Lecture title: ESCHERICHIA COLI INFECTIONS (COLIBACILLOSIS); LECTURE 1.

Lecturer Affiliation:

Definition:

Avian colibacillosis is an infectious disease of birds in which Escherichia coli is the primary or secondary pathogen.

Colibacillosis infections includes;

- Airsacculitis,
- Omphalitis,
- Enteritis,
- Cellulitis,
- Salpingitis,
- Synovitis and osteoarthritis,
- Panophthalmitis and meningitis,
- Colisepticemia,
- Coligranuloma,
- Peritonitis, and
- Pericarditis.

Occurrence:

Colibacillosis occurs in all types and all ages of poultry as well as in other birds and many kinds of mammals. Most reported outbreaks in poultry have been in chickens, turkeys, and ducks.

Many outbreaks occur in poultry in these conditions:

- Under a low standard of sanitation,
- Poor environmental conditions,
- After a respiratory or immunosuppressive disease.

Infection is more frequent in young than mature birds. Colibacillosis is common throughout the world.

Etiology:

The etiologic agent is the bacteria Escherichia coli (E. coli). Escherichia is a genus of the family Enterobacteriaceae, which is composed of organisms that can grow aerobically or anaerobically and utilize simple carbon and nitrogen sources. E. coli is a Gram-negative, nonspore-forming bacillus, usually –3 × 0.6 µm. Most strains are motile and have flagella.

Colony Morphology; On agar plates incubated for 24 hours at 37ºC, the colonies are low, convex, smooth, and colorless. Colonies are bright pink and surrounded by a precipitate on MacConkey's agar, and have a dark green-black metallic sheen on eosin-methylene blue (EMB) agar.

Serotypes of E. coli are classified according to the Kauffmann scheme. Currently there are approximately 180 O, 60 H and 80 K antigens. In most serologic typing schemes only the O and H antigens are determined (e.g., O157:H7).

In the intestinal tract of normal poultry, nonpathogenic serotypes are much more in number than the pathogenic serotypes, with 10% to 15% of intestinal coliforms being potential pathogens.

Epidemiology:

E. coli is present in the intestine of birds. Birds are continuously exposed through contaminated faeces, water, dust, and environment.

Any time a bird's resistance to disease is impaired, pathogenic or facultative pathogenic strains may infect the bird.

E. coli has been isolated from the eggs of normal hens. Its presence has been attributed to ovarian infection, oviduct infection, and to eggshell contamination followed by penetration.

Chicks may hatch with a latent infection; however, active infection will typically only occur if some environmental stress or lesions initiates the disease process.

Clinical Signs and Lesions:

1. **Airsacculitis:**

It is a respiratory sign that occur and vary in severity. This pathology may be associated with;

- poor environmental conditions such as dusty litter, poor ventilation, high ammonia levels, sudden variation in the temperatures.
- It is also associated with respiratory infections (infectious bronchitis virus, Newcastle disease virus, infectious laryngotracheitis virus, and mycoplasmas).
- Immunosuppressive diseases (infectious bursal disease, chicken anemia virus, Marek's disease).

In these cases, E. coli is a secondary pathogen and will cause the airsacculitis lesions.

Air sacs are normally thin, glistening and transparent but bacterial infection will cause the air sacs to become thickened, increase in number of blood vessels within the air sac walls and exudate will accumulate within the cavity of the air sac.

The mucous exudate will eventually become fibrinous. Thickened air sacs and caseous exudate in the air sac will be present in more severe and chronic cases.

There is often an accompanying fibrinous pericarditis, fibrinous perihepatitis and peritonitis. Airsacculitis occurs mainly in 3-7-week-old broilers, peaking at 5-6 weeks.

2. Omphalitis and yolk sac infection:

E. coli is often isolated in pure culture from the yolk sac of recently hatched birds. Clinical signs includes;

- Depression, septicemia, and variable mortality.
- The navel is swollen and inflamed.
- Abnormal yolk material and peritonitis is typically seen on necropsy of birds with an E. coli infection of the yolk sac.

A great variety of other organisms such as species of Aerobacter, Proteus, Klebsiella, Pseudomonas, Salmonella, Bacillus, Staphylococcus, enteric Streptococcus, and Clostridia are frequently isolated from yolk sacs of embryos and navels of chicks, most likely as mixed infections.