*Infectious Bronchitis IB

Infectious bronchitis (IB) is an acute highly contagious viral disease of respiratory and urogenital system of chickens affecting both broilers and layers at all ages. It causes significant economic losses to the poultry industry worldwide. The disease was first identified in North Dakota, USA, when reported a new respiratory disease in young chickens. Since then, IBV has been recognized widely, especially in countries with large commercial poultry populations.

Etiology

IB is caused by Gamma corona virus genus in the family Coronaviridae, it contains a single-stranded RNA an enveloped virus Three virus-specific proteins have been identified; Structural proteins include from the Envelope protein[E], Matrix protein [M], and Nucleocapsid protein [N], its rapid spread and a notable capacity to modify its genome both by spontaneous mutation and genetic recombine Corona virus characterized by fairly labile (fragile), being easily destroyed by disinfectants, sunlight, heat and other environmental factors. Several strains of IB virus have a strong affinity for the kidney (Nephropathogenic strains). These strains may cause severe renal damage.

History

The disease was first described in 1931 in a flock of young chickens in the United States. Since that time, the disease has been identified in broilers, layers and breeder chickens throughout the world. Vaccines to help reduce losses in chickens were first used in the 1950s.

Host Susceptibility.

All domestic fowl (Gallus gallus) pheasant, peafowl, turkey, geese, pigeon, penguins , quail, duck, and Amazon parrot are considered to be natural hosts for IBV.

Incubation Period

Generally the short incubation period for IBV varies with infective dose and route of infection. For example, while infection via the tracheal route may take a course as short as 18 hours, ocular inoculation leads to an incubation period of 36 hours .

Infection and Transmission.

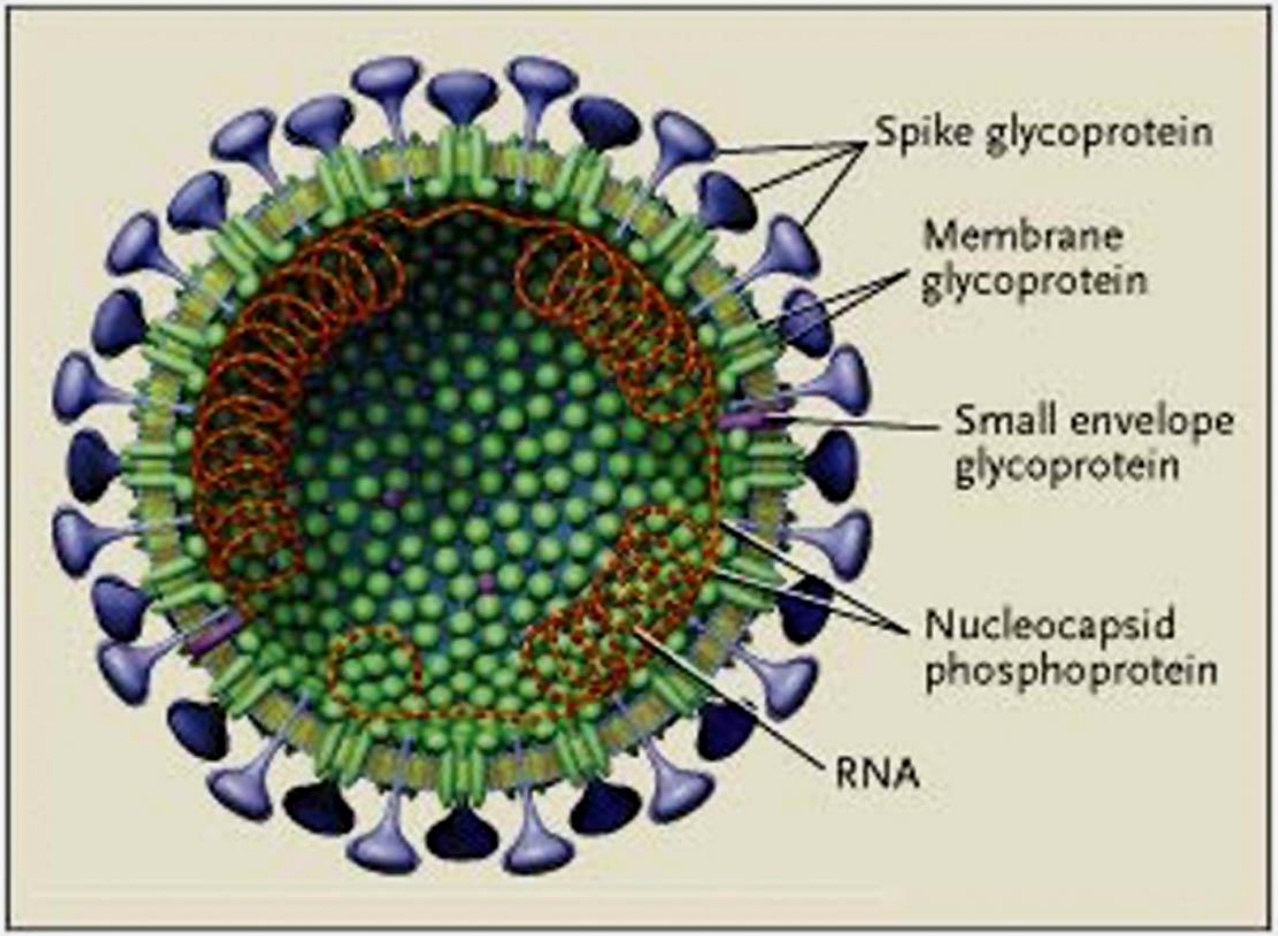
1.The virus is transmitted via the respiratory secretions, as well as faecal droplets from infected poultry.

2. Contaminated objects and utensils may aid transmission and spread of the virus from one flock to another.

Morbidity and Mortality.

