

# Avian Pox

## Def:

Fowl pox is an economically important slow-spreading viral infection of commercial poultry because it is associated with a drop in egg production and may cause mortality, clinically; fowl pox occurs in two forms cutaneous or dry form, discrete nodular proliferative skin lesions occur in the nonfeathered parts of the body.

## Etiology:

The virus belongs to **family** Poxviridae, **genus** Avipoxvirus

## Host Range:

- Many species of birds are susceptible to avian pox including domestic poultry (**chickens and turkeys**), pet birds, and more than 60 species of free-living birds.
- Avian pox occurs in **all age** groups of birds
- Avian pox does not represent a risk to human health

## Transmission:

The avian pox virus is usually transmitted **mechanically** to pen-mates through skin abrasions

- Humans can also inadvertently spread the virus through contact with infected poultry (via ocular infection) during vaccination regimens

- Mosquitoes, other flying insects, and parasites can serve as mechanical vectors.

- **In contaminated environments**, the dried virus can also become **aerosolized** and gain entry into birds' mucous membranes and respiratory tracts.

- The incubation time varies by species but is typically **4-10** days in chickens and turkeys

- **Morbidity** in chickens and turkeys varies from a few birds to an entire flock, depending on virulence and on the course of the disease may last approximately 2-8 weeks, during which time birds can lose weight and egg production may be retarded.

- **Mortality** is typically low, it may be as high as **50%** with virulent strains or if secondary infections complicate the disease.

## Clinical Signs

Clinical signs are somewhat variable depending on:

1-host species

2-virulence of the virus strain

3-distribution of lesions, and other complicating factors.

-The disease onset is often gradual in poultry and usually goes undetected until skin lesions are obvious. Only a few birds develop lesions at one time.

-In chickens and turkeys, signs may vary with **two** overlapping forms of the disease:

**1-Cutaneous (dry pox):** Common form in most outbreaks

- The dry form begins with a pimple or scab on nonfeathered areas of the skin such as the comb, wattles, eyelids, feet, and legs.
- The infection may spread to other feathered areas of the body (especially in turkeys).
- Infected birds often have difficulty eating and reduced feed intake and weight loss is common.
- Other signs may include drop in egg production, facial swelling, blindness (caused by ocular and periocular involvement) and loss of vigor.
- Mortality is usually low in uncomplicated cases, unless secondary infections become a problem.

## 2-Diphtheritic (wet pox): canker

-The wet-mucous form produces diphtheritic, **yellow canker** lesions on oral mucous membranes, tongue, esophagus, or trachea. Lesions in the upper digestive and respiratory tract may result in **inappetence** and **dyspnea**, respectively.

-Other mild to severe respiratory signs may also occur. Lesions in the eye and nasal cavity lead to oculonasal discharges.

-Mortality often results from suffocation or starvation.

Avian pox is generally associated with a **more chronic** condition in turkeys than in chickens.

## 3-Mixed form

Both Cutaneous and diphtheritic forms on one bird

## 4-Canary pox

- Systemic infection with high mortality(100%).

## Post-mortem Lesions

### Cutaneous (dry pox):

- This form is characterized by a local epithelial hyperplasia involving the epidermis and feather follicles.
- The nodules begin as small white foci, which rapidly increase in size and turn yellow.
- Within 5-6 days, papules develop and progress into vesicles. These vesicles may coalesce and turn grey to dark brown, with a rough wart-like texture.
- Within two weeks, the pox lesions develop inflammation and hemorrhage around their base.
- Over time, the lesions turn into scabs which eventually slough, often revealing a smooth scar.



## Diphtheritic (wet pox):

-This form is characterized by the development of white opaque nodules on the mucous membranes of the digestive and respiratory tracts, such as the oral cavity, tongue, larynx, esophagus, trachea, and sinuses.

- These nodules enlarge and coalesce into yellow diphtheritic membranes.

