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COLISEPTICAEMIA IN A 6-WEEKS-OLD BROILER FLOCK: A CASE REPORT

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ABSTRACT

Avian colibacillosis is considered to be a major bacterial disease in the poultry industry worldwide. It is an infectious disease of birds caused by *Escherichia coli,* which is considered a cause of morbidity and mortality with associated economic losses to the poultry industry. Colibacillosis of poultry is characterized in its acute form as colisepticaemia, resulting in death. Two carcasses of six-week-old broilers were presented to the avian clinic of the Veterinary Teaching Hospital, Usmanu Danfodiyo University, Sokoto, with a complaint of sudden death observed overnight. Postmortem findings revealed dirty and moist feathers, congested breast and thigh muscles, haemorrhagic trachea, empty crop, cloudy air sacs; the heart was congested and covered with fibrin deposit, the liver was also enlarged and covered with fibrin, the tarso-metatarsal joint was swollen, and the caecal tonsils were congested. Haemorrhagic intestines and cheesy exudate were seen on the peritoneum. Samples were taken from the heart, liver, and intestines, and the bacteriology result revealed *Escherichia coli.* The sudden death observed, coupled with necropsy lesions and laboratory results obtained, confirmed colisepticaemia in the flock. The flock was treated with enrofloxacin oral solution and vitalyte powder, and the birds recovered.

Keywords: Broilers, Colisepticaemia, *Escherichia coli*, Enrofloxacin.

Introduction

Colibacillosis is one of the most prevalent infectious diseases of poultry, contributing substantially to morbidity and mortality in young chicks. It is characterized by systemic and localized bacterial infections caused by *Escherichia coli*, which may lead to airsacculitis, pericarditis, perihepatitis, septicaemia, and omphalitis in affected birds (Panth, 2019). The disease is associated with significant economic losses in the poultry industry due to production inefficiencies, increased mortality, and elevated costs of treatment and control (Koutsianos *et al.,* 2021). Colibacillosis can develop as a secondary disease when the host's immune defenses are impaired by other infections or environmental stressors. Respiratory pathogens such as *Mycoplasma* species, infectious bronchitis virus, and Newcastle disease virus have been identified as common predisposing factors that facilitate systemic *Escherichia coli* invasion in poultry (MSD Veterinary Manual, 2025). Young chicks are susceptible due to their immature immune systems, and environmental stressors such as poor ventilation, high stocking density, and inadequate hygiene. Transmission occurs through multiple routes, including inhalation of contaminated dust, ingestion of infected feed or water, and contamination via shell membranes or fomites (Panth, 2019).

In its acute form, colibacillosis appears as septicaemia, leading to sudden death, while subacute and chronic forms are characterized by pericarditis, airsacculitis, perihepatitis, and other serosal lesions found during postmortem examination (Koutsianos *et al.*, 2021). Several studies have reported a variety of *E. coli* serotypes linked to disease outbreaks and their pathological effects in broilers (Elnagar *et al.*, 2021). Moreover, field investigations have shown that pathogenic *E. coli* infections in broilers cause clinical disease with significant impacts on organ systems (Youssef *et al.*, 2008).

In addition to pathogenic strains, enterotoxigenic *E. coli* have been isolated sporadically from chickens with diarrhoea and occasionally from clinically healthy birds, indicating the complexity of *E. coli* dynamics in poultry populations (Vandekerchove *et al.*, 2004; Kabir, 2010). Predisposing factors for colibacillosis include poor navel healing, mucosal damage due to viral infection, immunosuppression, and environmental stresses that impair host defenses (Panth, 2019).

This case report presents a case of sporadic mortality associated with *E. coli* infection in a commercial broiler farm, the diagnostic protocol and therapeutic management approach used to confirm and manage the disease.

Methodology

Case Presentation and Management

Two broiler carcasses were presented to the Avian Clinic of the Veterinary Teaching Hospital, Usmanu Danfodiyo University Veterinary Sokoto, following a sudden death observed overnight**.** The flock consisted of 261 six-week-old broilers**,** sourced from a farm support program and fed a commercial broiler finisher ration.