Mortality rate may range from 25 to30% in young chicks but may increase to 80% as a result of factors that are host-associated (age, immune status), virus-associated (strain, pathogenicity, virulence, and tissuetropism), or environmental (cold and heat stresses, dust, and presence of ammonia). Secondary bacterial infections (E. coli) or coinfection with immunosuppressive viruses such as Marek's disease virus, infectious bursal disease virus (IBDV). Generally, nephropathogenic IBV strain causes high mortality, compared with strains infecting only the respiratory or reproductive systems .

Schematic drawing of SARS coronavirus



Source: Drazen JM[14]

Clinical Signs—Chicks

1.Coughing, sneezing, tracheal râles, nasal discharge, and frothy exudate in the eyes.
2.Affected chicks appear depressed.

Clinical Signs—Chickens

1.Coughing, sneezing and tracheal râles may be observed.

2.False layer

3.A drop in egg production of 5 to 10% lasting for 10 to 14 days is commonly reported, if complicating factors are present, production drops may be as high as 50%.

4. Dullness with ruffled feathers .

5. The oviduct have been show shorten and misshapen..

6.Eggs produced following infection may have thin shells, rough or irregular shells or soft, misshapen, with watery albumen.

7. Loss of pigment in brown-shelled eggs is common.

8.In severe complicated cases, chickens may develop airsacculitis.

9.Kidney damage that progresses to urolithiasis.

Lesions

1.If complicating factors are present, airsacculitis with deposition of fibrinous exudates on air sacs,

2. Congestion with oedema of the lungs, and Kidney damage may be significant following infection with nephropathogenic strains.

3.Kidneys of affected chickens will be pale and swollen to urate crystal deposition in the kidney parenchyma and in the ureters and visceral uricosis .

4. Urate deposits may be observed on the viscera.

5.Laying chickens may have yolk material in the body cavity and developing yolks in the ovary may be flaccid.

6.Infection of very young chicks may result in the development of cystic oviducts.

7.Fibrinous exudates were also seen on the heart and liver.

8. The proventriculus consisted of the thickening of the wall, in some cases associated with proventricular congestion at the point of emergence of the glandular ducts (papilla) .

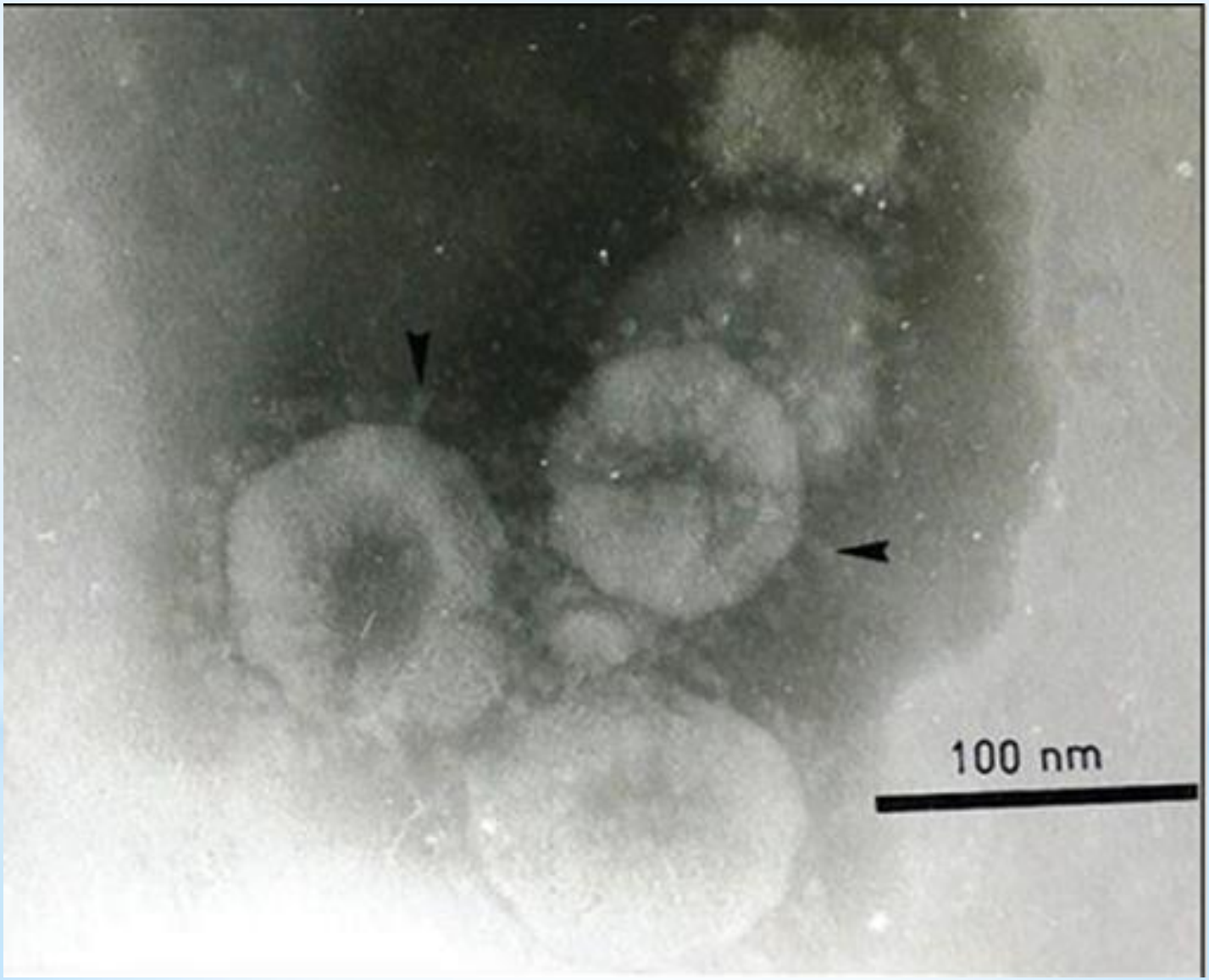
* **Histopathological changes**
* 1. Loss of cilia.
* 2. Infiltration lymphocytes between epithelial cells .
* 3. Presence of Russell bodies in Harderian cells has been observed following infection with IBV serotype .
* 4.Interstitial nephritis, tubular degeneration, and infiltration by heterophils.
* 5.In some cases, necrotic proximal and dilated convoluted tubules are filled with urates and casts.
* 6. Oedema of Bowman's capsule and granulocytic infiltration has been reported in the collecting ducts and spheroids .