- If these diphtheritic membranes are removed, **bleeding erosions** will be found beneath the membranes. In some cases, birds may have a localized pox infection, with small nodules found on internal organs.

Birds may have a combination of both cutaneous pox lesions (typically involving the comb, wattles, and eye region) as well as diphtheritic lesions in the digestive and respiratory tracts.

# Diagnosis

**1-A presumptive** diagnosis can be made in the field based on characteristic skin lesions & signs.

**2-A confirmed** diagnosis should be by laboratory testing.

**Sample**--Collect and submit cutaneous and diphtheritic tissue lesions

1-The virus can be isolated in the chorioallantoic membrane (CAM) of chicken embryos inducing pock's lesions on CAM & nodules on embryo skin, susceptible birds, or avian cell cultures.

2- The presence of **cytoplasmic inclusions "Bollinger's bodies"** found on microscopic examination of stained with H & E affected tissue sections

**3**-Inclusions are also detected by **fluorescent antibody** and **immunoperoxidase** methods.

4-Field viruses can be detected in the laboratory by polymerase chain reaction (PCR) and can be compared by restriction endonuclease digestion.

**5**-Viral particles, with typical poxvirus morphology, can be detected by **electron microscopy**.

## Differential Diagnosis

For the cutaneous form:

- bacterial dermatitis should be ruled out.

- **Cutaneous lesions**, caused by pantothenic acid or biotin deficiency in young chicks

- by T-2 toxin could be mistaken for pox lesions.

### **-diphtheritic form**

when respiratory signs are present, rule outs must include diseases

- such as avian influenza and infectious bronchitis.

- The diphtheritic lesions may resemble signs of infectious laryngotracheitis. Histologic examination of poxvirus lesions will reveal epithelial hyperplasia with intracytoplasmic inclusion bodies; whereas, **laryngotracheitis**, caused by a herpesvirus, produces intranuclear inclusions.

- **In doves and pigeons**, diphtheritic pox lesions may be mistaken for lesions caused by *Trichomonas gallinae*, which is diagnosed by microscopic examination of smears or by culture.

# Prevention and Control

1-**Biosecurity and strict hygienic measures** due to the large DNA virus is highly **resistant and can survive in dried scabs** in the environment for months to years, infecting replacement birds.

## 2- Vaccination

- **Fowl pox and pigeon pox** live attenuated egg adapted or T.C adapted I/D vaccines are commonly used for immunization of chickens.
- **In laying** birds is performed around 4 weeks of age, following by a booster one or 2 weeks before the onset of egg production.
- **In Broilers** are only vaccinated at an early age in areas in which the disease is endemic. On average, immunity develops around two weeks post-vaccination.
- **Methods of Vaccination** are commonly applied by:
  - 1- chicken---- **wing-web** stabbing method and induces a mild form of the disease.
  - 2-turkey---upper thigh **scarification**
  - 3-pigeons---**brushing of feather follicle** "picking feather" by diluted pox vaccine
  - =chicken &turkey vaccinated by fowl &pigeon pox vaccine
  - =pigeon vaccinated only by pigeon pox vaccine
  - =**under stress must be vaccinated** by T.C adapted vaccine (more mild)or pigeon pox vaccine (less post-vaccinal reaction than fowl pox vaccine)
  - =**the same in case of outbreak** & found 1<sup>st</sup> few cases appear healthy &must be vaccinated

# Vaccinal take

## Def:

Post vaccinal reaction occur after vaccination of birds by 7-10 days in layers & breeder

## Description:

Reddens, swelling, hotness & scabs at the site of inoculation

## Indication:

-A "**take**" is a swelling of the skin or a scab at the site where the vaccine was applied and is **evidence of successful vaccination**.

Interpretation (at least examine 50 birds /house)

1-80-90% of birds /house ----successful vaccination

2-less than 70-75% ----revaccination

3-less than 40%---strict revaccination (no response)

=No treatment exists for birds infected with avian pox viruses.

