

**1-Viral diseases**  
**NEWCASTLE DISEASE**  
**(ND)**

Is a viral disease of many species of birds characterized by marked variation in PM. Lesions due to variation of pathotypes.

If NDV caused by slightly pathogenic (lentogenic) strains of virus it produce few mortality.

NDV if caused by moderately pathogenic (Mesogenic) strains of virus and characterized by respiratory and CNS involvement with high mortality; in layers marked drop in egg production and bad quality with few or little mortality.

NDV if caused by the most pathogenic (Velogenic strain) this velogenic strain may be according to its tropism (Vicerotropic or Neurotropic). The disease is usually characterized by a short course, marked respiratory sings, diarrhea, and paralysis followed by death.

**Gross lesions of velogenic Newcastle disease.**

- 1) Severe inflammation of trachea and air sacs.
- 2) Hemorrhagic or necrotic focal lesions in the intestinal mucosa appear as circumscribed bluish red raised necrotic tissue easily to enucleated.
- 3) Hemorrhagic necrosis of cecal tonsils.
- 4) Hemorrhages on the mucosal surface of the proventriculus or in the gizzard.
- 5) Hemorrhages on the serous membranes, and the mucosa of the esophagus.

**Microscopical examination :**

- Neuronal degeneration, perivascular cuffing with lymphocytic cells and endothelial hypertrophy.

## **Infectious bronchitis** **(IB)**

Infectious bronchitis is an acute, highly contagious virus-caused disease of chickens characterized by respiratory signs, severe renal disease and marked decrease in egg production and bad egg quality.

**Cause** Coronavirus

### **PM. Lesions:**

- 1) There is mild to moderate inflammation of the respiratory tract. There may or may not be airsacculitis. Severe airsacculitis is manifested as a marked thickening and opacity of the air sac membranes and often is accompanied by much exudate in the air sacs. Older birds are usually more resistant.
- 2) The kidneys sometimes are swollen and the ureters and tubules contain uric acid crystals especially in young birds, including broilers.
- 3) Yolk material frequently is throughout the peritoneal cavity and the ovarian follicles appear flaccid. These lesions are not specific for IB but accompany many acute diseases of layers.
- 4) In layers that had IB or a severe vaccination reaction while less than two weeks old, there may be abnormalities of the oviducts in occasional birds. The oviducts may be hypoplastic or cystic and such birds may deposit yolk or fully formed eggs in the abdominal cavity and are referred to as internal layers.
- 5) Swollen bursa & occasionally hemorrhagic.
- 6) Congestion of pectoral, thigh & leg muscle.

## **Infectious bursal disease (IBD) Or (Gomboro)**

**IBD** is an acute, contagious viral disease of young chickens characterized by diarrhea, vent picking, trembling, incoordination, inflammation followed by atrophy of the bursa of Fabricius and by a variable degree of immunosuppression.

### **PM Lesions:**

- 1) Initially the bursa is enlarged to about twice normal size, severely edematous and reddened; it may contain

hemorrhages. The swelling reduce about the fifth day and the bursa atrophies rapidly from the eight day onward.

- 2)The intestine shows increase mucous in the lumen.
- 3)In field outbreaks, hemorrhages are common in thigh and pectoral muscles and, and perhaps at the junction of the proventriculus and gizzard.
- 4)The parenchymatous organs, especially the kidneys, may be swollen. The ureters may contain urates.

### **Microscopical lesions:**

- 1)In bursa there is lymphoid follicle depletion, cystic formation and destruction followed by atrophy.
- 2)The spleen showed similar changes like bursa.
- 3)Thymus and cecal tonsils showed the same changes but recover more rapid and completely than does the bursa.
- 4)The variant strain induce rapid bursal atrophy and severe immunosuppression.

### **Infectious laryngotracheitis** **(ILT)**

Infectious laryngotracheitis is an acute viral disease of chickens & pheasants characterized by marked dyspnea, coughing, gasping and expectoration of bloody exudate

**Cause:** Herpsvirus.

### **PM. Lesions:**

- 1)Severe laryngotracheitis, often with bloody exudate in the trachea. Inflammation may extend to the bronchi and air sacs.
- 2)Dead birds may have an occluding pseudomembrane or cheesy plugs in the trachea, death having occurred from suffocation.
- 3)Infected birds often have a bloody peak or blood on the face, head or feathers.
- 4)In less pathogenic outbreaks, mild conjunctivitis and sinusitis may be the only lesions.