The disease onset was rapid, occurring within **one day**, with **two birds affected,** resulting in a mortality rate of 0.8%. Vaccination records indicated that the birds received Newcastle disease (ND) vaccine, La Sota strain, at three weeks, and infectious bursal disease (IBD) vaccines at two and four weeks of age. The flock had a previous history of coccidiosis, treated with Amprolium powder (1 g/L) and Vitalyte (1 g/L) for five consecutive days and were managed under a deep litter system.

Clinical Plan and post mortem Laboratory examination

The clinical plan included conducting a thorough postmortem examination of the affected carcass to identify any gross pathological lesions indicative of infectious or systemic disease, and collection of appropriate samples for laboratory analyses, including bacteriological and histopathological evaluation, to confirm the causative agent. Measures were put in place to manage the remaining flock, including reinforcement of biosecurity, close monitoring for morbidity, and administration of appropriate therapeutics to prevent further mortality and ensure the health of the unaffected birds.

Results

Post-mortem examination of carcasses

Post-mortem examination of the carcasses revealed that the feathers were dirty and moist, suggestive of poor hygiene and possible environmental stress. There was a generalized congestion of the leg (A) and keel (B) muscles which are indicative of systemic circulatory disturbance and acute septicaemia, commonly associated with colibacillosis (Plate 1). Haemorrhages were observed along the tracheal mucosa which are suggestive of respiratory tract involvement and a recognized portal of entry for avian pathogenic *E. coli* (Plate 2). The relatively empty crop observed

during the post mortem examination reflects anorexia and acute disease progression prior to death, typical of rapidly fatal septicemic infections, as seen in plate 3. **A f**ibrin presence covering the liver surface (arrow) is indicative of fibrinous perihepatitis, which a classic lesion of colibacillosis (Plate 4). There was an Enlargement and congestion of the liver with fibrin deposition (arrowhead), which further confirms hepatic involvement and systemic bacterial dissemination (Plate 5). The enlarged and congested spleen (A) signifies systemic immune response to infection, while the cloudy air sacs (B) indicate airsacculitis. The cheesy exudate (C) represents fibrinous inflammatory material, and that is are commonly seen in chronic or subacute stages of colibacillosis (Plate 6). A fibrinous deposition on the heart surface (A) with associated congestion (B) was observed, which is a characteristic of fibrinous pericarditis, a key diagnostic lesion in colisepticaemia (Plate 7). A cheesy exudate within the peritoneum (A) is indicative of peritonitis, while the congested spleen (B) suggests septicaemia (Plate 8). Haemorrhages were also observed within the intestinal tract, reflecting severe vascular damage and systemic inflammatory response associated with acute *E. coli* infection as shown in Plate 10.

Laboratory investigations revealed *Escherichia coli.* Antimicrobial susceptibility testing of the isolate was carried out using the Kirby–Bauer disk diffusion method on Mueller–Hinton agar, in accordance with Clinical and Laboratory Standards Institute (CLSI) guidelines. In brief, pure colonies of the isolate were emulsified in normal saline and adjusted to match the 0.5 McFarland turbidity standard. The standardized inoculum was evenly spread onto the surface of Mueller–Hinton agar plates using a sterile swab and a commercial antibiotic-impregnated disc that included amoxicillin, streptomycin, clindamycin, trimethoprim, tetracycline, enrofloxacin, and gentamicin, was placed on the inoculated plates and incubated aerobically at 37 °C for 18–24 hours. Zones of inhibition were measured in millimetres and interpreted as susceptible, intermediate, or resistant based on CLSI interpretative criteria. The organism was found to be resistant to amoxicillin, streptomycin, clindamycin, and trimethoprim, intermediate susceptibility to tetracycline, and susceptibility to enrofloxacin and gentamicin. *Eimeria* oocyst + was found from parasitology laboratory. The condition was confirmed to be Colisepticaemia.

The remaining flock was treated with Enrofloxacin oral solution at a concentration of 1 ml per 2 L of drinking water for five consecutive days, Vitalyte® powder at 1 g per 1 L of drinking water for the same duration to support hydration and electrolyte balance.