* **Diagnosis**
* 1.Clinical signs and lesions.
* 2.Serologic tests like Enzyme Labeled ImmunoSorbent Assay (ELISA), virus neutralization, and haemagglutination inhibition (HI).
* 3. Isolation and identification of the virus. If tissue samples are to be collected, recommended tissues are trachea, kidney, proventriculus, tonsil, and oviduct, or swabs. Place the samples in sterile, tightly sealed plastic specimen bags contain buffered solutions of media or PBS, and transported to the laboratory on ice for further processing typically this is done in by inoculated extracted fluid in the specific pathogen-free chicken embryos at 9 to 11 days of incubation by the allantoic sac route of inoculation.
* **Control**
* 1.Prevention of IB is best achieved through an effective biosecurity program.
* 2. Vaccinated with modified live vaccines to provide protection.
* 3.The multiplicity of serotypes identified in the field presents a challenge in designing an effective vaccination program.
* 4. Both killed and live attenuated vaccines are used for immunization against IB. Vaccination administrated at age one day old.

Clinical signs FO R

IB

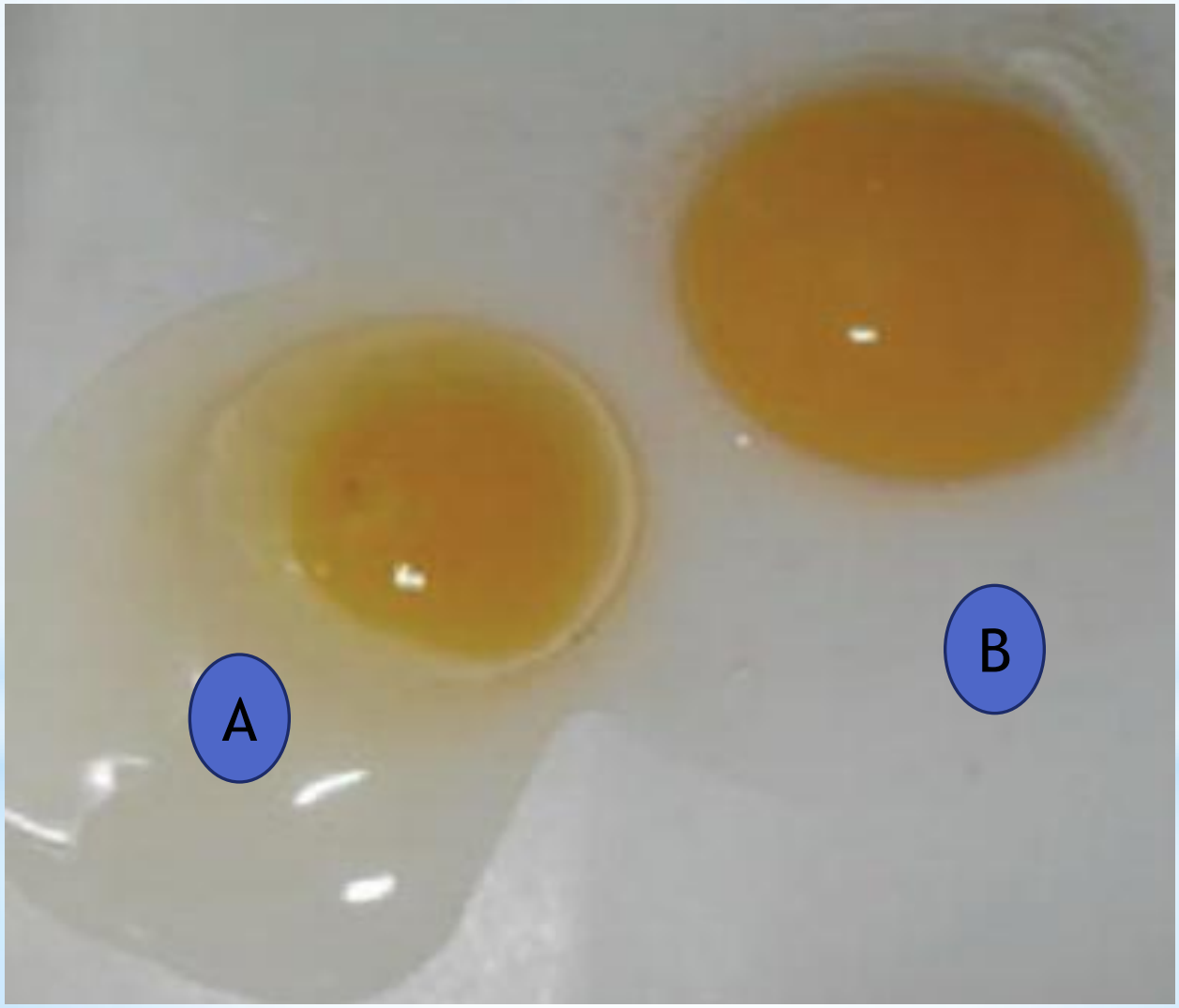
* Negative staining electron microscope showing spherical shape of virus with typical spike projections (arrow) surrounding the virion of avian infectious bronchitis virus .