### **Microscopical lesions:**

- Birds killed at the first few days of the disease reveal intranuclear inclusion bodies in epithelial lining the trachea.
- Desquamate necrotizing tracheitis.
- Hemorrhagic areas in the trachea & larynx.

### **Fowl pox (Avian pox)**

fowl pox is a slow spreading viral disease of chickens, turkey and other birds characterized by cutaneous lesions on unfeathered skin of the head, neck, legs and feet and/or by diphtheritic membrane in the upper digestive and respiratory tract.

**Cause:** Large DNA poxvirus.

### **Gross lesions:**

#### **1) Cutaneous lesions**

The reaction against poxvirus varied from mammals, it is mainly proliferative rather than exudative. Characterized by appearance of wart like papillae or nodules, on face and unfeathered areas, comb and wattles, which soon become dark brown and hard and rapidly dissciate. The ordinary lesions of pox in mammals (*Papule, Vesicles, Pastule and Scabs*) seldom appear in poultry.

#### **2) Diphtheritic**

Lesions are raised, buff to yellow plaques on *mucous membrans*. The lesions appear in mouth but may be present in sinuses, nasal cavity, conjunctiva, pharynx, larynx, trachea or esophagus.

Diphtheritic lesions often accompany cutaneous lesions but may occur alone in some birds.

## Avian viral tumours

### 1- Marek's

Marek's disease is a herpesvirus neoplastic disease of chicken characterized by infiltration of various nerve trunks and/or organs with pleomorphic lymphoid tissue.

#### Cause: Herps virus

#### Gross pathology:

For different lesions patterns are recognized

- 1) Gross enlargement of peripheral nerves.
- 2) Discoloration of the iris → fish eye dis.
- 3) Enlargement of feather follicles with reddening (Skin leukosis).
- 4) Visceral tumors involving the liver, heart, spleen, gonads, kidney, proventriculus and other organs or tissues.

*Visceral Viral tumors are the most frequent lesions, but combinations of lesion patterns are common.*

#### **Microscopical lesions:**

The lymphocytes are characterized by mixture of pleomorphic lymphocytes. A few of these probably a true tumor cells which carry T-Cell surface antigens and tumor associated antigen. Others are probably host cells reacting against viral or tumor antigens and represent both T- and B-cells.

### 2-Lymphoid leucosis

Lymphoid leucosis is a vertically transmitted retrovirus-caused, neoplastic disease of semimature or mature chickens characterized by a gradual onset in a flock, persistent low mortality rate with **neoplasia in the** bursa of fabricius with metastasis to many other internal organs, **especially** the liver, spleen and kidney.

#### Cause: Retrovirus

#### Gross pathology:

There are no unique external lesions.

- 1) Lymphomas are seen in many organs in chickens 16 weeks of age or older.
- 2) Liver, kidney, ovary and bursa of fabricius are commonly involved.
- 3) Lesions are neoplasms with white to gray in color.
- 4) Neoplasms are focal or diffuse.
- 5) If the bursa is incised, small nodular lesions can often be detected that would not otherwise be obvious.

**Microscopical lesions:**

The neoplastic cells in the tumors are uniformly lymphoblastic with pyroninophilic reaction.

**3- Reticuloendotheliosis**  
**(RE)**

Reticuloendotheliosis is a term used for a variety of syndromes caused by retroviruses.

Cause Retrovirus

**Gross pathology:**

- 1) **The Runting syndrome** is characterized by severe atrophy of the thymus and bursa of fabricius. The birds are immunosuppressed and may show lesions of intercurrent infections. Generally no tumors are noted but some birds may have enlarged nerves.
- 2) **The chronic lymphoma syndrome** is identical to all respects with lymphoid leukosis. Another different lymphomas are closely resembles Marek's disease and also occur as early as six weeks of age.