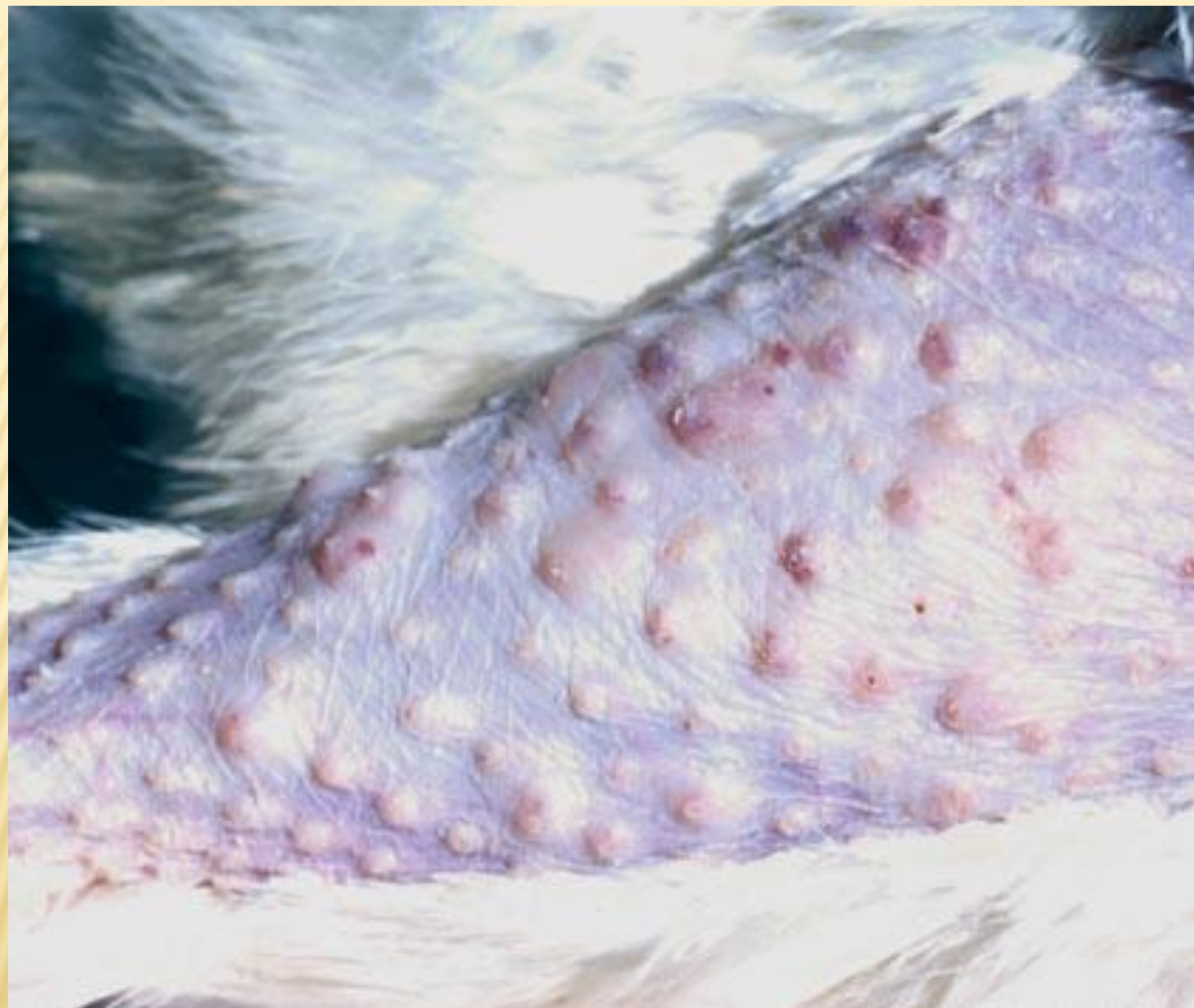
















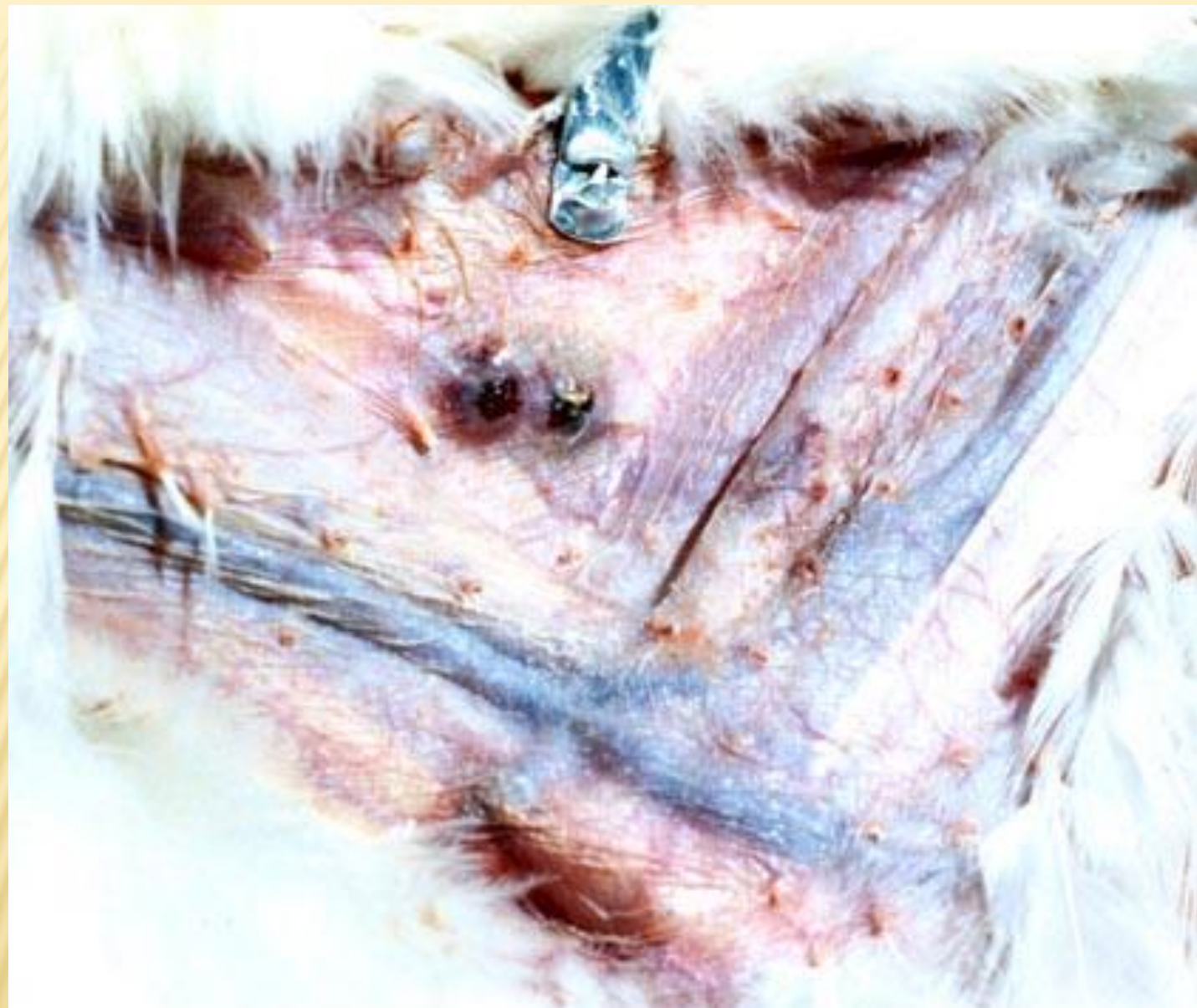














FOWL POX



# FOWL POX VIRUS

Plaques 6 days postinoculation