Please fully interpret the findings on each plate here before placing the plates.

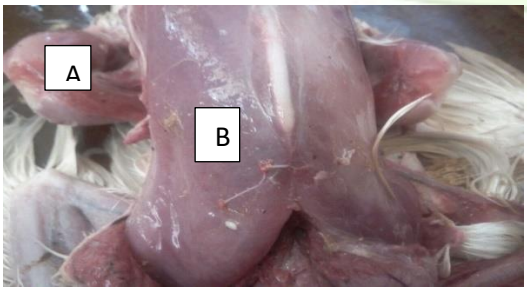

Plate 1: Generalized congestion of the leg (A) and keel (B) muscles


Plate 2: Haemorrhages in the trachea

Plate 3: Relatively empty crop

Plate 4: Liver covered with fibrin (Arrow)

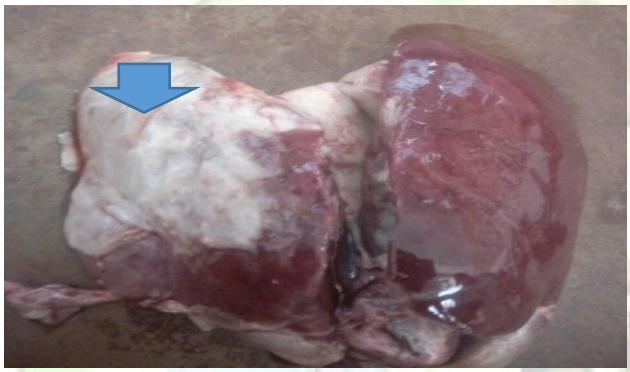

Plate 5: Enlarged and congested liver with fibrin (Arrow head)

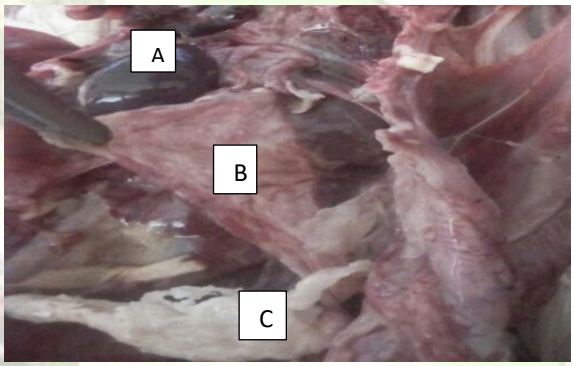

Plate 6: Enlarged congested spleen (A), cloudy air sac (B) and cheesy exudate (C)

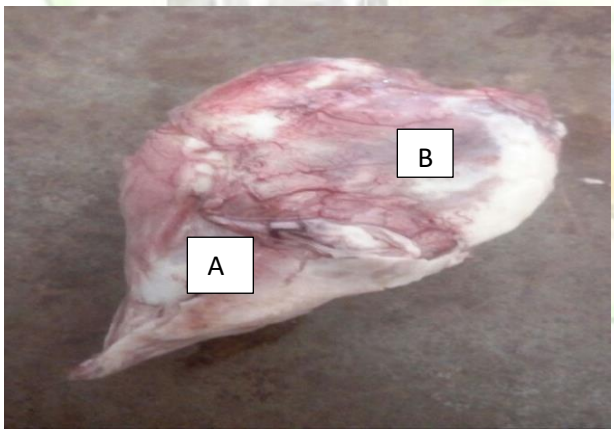

Plate 7: Heart covered with fibrin (A) and area of congestion (B)