## Differential diagnosis of avian tumors

Feature	Marek's disease	Lymphoid leucosis
Age	6 weeks or older	Not less than 16 weeks
Symptoms	Frequently paralysis	Non-specific.
Gross pathology <ul style="list-style-type: none"> <li>• Neural enlargement</li> <li>• Bursa of fabricucs</li> <li>• Tumurs in skin muscle and proventriculus</li> </ul>	Frequent Diffuse enlargement or atrophy May be present	Absent nodular tumor usually absent
Microscopic lesions <ul style="list-style-type: none"> <li>• Neural involvement</li> <li>• Liver tumours</li> <li>• Spleen</li> <li>• Bursa</li> </ul>	Yes Often perivascular Diffuse Interfollicular tumour and/or atrophy of the follicle	No focal or diffuse often focal Interfollicular tumour.
Central nervous system	Yes	No
Lymphoid proliferation on skin and feather follicle.	Yes	No
Cytology of tumour	Pleomorphic lymphoid cells including lymphoblasts, small medium and large lymphocytes and reticular cells.	Lymphoblasts
Category of neoplastic lymphoid cells	T cells	B cells.

**Bacterial diseases**  
**1- Avian colibacillosis**  
**(E.Coli infection)**

Avian colibacillosis is an infectious disease of birds on which E.coli is the primary or secondary pathogen. Infections include *Hjarre's disease (coligranuloma)*, peritonitis, salpingitis, synovitis, omphalitis, and airsacculitis.

**Cause:**

**E.coli.** Three serotypes frequently have been identified in disease outbreaks. In the intestinal tract of normal poultry non-pathogenic serotypes are present.

**Pathogenesis:**

E.coli is present in the intestine of birds and is disseminated widely in feces. Birds are continuously exposed through contaminated feces, water, dust and environment. Any time a bird's resistance to disease is impaired, pathogenic or facultative pathogenic strains may infect the bird.

**Gross pathology:**

*A variety of lesions* were observed in cases from which E.coli has been isolated.

**1) Airsacculitis:**

Lesions may accompany **dusty litter**, follow **vaccination** or infection with *Mycoplasma, IB, NDV, and ILT*.

Lesions in this type are characterized by thickened air sacs which instead of being thin and glistening become thick, dull, and opaque. In severe cases caseous material in the air sacs are present. There is often accompanied adhesive pericarditis and fibrinous perihepatitis.

**2) Omphalitis: (Navel infection)**

In recently hatched chickens the navel is swollen, inflamed and the birds feel wet. Abnormal yolk material and peritonitis are seen.

**3- Acute septicemic picture ( Coli septicemia)**

Is an acute septicemic diseases caused by E.coli resembling fowl typhoid and fowl cholera. Characterized by sudden



deaths, variable morbidity and mortality. Parenchymatous organs are swollen with congested pectoral muscle. Liver is green and may have small necrotic foci. Petechial hemorrhages pericarditis, and peritonitis.

#### 4- **Enteritis**

There is diarrhea. At necropsy there is enteritis, -often with excessive mucous. The feeding of E.coli with mild Eimeria burnetti infection will result in severe hemorrhagic typhlitis.

#### 5- **Salpingitis**

This form may occur following entry of coliform bacteria from the vagina of in laying hens. Affected birds usually die during first six **monthes** post-infection and never lay. The oviduct is distended with exudate that may be cheesy and of foul odor.

#### 6- **Coligranuloma. (Hjarre's disease)**

Appear as sporadic cases in adult chickens as nodules (granulomas) occur along the intestinal tract, mesentery and in the liver. Spleen is not involved. The lesions resemble those of tuberculosis.

#### 7- **Synovitis and arthritis**

Affected birds are lame or recumbent. There are swelling of one or more tendon sheath or joint.

#### 8- **Panophthalmitis**

#### 9- **Pericarditis**

Most serotypes of E.coli, after a septicemia cause pericarditis.

