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WEBINAR**



COLIBACILLOSIS or *E coli* INFECTION

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COLIBACILLOSIS or *E coli* INFECTION

- Colibacillosis is the most common, most troublesome and economically the most important bacterial poultry disease in poultry worldwide
- E coli* produces clinical disease only when there is a serious management fault or some other underlying disease is already present.


Escherichia coli

- In other words, Clinical Colibacillosis occurs when birds defense have been damaged or overpowered
- Endotoxin from *E coli* causes severe Gut Health problem which may not cause mortality but has significant importance today

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COLIBACILLOSIS or *E coli* INFECTION

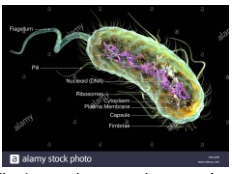
- Research has increasingly focused on the pathogenesis of avian pathogenic *Escherichia coli* (APEC) infections, little is known about their reservoirs
- APEC are present in the normal microflora of the GI tract and other mucosal surfaces of poultry
- APEC are mostly associated with extra-intestinal disease, principally respiratory or systemic infections.
- The acute form of the disease is characterized by septicaemia, resulting in death, while the subacute form coincides with pericarditis, airsacculitis, omphalitis, perihepatitis, salpingitis and peritonitis.



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COLIBACILLOSIS or *E coli* INFECTION

- Escherichia coli* is a gram-negative, rod-shaped bacterium normally found in the intestine of poultry.
- Most *E coli* are not pathogenic, but some are greatly pathogenic. The commensal *E coli* many time produce infections under favourable conditions when the host's defense were weakened



Route for entry of *E.coli* is respiratory tract following any damage to the mucosal lining of trachea due to

- Infections like ND, IB, ILT, Mycoplasmosis, LPAI
- Irritation from Inhalation of dust or Ammonia
- Over reaction to Respiratory Disease Vaccination

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COLIBACILLOSIS or *E coli* INFECTION

- The infection strategy of *E. coli* is to colonize a mucosal site, evade host defenses & multiply
- The frequent occurrence of APEC strains in chickens, indicates that the absence of clinical signs in the chicken's intestine carrying *E. coli* does not necessarily exclude alterations in the intestinal epithelia function
- The *E. coli* is moderately resistant in the environment but sensitive to most disinfectants and Temperature above 80° C
 - Morbidity varies but mortality is 5 – 20%
 - Colibacillosis may be localized infections or systemic (Colisepticemia)



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SOURCE OF *coli* INFECTION

- Large numbers of *E. coli* are maintained in the poultry house environment through fecal contamination; 1gm faeces may contain 1 million *E. coli*
- 10-15% of commensal *E. coli* may produce disease under suitable conditions like Poor Incubation leading to weak chicks, poor brooding.
- Faecal contamination of egg during & after laying is very common through the shell.
- Infected hens can transmit APEC through oviduct to the egg and finally to the chick.
- Initial exposure to APEC may occur in the hatchery from chicks of one contaminated eggs to other, which may cause very high chick mortality. APEC spread very rapidly in newly hatched chicks and are very common in their intestine.



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SOURCE OF *coli* INFECTION

- In laying hens *E. coli* after acquiring disease causing ability, enters into circulation to produce systemic infections when the bird's defense has been compromised
- Poultry house dust contain high concentration of *E. coli* which persist long in dry dust
- Contaminated water can be source of *E. coli* in poultry house
- Rodents (Rats, Mice) droppings usually transmit APEC, received during last flock or from neighbouring farms



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PRE-DISPOSING FACTORS IN *E coli* INFECTION

Broiler

- Multi Age Farm complex
- Respiratory Stress resulting mucosal damage caused by infections with *Mycoplasma*, IB & ND
- Environmental Stress, such as Extreme Temperature, High Humidity, and high Litter Ammonia & Dust in poultry houses, poor Litter, poor Ventilation contribute to the respiratory stress
- Immuno-suppression due to Viral disease like IBV, IBH & CIA and Mycotoxins

Layer/ Breeder

During Peaking Period

- Multi Age Farm complex
- Exposure to *Mycoplasma (M gallisepticum & M synoviae)* and/ or Infectious Bronchitis virus
- Poor Ventilation with high levels of Dust and/ or ammonia
- Stress of Production in a young developing birds
- High levels of circulating endogenous hormones (especially Oestrogen)

During Late Lay Period

- Too much Light Intensity
- Small-framed birds
- Excessively large sized egg
- Excessive fat pad