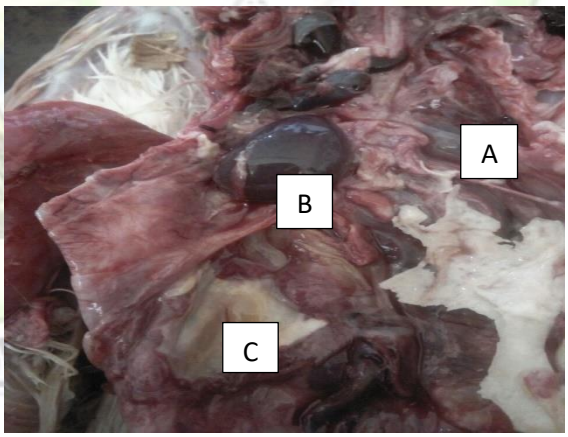

Plate 8: Cheesy exudate (A) within the peritoneum and Congested spleen (B)

Plate 9: Haemorrhage in the intestine

Discussion

Colibacillosis remains one of the major infectious causes of morbidity and mortality in commercial poultry production, particularly during the early stages of life. In this current case, a low mortality rate was recorded, which may be attributable to the relatively older age of the birds (six weeks), as older broilers are often better able to withstand systemic bacterial infections. Kabir (2010) reported that the disease affects birds of all ages; however, mortality is generally more severe in younger chicks due to their immature immune systems. The gross pathological findings observed in this case were characteristic of colibacillosis, notably polyserositis involving the liver, air sacs, and pericardium, with fibrinous exudation. Similar lesions have been consistently reported in cases of colibacillosis in broiler chickens, where fibrinous pericarditis, perihepatitis, and airsacculitis are considered features of the disease (Yousseff *et al.*, 2008; Kabir, 2010; Nolan *et al.*, 2020). These lesions reflect the septicemic nature of the infection and the ability of *Escherichia coli* to disseminate systemically following respiratory or mucosal compromise.

The pathogenicity of *E. coli* infections in poultry has been closely linked to the presence and expression of specific virulence factors, particularly those associated with adhesion, iron acquisition, serum resistance, and invasion of host tissues, especially within the respiratory tract (Stordeur and Mainil, 2002; Nolan *et al.*, 2020). Tonu *et al.* (2011) further emphasized that the classification of *E. coli* strains into pathogenic and non-pathogenic groups is largely based on their capacity to cause disease, which depends on the type, number, and combination of virulence determinants present in individual strains.

Antimicrobial susceptibility testing in this case revealed resistance of the *E. coli* isolate to amoxicillin, streptomycin, clindamycin, and trimethoprim, intermediate susceptibility to tetracycline, and susceptibility to enrofloxacin and gentamicin. These findings are consistent with earlier reports of widespread antimicrobial resistance among poultry-associated *E. coli* isolates. Amara *et al.* (1995) reported high resistance of *E. coli* isolates to sulphonamides, oxytetracycline, trimethoprim–sulphamethoxazole, and chloramphenicol, with variable susceptibility to fluoroquinolones and aminoglycosides. More recent studies have similarly documented increasing resistance of avian *E. coli* isolates to commonly used antibiotics, raising concerns about treatment efficacy and

public health implications (Nhung *et al.,* 2017; Osman *et al.,* 2018).

Antibiotic resistance in *E. coli* is primarily a genetically mediated trait, often associated with plasmid-borne resistance genes that can be horizontally transferred between bacterial populations. These resistance determinants can be detected using molecular techniques such as polymerase chain reaction (PCR), and their emergence has been strongly linked to the indiscriminate and prophylactic use of antibiotics in poultry production systems (Roth *et al.,* 2019). The resistance pattern observed in this case shows the need for prudent antimicrobial use, routine susceptibility testing, and improved farm biosecurity to mitigate the spread of resistant bacterial strains.

Conclusion

Even though the overall mortality rate was low, the presence of systemic lesions shows the pathogenic potential of *E. coli* under favorable predisposing conditions. The observed antimicrobial resistance pattern further emphasizes the ongoing challenge posed by multidrug-resistant *E. coli* strains in poultry production systems. Prompt diagnosis, laboratory confirmation, and targeted antimicrobial therapy were critical in limiting disease spread and preventing further losses in the flock.

Routine monitoring and early investigation of sudden mortalities were recommended to facilitate the timely diagnosis of the disease. In addition, improved management practices should be implemented to minimize environmental and stress-related predisposing factors.

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