## **2- Avian salmonellosis** **Pullorum disease.**

White Diarrhea; Bacillary white diarrhea; BWD

Pullorum disease is an infectious, egg transmitted disease of poultry, characterized by white diarrhea and high mortality in young birds and by asymptomatic adult carrier.

**Cause** Salmonella pullorum.

**Gross pathology**

**Adults:**

Often there are no lesions. Occasionally there is nodular myocarditis, pericarditis or abnormal gonads. Ovary may be hemorrhagic, atrophic or discolored follicles. Oviduct

impaction, peritonitis and ascites, atrophic testes.

### **In very young birds**

- Birds died after short septicemic course. Dead birds feel wet. **Many** birds have pasted white feces in the vent area.
- Classically there are gray nodules in one or more of the following sites: *Lungs, liver, gizzard wall, heart, intestinal or cecal wall, spleen and peritoneum.*
- Petechial hemorrhage or foci of necrosis in the liver.
- Joints may be swollen in some birds.
- When the intestine is opened white plaques may be found in the intestine or ceca.
- Spleen frequently enlarged
- Ureters frequently distended with urats.
- Unabsorbed yolk sac

### **Fowl Typhoid**

It is an infectious disease, primarily of chickens and turkeys with many of the lesions that occur with pullorum disease.

**Cause: Salmonella gallinarum.**

Gross **pathology**

#### **1- In'chickens and young poults**

Lesions of fowl typhoid and pullorum are similar in chickens and young poults.

#### **2-Lesions of acute fowl typhoid in older birds**

- Bile stained ("Bronzed") enlarged liver with or without small necrotic foci.
- Enlarged spleen and kidneys.
- Pall carcass with thin watery blood.
- Enteritis in the anterior small intestine, often with ulceration.

**3- Lesions in older birds (*Chronic fowl typhoid*),. Resembles those seen in pullorum disease.**

### **3- Fowl cholera**

#### **Pasteurellosis**

Is an infectious disease of poultry appears as an acute septicemic disease with high morbidity and mortality. A chronic form (Localized) form occurs follow an acute form or independently.

**Cause:** *Pasteurella multocida*.

#### **Gross lesions:**

1- In peracute form:

- Lesions may be absent, but petechial and ecchymotic hemorrhages on heart, under serous membranes and mucous membranes of gizzard and or abdominal fat.
- Duodenitis.

2- In acute form:

- Lesions appear as disseminating intravascular coagulation of blood (Thrombi).
- In layers and breeders hens, free yolk in the peritoneal cavity. Acute oophoritis with regressing follicles and acute diffuse peritonitis. (NB. These lesions may accompany many other acute diseases).
- Diffuse streak hemorrhages of the liver. With or without small necrotic foci in the liver (Corn meal liver).

3- In chronic form:

- Localized chronic inflammatory lesions involve joints, tendon sheath, wattle edema and abscess, conjunctival sac, infraorbital sinus, and the nasal turbinate.
- Lung sequestration mainly in turkeys.

### **4- Infectious coryza**

#### **(Coryza)**

Is an acute and subacute disease of chickens characterized by conjunctivitis, oculonasal discharge, swelling of infraorbital sinuses, edema of the face, sneezing and sometimes by infection of the lower respiratory tract.

**cause** *Hemophilus paragallinarum*

## **Gross lesions**

- 1-There is catarrhal inflammation of nasal passages and sinuses and nasal discharge often is apparent. One or both infraorbital sinuses may be distended with exudate.  
( **NB.** *Similar distention can occur with localized fowl cholera, Pox, Vit.A deficiency and staph.infection.*)
- 2-Conjunctivitis, with adherence of eyelids with accumulation of cheesy exudate.
- 3-Edema of the face and wattles, and in complicated cases there is tracheitis, pneumonia and airsacculitis.

## **5- Mycoplasma Gallisepticum Infection**

### **Chronic respiratory disease (CRD)**

Is a respiratory disease of chickens and turkeys, characterized by respiratory signs and lesions and prolonged course in the flock.

Cause *Mycoplasma galisepticum*.

The organism is often associated with one or more of the following agents and these associations enhance pathogenicity.