Dullness exhibited in chickens infected with IBV.

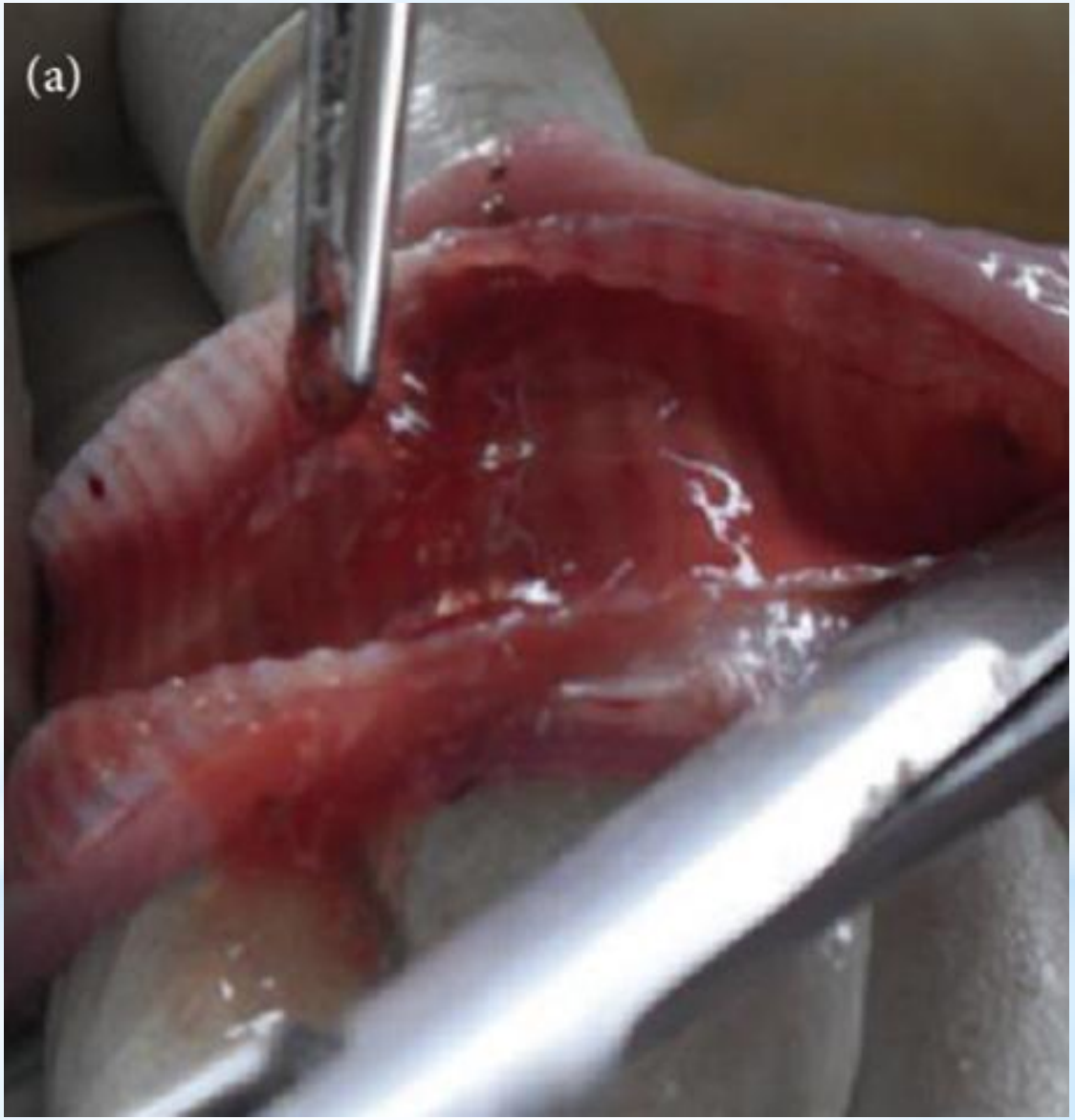
* **Eggs produced following infection may have thin shells, rough or irregular shells or soft .**

Watery albumen from IBV infected chicken (A) compared to normal egg (B)