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COLISEPTICEMIA

- Colisepticemia is the most serious form of Colibacillosis with presence of E coli in blood circulation, very common in young chicks
- Most important Source of infection is poultry house dust which are contaminated with dry faecal material, gains entry through respiratory tract
- Chicks may get infections from contaminated eggs which may get the bacteria in cloaca of infected hen during laying or after laying during handling
- Egg transmission possible from oviduct of infected hen
- A layer of white fibrin covers heart (Pericarditis) & Liver (Perihepatitis)
- Airsacs are thickened with cheese like material



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RESPIRATORY TRACT *E coli* INFECTION

- Inhalation of E coli contaminated dust is the most important source of Airsacs infection producing Colisepticemia and/or localized respiratory infections
- Exposure to poultry house dust, Ammonia, Respiratory infections like ND, IB, Mycoplasma destroy the cilia of trachea and permits inhaled E coli to establish, grow & cause infections
- Respiratory infection is common in field condition after Mycoplasmosis and the situation is called Airsacculitis or Chronic Respiratory Disease (CRD); mainly occurs after 3 weeks of age in broiler resulting huge economical losses due to mortality and poor performance driven morbidity
- Infected Airsacs thickened & contain cheese like material
- Trachea contain haemorrhagic rings & sometime mucoid white pus



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OSTEOARTHRITIS, SYNOVITIS & COLIGRANULOMA

- Systemic Colibacillosis causes Inflammation of joint (Arthritis) associated with degeneration of cartilage & bone of joints (Osteoarthritis) of Hock, Stifle, Hip & Wing joints.
- Inflammation of the synovial tissues in the joints (Synovitis)
- Localization of E coli in bone & synovial tissues is common in Colisepticemia
- Symptoms are mild to severe lameness & poor growth
- Affected birds become victim of cannibalism
- Coligranuloma is also known as 'Hjree's disease
- Uncommon disease but causes occasional sudden death in laying hen without showing 'specific symptoms
- Post Mortem examinations shows characteristic hard yellow nodule growth in the intestinal wall, particularly the caeca
- Sometime liver become hard, discoloured & swollen



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OMPHALITIS OR YOLK SAC INFECTION

- Yolk sac infection or Omphalitis or Mushy Chick Disease is the inflammation of naval
- Omphalitis is the most common reason of early chick mortality in poultry
- Predisposing Factors include Hatch window Length, Hatchery hygiene, Improper/unhygienic transport system, Low Brooding Temperature, Fasting after hatching, etc
- Routes Of Infection
- Faecal Contamination of Eggs after laying at farm or during laying from infected hen is the most important source of infection.
- Infection occurs after contamination of unhealed naval with E coli
- E coli grows rapidly in the intestine of newly hatched chicks and infection spreads chick to chick in hatchery, chick box and in brooding house.
- Hatchery with low humidity has high incidence of providing chicks with Omphalitis



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OMPHALITIS OR YOLK SAC INFECTION

- Some embryos may die before hatching, particularly late in incubation, others die at or soon after hatching.
- Omphalitis mortality very high during first 6 days after hatch and then it reduces, but it may continue up to 21 days.
- A small no of APEC can cause 100% day old chick mortality following yolk sac infection.
- With less severe strain, there may not be embryonic or chick mortality, but the infected yolk sac being retained as cheese like material and those chicks grows poorly



SYMPTOMS

- The naval is swollen & red
- The abdomen is distended and the blood vessels on abdominal surface are prominent with full of blood
- In severe cases naval wall & underlying skin undergo lysis and are wet & dirty. Those soft pulpy skin chicks are called 'mushy chicks' and the condition as 'mushy chick disease'

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OMPHALITIS OR YOLK SAC INFECTION

Post Mortem Findings

- The blood vessels below skin & in yolk sac are filled with blood
- Inflamed unabsorbed yolk is the pathognomic finding which looks bigger due to non-absorption. It is abnormal in colour (yellow or brown-green), consistency (thickened or watery) & foul-smelling.
- Peritonitis, haemorrhages on intestinal surface
- Chicks which live over 4 days show pericarditis along with yolk problem.
- There may be vent pasting, enlarged gall bladder, dehydration, emaciation etc with yolk problem



Omphalitis – Harmful Effects

- Deprivation of Nutrients & Maternal Antibodies for the newly hatched chicks which invite future problems
- Absorptions of Toxins in the body of the chicks
- E coli may enter into the bloodstream and produce colisepticemia leading to heavy mortality
- The survivor chicks perform very poorly; stunted growth, secondary infections or relapse of E coli infections which persist long in inflamed yolk sac.