***Infectious bronchitis, Newcastle disease, E.coli, pastuerella multocida and hemophilus para gallinarrum.***

In chickens the organism may be present and cause no disease until triggered by stress (*Changes in housing, management, nutrition, weather, vaccination, other infection, and increase level of dust or amonia in the environment*).

### **Gross pathology**

- 1-Poor physical condition and loss of weight are usually apparent and suggest the presence of chronic disease.
- 2-Catarrhal inflammation of the nasal passages, sinuses, trachea, and bronchi.
- 3-Air sacs often are thickened, opaque and contain hyperplastic lymphoid follicles in their wall it often contains slimy or cheesy exudate. (***Recent vaccination against NDV, or IB may enhance the opacity of air sacs.***)
- 4-The classic lesions of the disease are **Airsacculitis**, **Fibrinous perihepatitis** and **Adhesive pericarditis**.

### **Mycotoxycosis**

Mycotoxycosis is a disease caused by toxic fungal metabolite. Poultry mycotoxycosis are usually caused by fungi that colonize and invade grains and feeds, and the environmental factors as high humidity play role in aggravating toxin production.

### **Aflatoxycosis**

Is a primary disease of liver with important ramifications for other body systems, which may ultimately cause production problems and mortality. Affected birds have reduction in growth, carcass pigmentation, and immunosuppression. The disease may be fatal. Aflatoxin B1 is a potent, naturally occurring carcinogen and thus has special public health consideration.

**Aflatoxins are mostly Hepatotoxic.**

#### **Gross pathology**

- Jaundice and generalized edema.
- Hemorrhages.
- Tan yellow discoloration of liver.
- Swelling Of kidneys.

#### **Microscopically**

- Necrosis of hepatocytes with areas of fatty changes.
- Hyperplasia of bile ducts with billiary cirrhosis.

### **Ochratoxycosis**

Is a Mycotoxin in feeds contaminated with toxogenic strains of *Penicillium viridicatum*. The fungi produce ochratoxin and citrinin and both are nephrotoic.

#### **Gross pathology**

- Reduction in weight gain.
- Hepatotoxicity with degenerative changes in the liver.
- Nephrotoxicity in kidneys.
- Visceral gout. And dehydration.

**Ochratoxin is mostly nephrotoxic**

## Coccidiosis

Avian coccidiosis is a protozoal disease of poultry characterized by diarrhea and enteritis.

Cause Different species of *Eimeria*.

### **Gross pathology**

#### **1- Those affect the anterior one third of the intestine,**

##### **Cause *Eimeria acervulina***

##### **Gross pathology**

- Enteritis in the anterior one third of the intestinal tract.  
(NB. This location is also favored by 4 less pathogenic species)
- In severe cases lesions may extend further down the tract.
- Enteritis may be mild or severe and can lead to thickening of the mucosa.
- Transverse white to gray striation (plaques) are often visible in the mucosa but may go unrecognized if they coalesce.
- Oocysts in mucosa' scrapings are moderate in size and egg shaped.
- This type of coccidiosis occurs rather frequently in older birds.

#### **2- Those affect the middle one third**

##### **a) Cause *Eimeria necatrix***

##### **Gross pathology**

- It may affect the intestinal tract in severe cases.
- Congestion, hemorrhages, necrosis and white to yellow foci (very large chizonts), and petechial hemorrhages may be seen through the serosa.
- Oocyst may be developed only in the ceca.
- It is a severe pathogen with high mortality.

**b) Cause *Eimeria maxima***

**Gross pathology**

- Mild to severe enteritis in the middle one third of the intestine.
- **Thickening of the intestinal wall** and marked dilatation.
- Bloody intestinal content.
- Very large oocysts, often with golden color.

**3 Those affect the posterior one third**

**a) Cause *Eimeria burnetti***

**Gross pathology**

- Fibrinous or fibrinonecrotic mass of debris may cover the affected mucosa.
- Presence of caseous cores in the cecum or rectum.

**b) Cause *Eimeria tenella*.**

**Gross pathology**

- Marked typhlitis with occasional involvement of the adjacent areas of the intestine.
- Blood appear in ceca and feces in early cases.
- Cheesy cecal cores may be found.