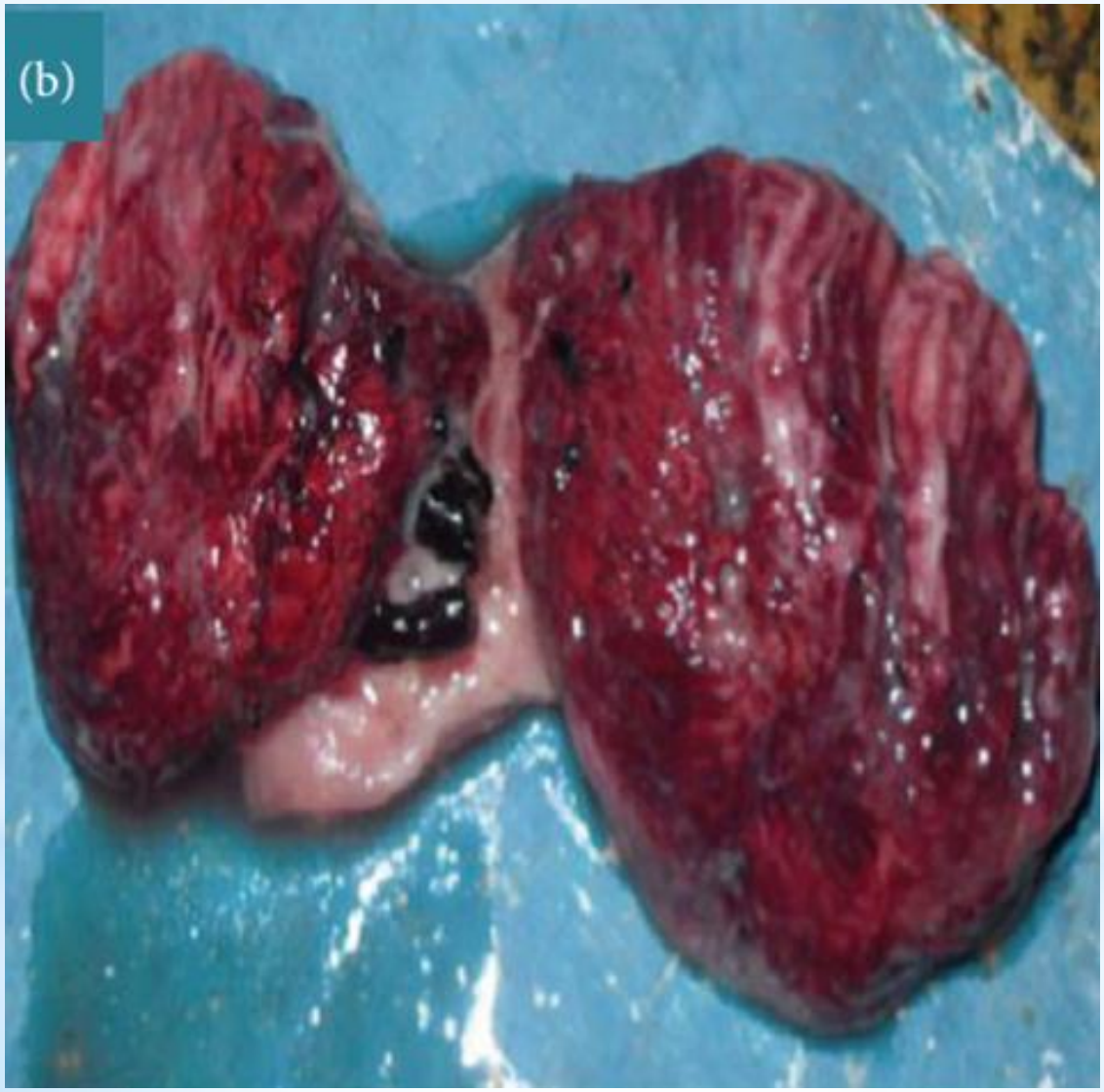


*Post mortem Lesions (P.M. lesions)

