

ADENOVIRUS INFECTIONS

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DISEASES

ADENOVIRUS INFECTIONS

AVI are group of infections caused by a members of avian adenovirus group in many species of poultry. By respiratory, enteric, hepatitis, splenomegally, hydropericarditis, anemia, mortality, drop in egg production and immunosuppression.

Member of this family caused disease condition or sharing others in inducing syndrome or act as helper virus for tumor

Family Adenoviridae

- Genus Aviadenovirus: **Group I Avian Adenoviruses**
 - **Fowl Adenovirus** - 12 Serotypes / 5 Species
 - Inclusion Body Hepatitis (IBH)
 - Hydropericardium Syndrome (Angara Disease)
 - Gizzard Erosion and Proventiculitis
- Genus Siadenovirus: **Group II Avian Adenoviruses**
 - Hemorrhagic Enteritis (turkeys), Marble Spleen Disease (pheasants), Splenomegaly (chickens)
- Genus Atadenovirus: **Group III Avian Adenoviruses**
 - Egg Drop Syndrome (EDS)

VIRUS

Adenoviruses are double stranded DNA , enveloped , grow in cell nucleus with intranuclear inclusion. AVs not agglutinate generally chicken RBCs; Except EDS and Quail bronchitis who agglutinate rat and human O type .

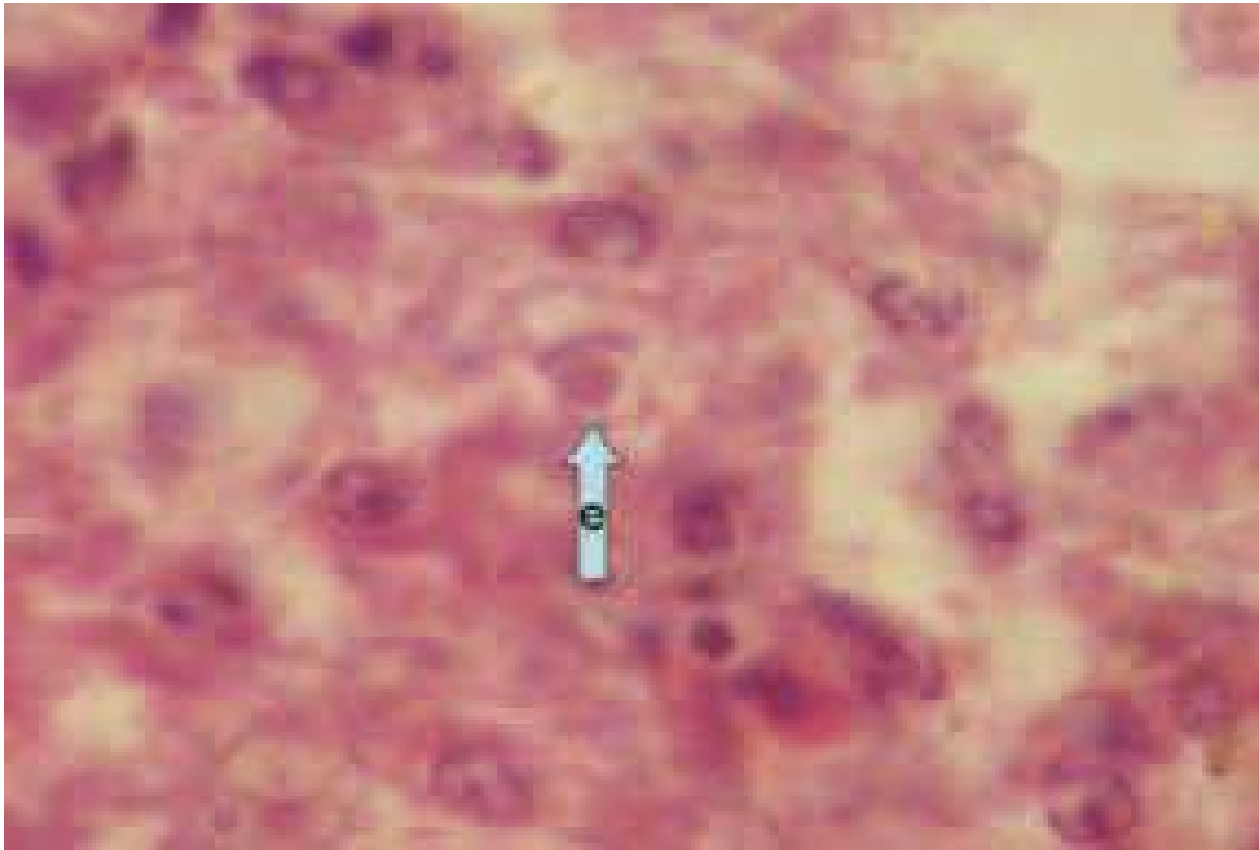
LAB.HOST:

E.C.E.: AVs grow on all sac → Serial passage → curling & Dwarfing, death, stunted hepatitis, splenomagaly, congestion and hemorrhages in all parts . Hepatocytes have Basophilic or eosinophilic inclusion body .

TISSUE CULTURAL(TC): It is useful to use homologous

It is useful to use homologous cell to examine host sample.

Basophilic or eosinophilic inclusions .



Transmission and epidemiology:

- ❖ AVs transmitted through both **vertical** and **horizontal** routes.
- ❖ Infection can remain **latent** for at least one generation in SPF.
- ❖ Virus present in feces, tracheal, nasal and kidney mucosa i.e. all secretions.
- ❖ Newly hatched chicks induce higher virus secretion.
- ❖ Broiler: 1st wave of excretion between 4-6 ws. Layer: 1st 5-6 ws till 15 ws & 2nd wave of virus excretion around peak of egg production due to **stress of production and SEX hormones**.

INCLUSION BODY HEPATITIS

DEFINE:

characterized by sudden onset of mortality peaking after 3–4 days and usually stopping on day 5 but occasionally continuing for 2–3 weeks. Morbidity is low; sick birds adopt a crouching position with ruffled feathers and die within 48 hours or recover. Mortality may reach 10% and occasionally as high as 30%.

PUBLIC HEALTH SIGNIFICANCE

- There is no evidence of productive infection of human cells by subgroup 1 viruses, and therefore any public health implications are likely to be minimal.

INCIDENCE AND DISTRIBUTION

•Subgroup I avian adenoviruses are distributed widely throughout the world, and domestic avian species of all ages are susceptible.

•**IBH** normally is seen in meat-producing birds at 3–7 weeks of age, but it has been reported in birds as young as 7 days old, and as old as 20 weeks. There is evidence that in an integrated broiler operation, disease occurs in chickens from certain breeder flocks

NATURAL AND EXPERIMENTAL HOSTS

•Chicken adenoviruses are ubiquitous in fowl populations.

TRANSMISSION

- **Vertical transmission is important in the spread of adenoviruses.**
- **Horizontal spread of virus is also important. Virus is present in feces, the tracheal and nasal mucosa, and kidneys. Therefore, virus could be transmitted in all excretions, but highest titers are found in the feces.**
- **Virus may also be present in the semen, presenting a potential risk where artificial insemination is used.**

INCUBATION PERIOD

- **The incubation period is short (24–48 hours) following infection by natural routes.**
- **IBH has been reproduced by inoculating day-old chicks by nasal and ocular routes with 24 isolates belonging to serotypes 6, 7, and 8.**

CLINICAL SIGNS

- Birds usually found dead
- Shanks and comb become very pale
- Reduced growth rate.