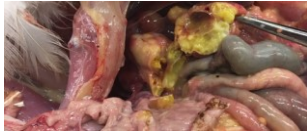
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SALPINGITIS & PERITONITIS IN Layer / Breeder

- Salpingitis, inflammation of Oviduct caused by E coli results reduced egg production in layer or breeder.
- Occasional death due to Salpingitis the common causes of mortality in layer/breeder
- Infection enters oviduct usually from cloaca but E coli may enter from infected Airsacs via systemic infections
- Peak egg production time associated with oestrogenic activity predispose to Salpingitis
- The oviduct found markedly distended with single or multiple masses of caseous material, which may sometime fill the entire body cavity.
- The caseous material usually contain a central egg, shell & membranes and produce foul smell
- Peritonitis, the inflammation of Peritoneum by extension of infection through oviduct to body cavity in layer/breeder and from Omphalitis in breeder



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EGG PERITONITIS IN Layer / Breeder

- Egg Peritonitis, the inflammation of Peritoneum caused by the presence of a broken egg in the abdominal cavity
- Egg peritonitis occurs when the hen matures too many egg follicles at once, and is sometimes the result of a condition known as EODES (erratic ovi-position and defective egg syndrome)
- Mostly caused by E coli, Egg peritonitis always include Salpingitis & impaction of oviduct

Symptoms are

- Lethargy
- Enlarged hard abdomen with a prominent keel
- Ceased egg production.
- Reduced activity.
- Reduced appetite.
- Penguin-like stance.

Post Mortem examinations reveals the presence of scattered pieces of yolk, thickened yolk, cheese like material or milky in the abdominal cavity



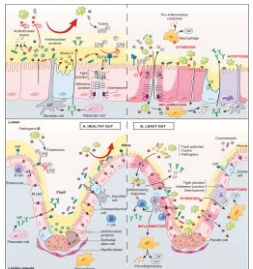
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APEC & GUT HEALTH


- The GI Tract is a large reservoir of many Gram negative bacteria including APEC, which act as a source of lipopolysaccharide (LPS), commonly known as endotoxin
- Luminal LPS, can enter systemic circulation; exposure can increase intestinal paracellular permeability and alter intestinal structure & function, resulting in impaired absorption & utilization of nutrients with negative impact on both poultry health and growth.
- Acute exposure to large amounts of endotoxin suppresses feed intake in chickens and activation of the innate immune system.
- Inflammation can divert energy and nutrients away from growth support and the immune system responses, leading to reduced growth and lowered feed efficiency.



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TREATMENT OF COLIBACILLOSIS


- E. coli responds in varying degrees to antibiotic treatments. Many strains are resistant to many antibiotics, but moderate therapeutic success may be achieved
- Antibiotics reduce mortality
- Antibiotics like Tetracyclines, Amoxicillin, Ampicillin, Chloramphenicol, Neomycin, Gentamycin, Enrofloxacin, Levofloxacin Cephalosporin, Ceftiofur sodium, Amikacin and antibacterial like Sulpha drugs, combination of Trimethoprim with Sulpha & Nitrofurans are used with varying degree of success due to resistance issue
- In Breeder or layer farm where birds are going to stay longer period, Antibiotic sensitivity test is suggested before arranging any treatment to APEC
- Colibacillosis can be successfully treated with New generation therapy of Bacteriophage which are available now



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CONTROL OF COLIBACILLOSIS


- Ensure highest level of Husbandry Practice to avoid any stress due to Management incompetency or Environment influence
- Avoid & Overcome Predisposing Factors which facilitates entry of APEC
- 100% Implementation of Biosecurity Norms



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CONTROL OF E coli – Highest Level of Husbandry Practice


- Avoid Overcrowding
- Avoid Dry dusty condition in poultry house
- Ensure Excellent Ventilation so as to provide the necessary Oxygen for birds, especially in EC shed and during winter & monsoon in open farming system
- Avoid Ammonia build-up inside poultry house
- Chicks shall come from disease free breeder, active and healed naval
- Ensure safe & easily assessable drinking water during whole production cycle
- Avoid Heat Stress during summer/monsoon through contingency management practice in open farming system
- Avoid Chilling during Brooding to make the foundation for the production days ahead arranging necessary Heat source for Temperature control



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CONTROL OF E coli – Avoid & Overcome Predisposing Factors

- Reduce Mycoplasma Exposure through Biosecurity & housing Mycoplasma free chicks
- Control ND, IB, ILT, LPAI & IBD through Scientific Vaccination program & Biosecurity





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CONTROL OF E coli – Implement 100% of Biosecurity Norms

- Shed Cleaning; making the farm Disease Free during downtime
- Entry Point Biosecurity
- Day to day farm Hygiene
- Avoid Faecal Contamination of Eggs from breeder after laying

- Scientific Disposal of Mortality
- Culling of Weak chicks early
- Control of Rats & Mice in farms
- Regular Health monitoring of Breeder/ GP stock to avoid Salpingitis

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THANK YOU

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