* **Presence of mucoid secretion, congestion, and hyperaemia in the trachea**

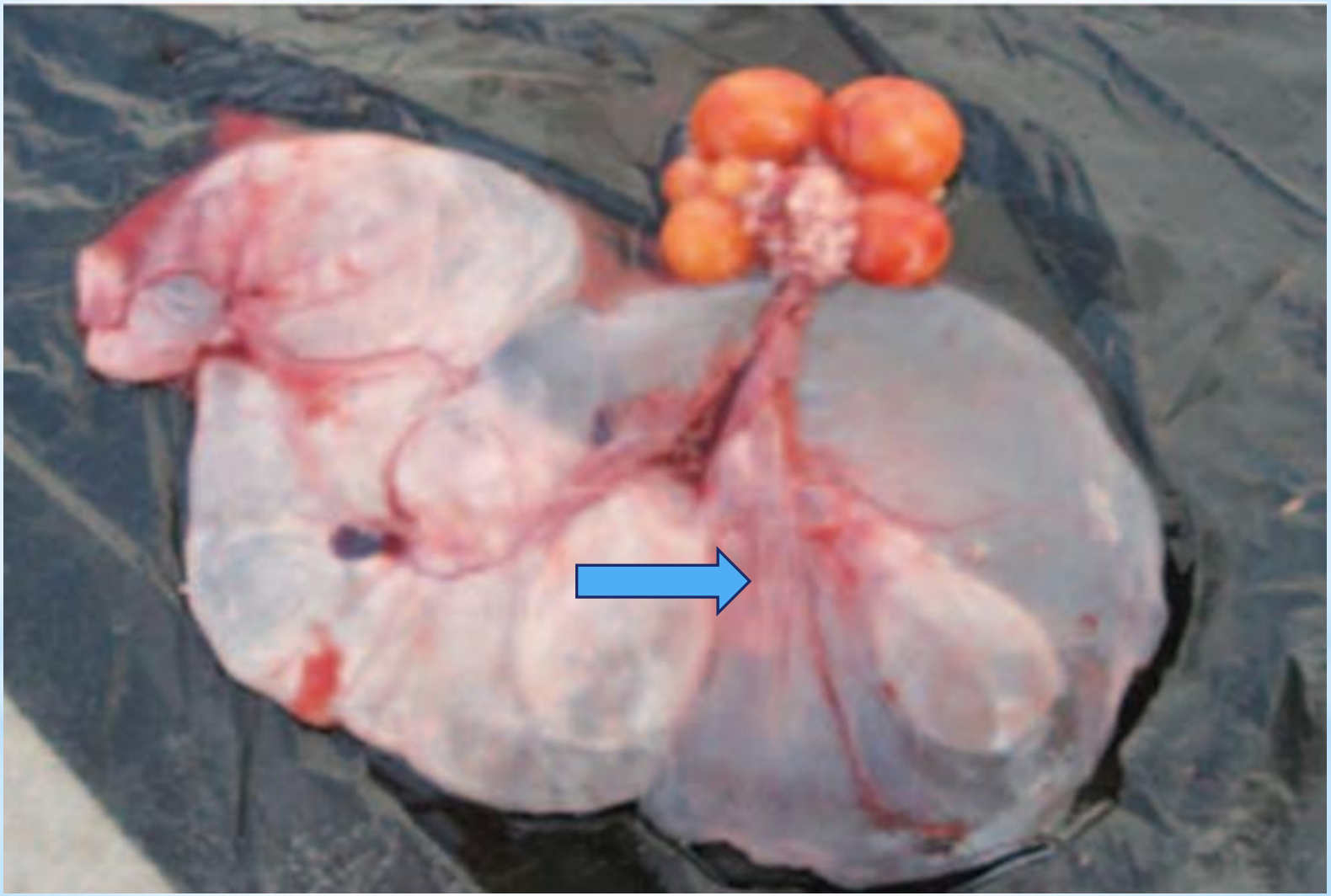


* **Congestion of the air sacs or lungs**

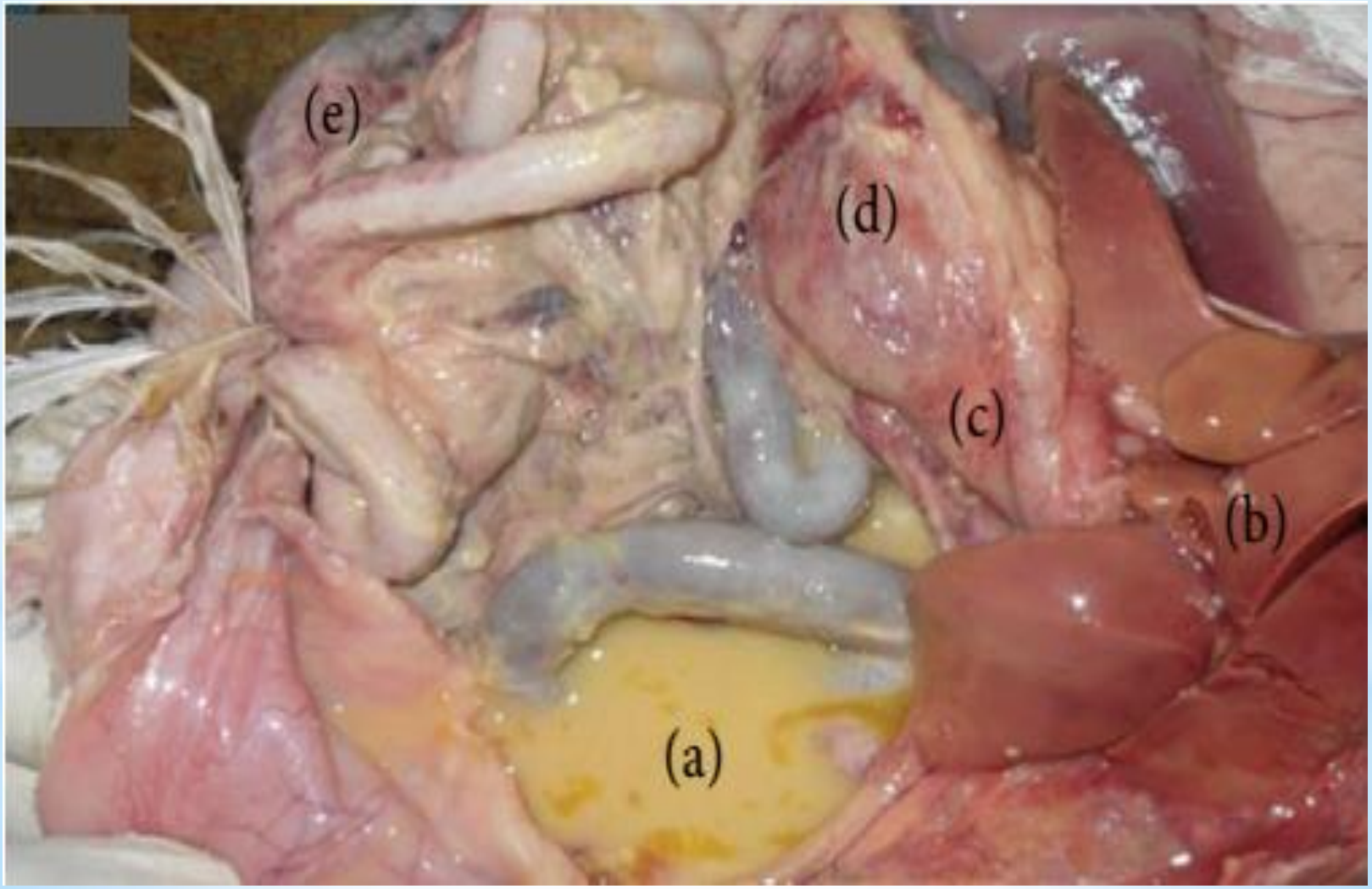


* **Swollen kidneys with massive urate crystal deposition in the kidney parenchyma and in the ureters.**