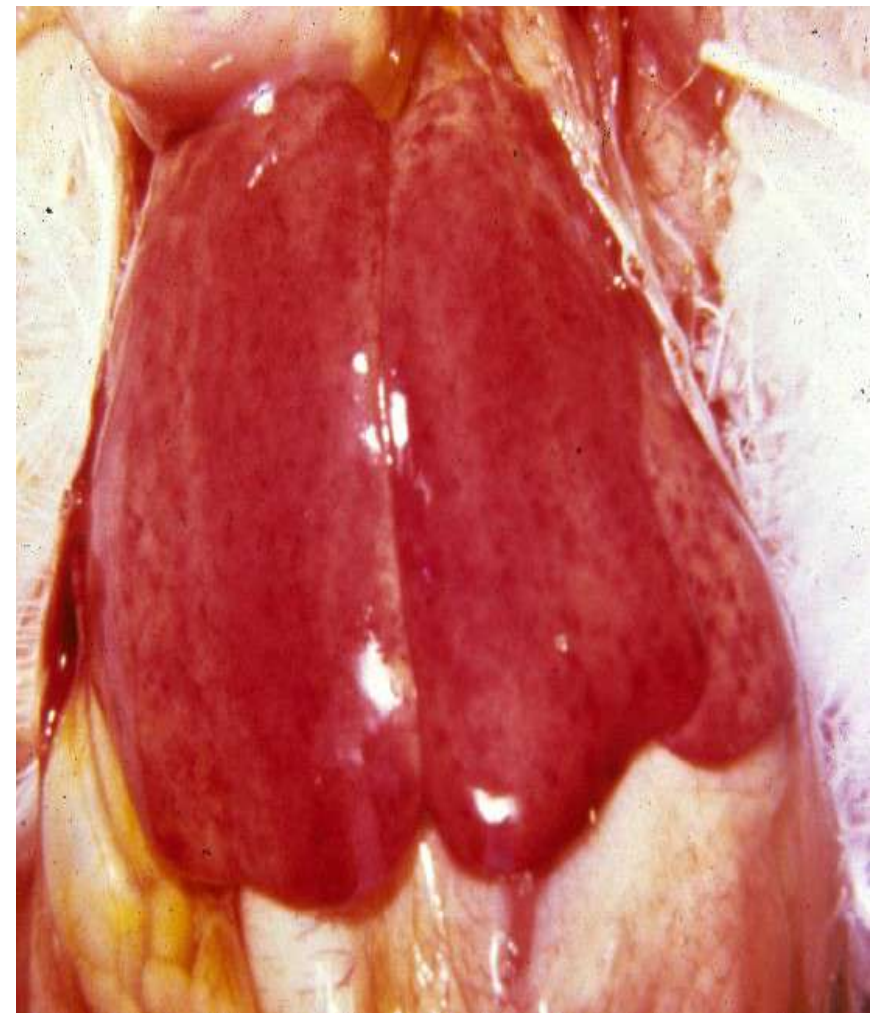


PATHOLOGY

GROSS LEIONS:

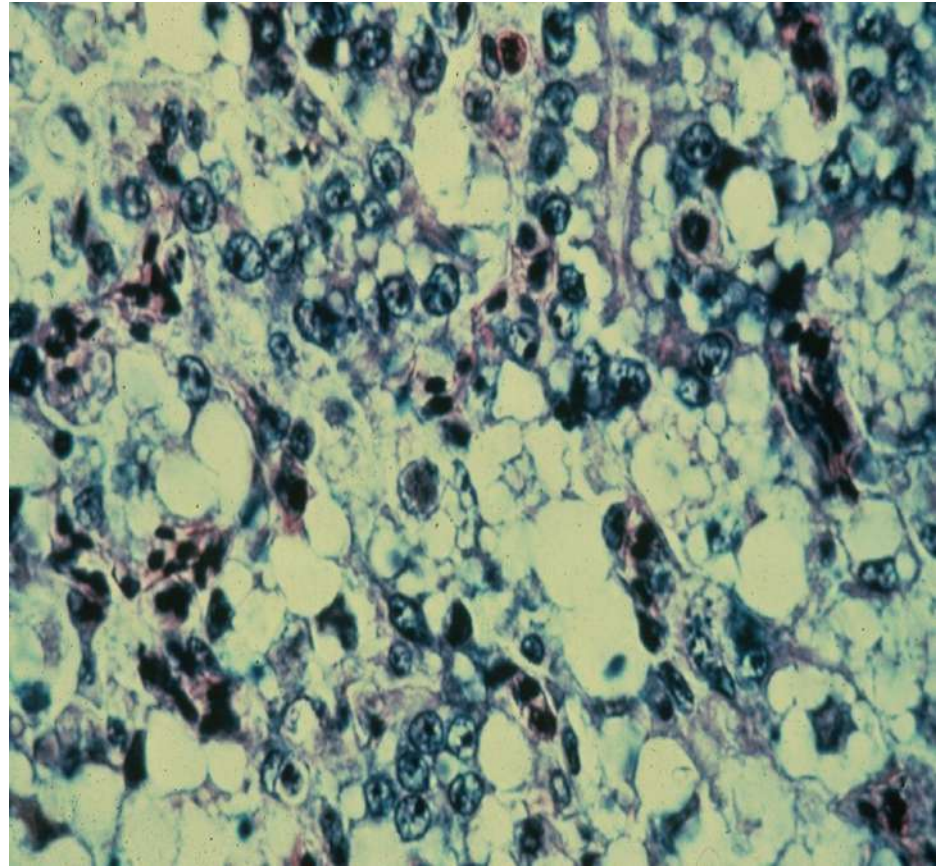
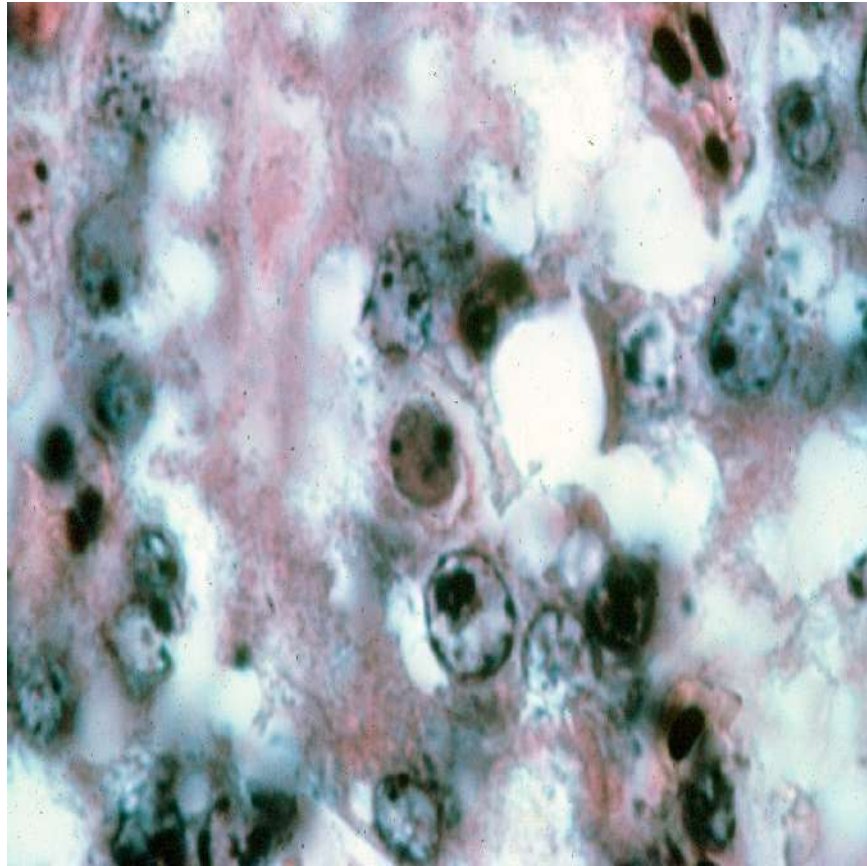
1. Livers swollen, mottled with subcapsular stellate hemorrhage.
2. Soft liver parenchyma.
3. Kidneys swollen and pale with some hemorrhage.
4. Bone marrow very pale.
5. Small bursa of Fabricius.
6. yellow, mucoid droppings due to excess bile acids.
7. lethargy huddling, ruffled feathers





MICROSCOPIC:

