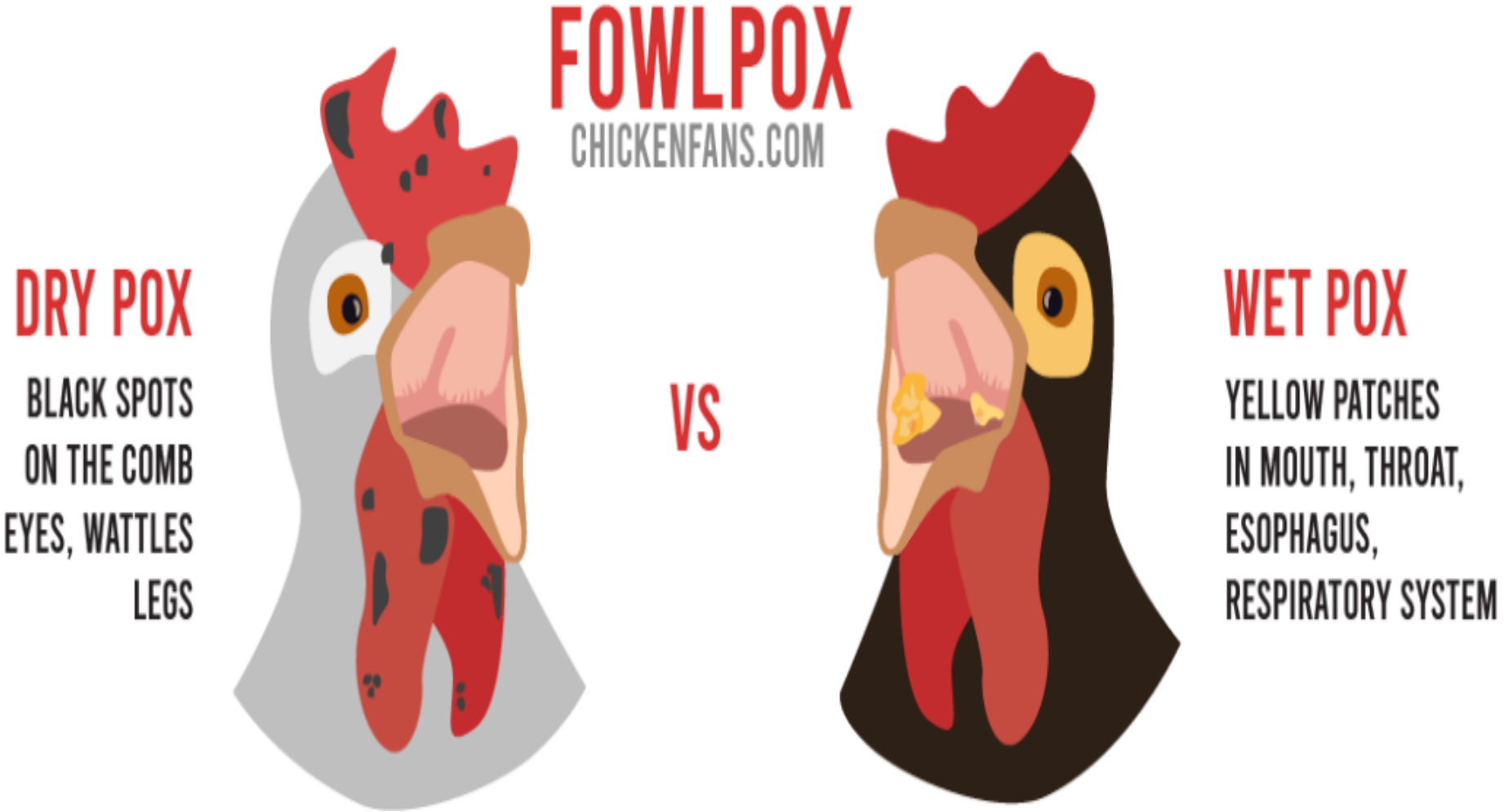

The cutaneous form

- The cutaneous form of fowlpox is characterized by nodular lesions on various parts of the unfeathered skin of chickens and on the head and upper neck of turkeys. Generalized lesions of feathered skin may also occur. In some cases, lesions are limited chiefly to the feet and legs.

- 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 in various stages of development may be found on the same bird.

The diphtheritic form

- In the **diphtheritic form** of fowlpox, lesions develop on themucous membranes of the mouth, esophagus, pharynx, larynx, or trachea (wetpox or fowl diphtheria). Occasionally, lesions occur almost exclusively in one or more of these sites.

- Caseous patches firmly adherent to the mucosa of the larynx and mouth, or proliferative masses may develop. Mouth lesions interfere with feeding. Tracheal lesions cause difficulty in respiration. Laryngeal and tracheal lesions in chickens must be differentiated from those of infectious laryngotracheitis, which is due to a herpesvirus that produces intranuclear inclusions.

The Systemic form

- In cases of **systemic infection** due to virulent fowlpox virus strains, lesions may be present in internal organs. More than one form of the disease (cutaneous, diphtheritic, or systemic) may occur in a single bird.

Diagnosis of Fowlpox

- **Characteristic** gross and microscopic lesions
- **PCR assay** for detection of the fowlpox virus-specific genes
- Cutaneous fowlpox infections usually produce characteristic gross and microscopic lesions. When only small cutaneous lesions are present, it is often difficult to distinguish them from abrasions due to fighting.
- **Microscopic examination** of affected tissues stained with H&E reveals **eosinophilic cytoplasmic inclusion bodies.** This is the most commonly used method in diagnostic laboratories.
- **The cytoplasmic inclusions** are also detected by fluorescent antibody and immunohistochemical methods (using antibodies against fowlpox virus antigens). The elementary bodies (Borrel bodies) in the inclusion bodies (Bollinger bodies) can be detected by light microscopy in smears. Viral particles with typical poxvirus morphology can be demonstrated by negative-staining electron microscopy as well as in ultrathin sections of the lesions.
- **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.

Treatment of Fowlpox

- **Vaccination**
- There is no specific effective treatment for birds infected with fowlpox virus; therefore, prevention is key. Disease control is best accomplished by vaccination.
- Where fowlpox is prevalent, chickens and turkeys should be vaccinated with a live-embryo- or cell-culture-propagated virus vaccine. The most widely used vaccines are
- live, attenuated fowlpox virus and pigeonpox virus isolates of high immunogenicity and low pathogenicity.

- **Management Practices:**
- Mosquito control
- Disinfection of feeders and birdhouses
- Quarantine of sick birds.

Thank you!

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