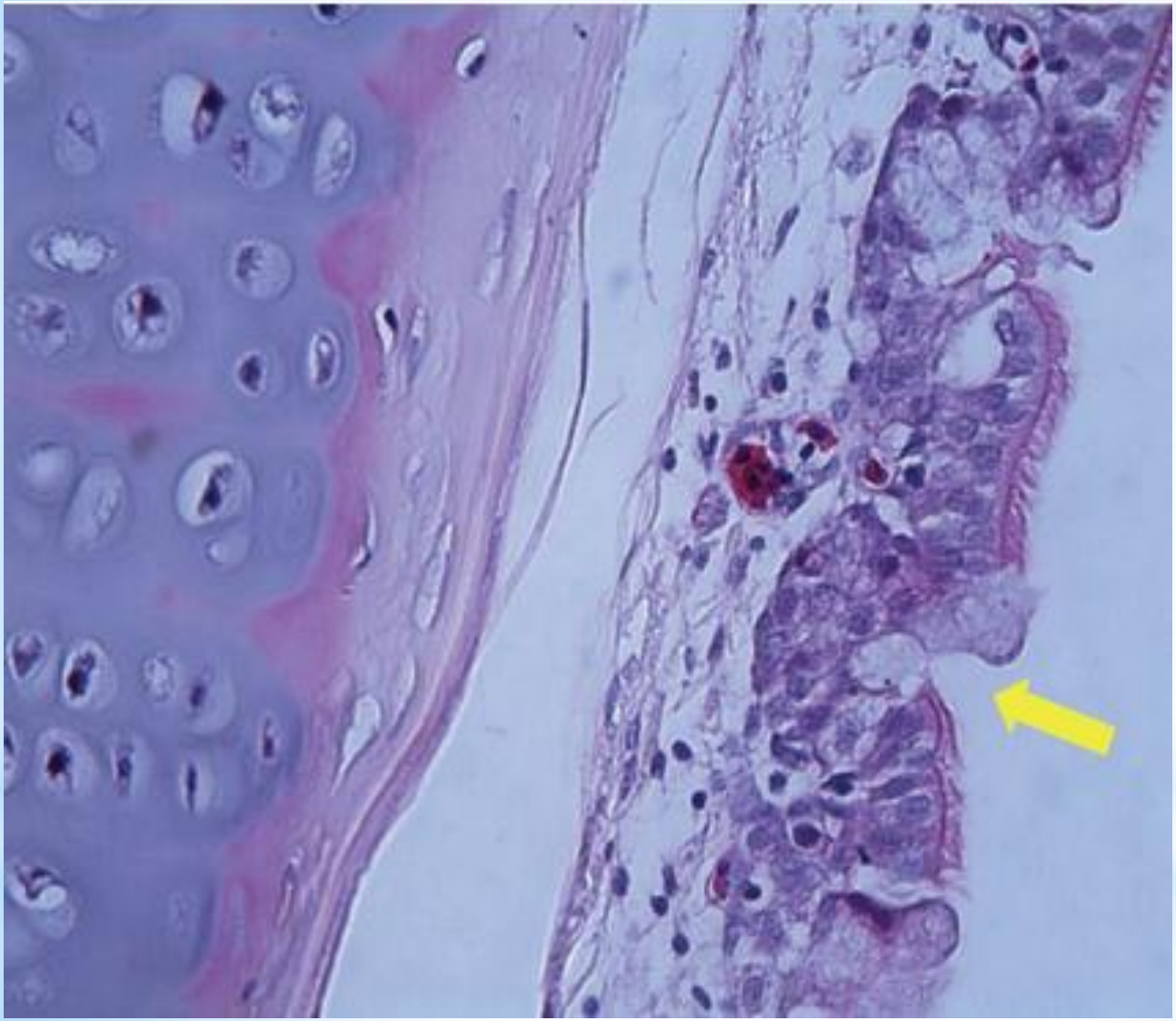
5- Ruffled feat Cystic oviduct , Note the distention of the oviduct with fluid accumulation ( ) hers



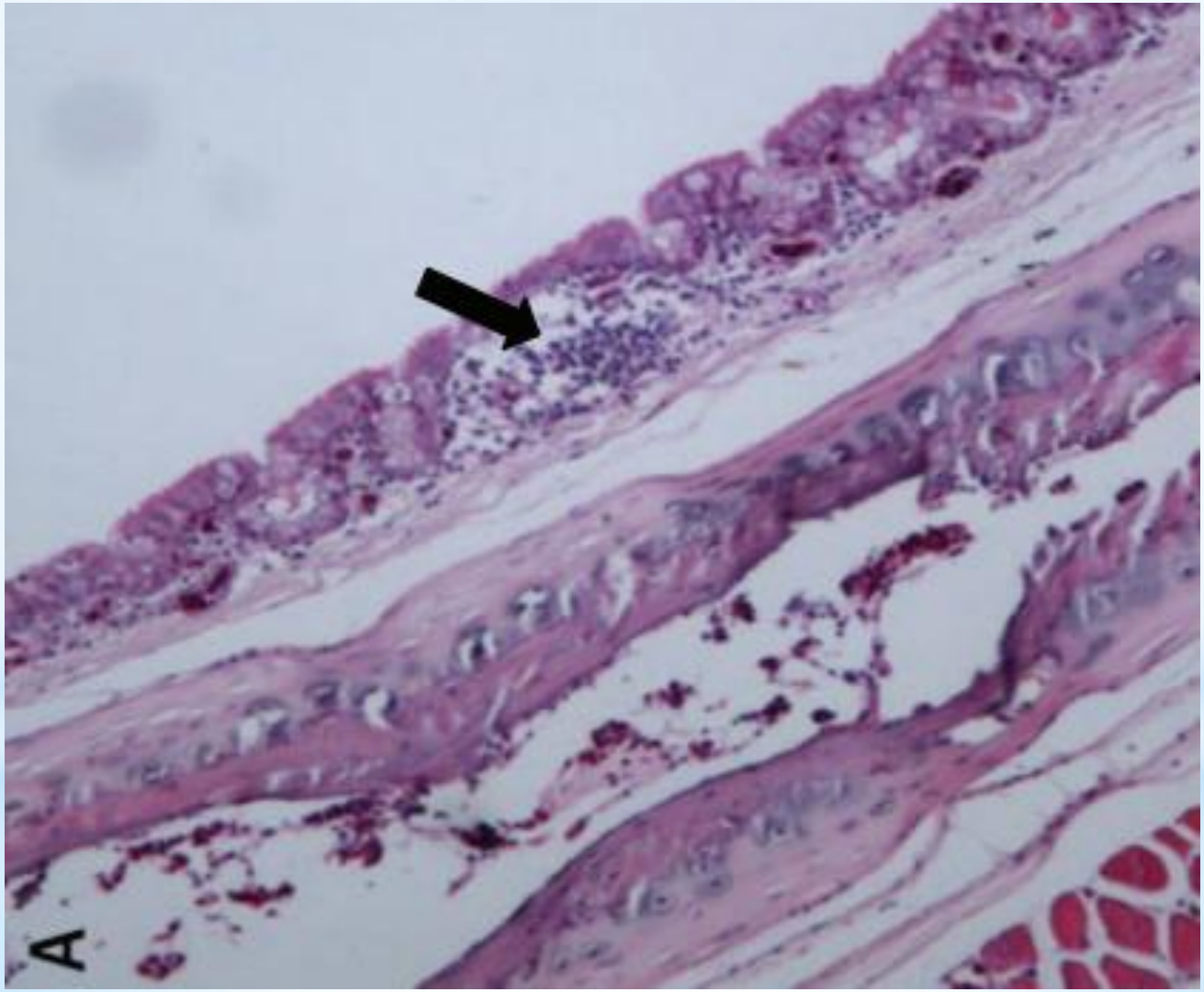
* Accumulation of egg yolk in abdominal cavity (a); slightly enlarged, pale, friable liver (b) , multiple petechial haemorrhages on the serosal surfaces of proventriculus (c), gizzard (d), and small intestine (e).