- **Kidney**
- Congestion, hemorrhage and nephrosis
- **Liver**
- Vacuolation of hepatic cells due to fatty changes
- Scattered areas of necrosis with focal areas of lymphocytes.
- Basophilic and eosinophilic intranuclear inclusion bodies – very numerous, inclusions surrounded by a clear halo



HYDROPERICARDIUM SYNDROME

Define:

In 1987, a new condition—Hydropericardium Syndrome or Angara disease—was recognized in Pakistan, and within one year it had devastated the national broiler industry in Pakistan. The disease subsequently was recognized in India, Kuwait, Iraq, Japan, and very severe form of IBH was diagnosed in South and Central America and Mexico.

Incidence and Distribution

- the only differences between hydropericardium syndrome and IBH is that the mortality rate and incidence of hydropericardium is higher in the former disease. It caused between 20 and 80% mortality, with very low morbidity. Typically, mortality starts at 3 weeks, peaks for 4–8 days in weeks 4 and 5, and then declines.**
- Hydropericardium syndrome also occurs in breeding and laying flocks, with lower mortality rates.**

Grosse lesions:

•In broiler 3-7 weeks, there is an accumulation of clear straw-colored fluid in the pericardial sac, pulmonary edema, swollen and discolored liver, and enlarged kidneys with distended tubules showing degenerative changes. Mortality can reach 70%.

Enlarged and mottled Spleen.

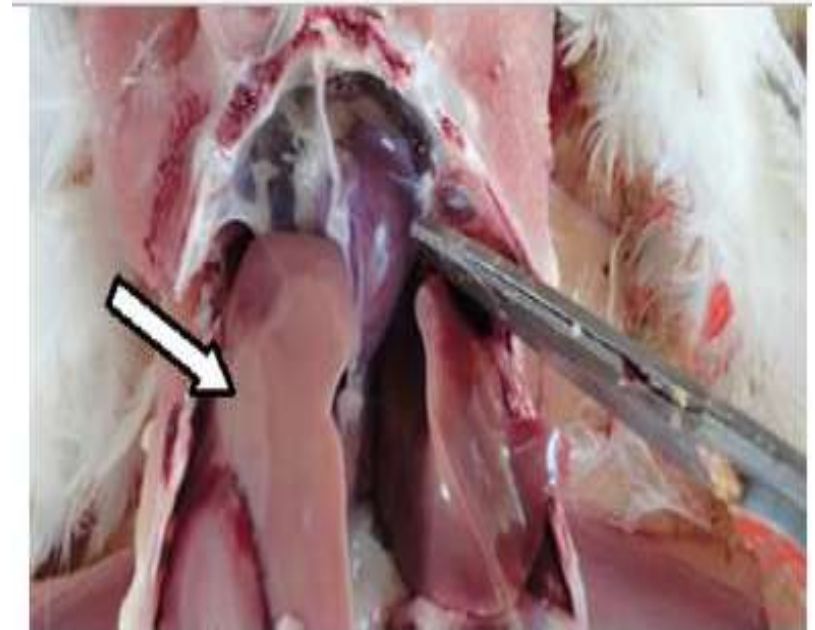


Fig.1. Broiler chicken with hydropericardium and hepatitis. The liver is pale, enlarged and discolored.

**accumulation of clear straw-colored fluid in
the pericardial sac**



Histological examination:

- **Multiple areas of focal necrosis exist with mononuclear infiltration in the heart and liver.**
- **Basophilic inclusions are present in the hepatocytes**

Diagnosis

1. Histopathology

- **Basophilic and eosinophilic intranuclear inclusion bodies – very numerous, inclusions surrounded by a clear halo**

2. Viral Isolation

Need SPF eggs. Some embryos will have liver lesions grossly and microscopically

3. By PCR.

Treatment and Prevention of IBH and

HHS:

****There is no treatment.**

1. Antibiotics may help prevent secondary bacterial infections. (Broad spectrum antibiotics) and vitamin fortification will diminish the mortality rate.

2. Vaccination with inactive vaccines at one day subcutaneous or intramuscular injection.

3. Decontamination of premise