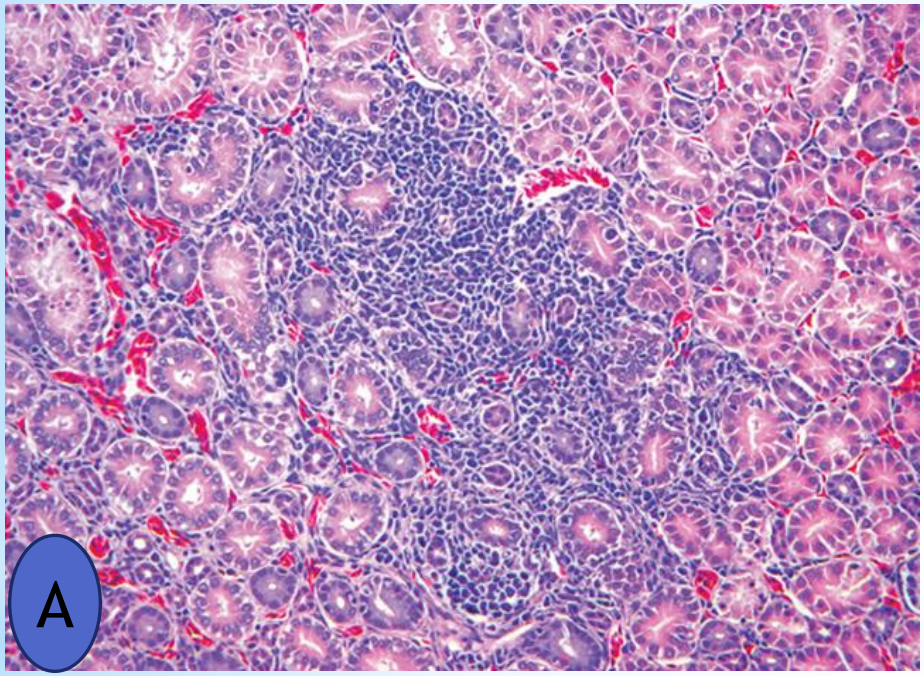
* **Evidence of mucosal secretions of goblet cells (yellow arrow)**



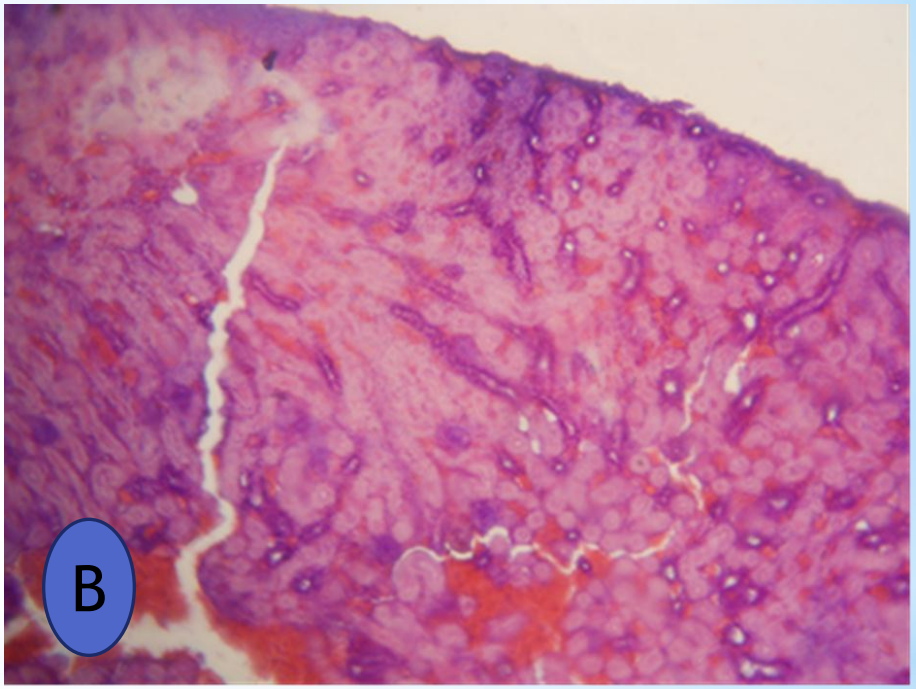
* **Infiltration of lymphocytes within the epithelia (black arrow)**



A- Interstitial infiltration of lymphocytes and plasma cells in the renal cortex is evident. (Hematoxylin and Eosin).



B-Chicken vaccinated by strain (4/ 91) Show present sever necrosis of renal tissue



Thank You!