American Journal of Biology and Natural Sciences
https://biojournals.us/index.php/AJBNS
ISSN: 2997-7185

Clinical and Pathological Study of Avian Cholera in Layer Chickens in Babylon Province/ Iraq

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Received: 2024, 15, Oct
Accepted: 2024, 21, Oct
Published: 2024, 28, Nov

Annotation: Avian pasteurella infection may cause in different avian species and therefore, cause huge financial losses especially in layer production cycle where the infection considers as one of the important pathogens. However, specimens were taken from layer hens' farm of Babylon province/ Iraq and transfer to laboratory to investigate pathological features of the infected chickens. Results of clinical signs consist of depression, loss of appetite, ruffled feathers, labored breathing. Characteristic gross pathological findings were localized infection of peritoneal cavity and oviduct. Also, there was petechial hemorrhage in uterus of layer hens. Petechial haemorrhage appears on abdominal fat of layers. As well as petechial hemorrhages and enlargement in liver of layer chickens revealed avian pasteurellosis in fowls. Conclusion consists of comprehensive information about clinical and gross postmortem lesion of layers of Babylon province. Moreover, the observed data may provide an overview on the significant threat of pathogen on layer chickens industry. Therefore, this investigation was important to develop

effective strategies to control avian pasteurellosis.

Introduction:

Avian pasteurellosis can infect a multiple species of domesticated as well as wild fowls. Due to the disease, there are significant financial threats because of increasing the mortality ratio, raising the cost of therapy and penalty for slaughters, as well as other costs associated with vaccine use. In total, *Pasteurella multocida* type A is the main etiology of avian pasteurellosis, then type F. In Turkey, serotypes 1, 3 and 4 have been identified more often (Shehata, A. A. & Hafez, H. M., 2024). However, *Pasteurella multocida* usually present as natural microflora in multiple animals, mammals and fowls (Hanchanachai, N. et al., 2021).

Pasteurella multocida is the etiological factor of avian pasteurellosis which is usually found in the upper respiration duct of health and diseased animal and birds, the pathogen is opportunistic therefore can causing the infection in animal (Elalamy, R. A. et al., 2020). Therefore, the pathogenesis of infection may be begin during stressing conditions. Young and growing animal are more susceptible to infection, which leads to large economic losses (Abbas, A. et al., 2023). The objective of the study was to highlight on the clinical findings as well as gross pathological examination of layer chickens

Materials and Methods

Specimens of laying hens cross Lohmann moribund cases with Fowl cholera cases were selected based on external clinical signs, in which infection was in the chronic phase of the disease. However, case history as well as gross pathological lesion of affected chickens was recorded.

The pathological analysis was carried out on samples from liver, oviduct and uterus of diseased fowls which have been either sacrificed or recently dead. The layer chickens were necropsied after few hours of collection.

However, clinical diagnosis was made based on case history from owners or farm workers. It was recorded clinical findings and gross pathological findings of diseased as well as dead fowls. The layers were examined and necropsy changes were recorded according to the procedure listed by Calnek et al. (2003) and Charlton (2000).

Results

Clinical signs

Infected chickens showed paleness, enlargement of wattles and comb**,** facial edema and dyspnea. Also, there are paleness and enlargement of wattles of layer Chicken (Fig 1 and Fig.2). Furthermore, respiratory symptoms were noticed in the infected fowls, where in some birds. Sneezing, depression, ruffled feathers, increment in respiratory rate as well as diarrhea was observed. In addition to reduce in feed intake or loss of appetite and loss of weight (Fig. 3).

Figure (1) Paleness and enlargement of wattles of layer Chicken.

Figure (2) Layer Chicken infected with *Pasteurella multocida* showing paleness and enlargement of wattles and comb**,** facial edema and dyspnea.

Figure (3) Layer chickens suffering from: ruffled feather, Depression, emaciation and weight loss.

Postmortem lesions

According to the gross findings, affected organs mainly were ovary, oviduct and uterus where there were localized infection of peritoneal cavity and oviduct (Fig.4 and Fig. 5).

Also, congestion was observed in uterus of layer hens where it shows petechial hemorrhage and hyperemia (Fig. 6).

Petechial haemorrhage appears on abdominal fat of layer chickens infected with *Pasteurella multocida* (Fig. 7).

As well as petechial hemorrhages and enlargement in liver of layer chickens that infected with *Pasteurella multocida* (Fig. 8 and Fig. 9)

Figure (4) Layer chicken appears localized infection of peritoneal cavity and oviduct.

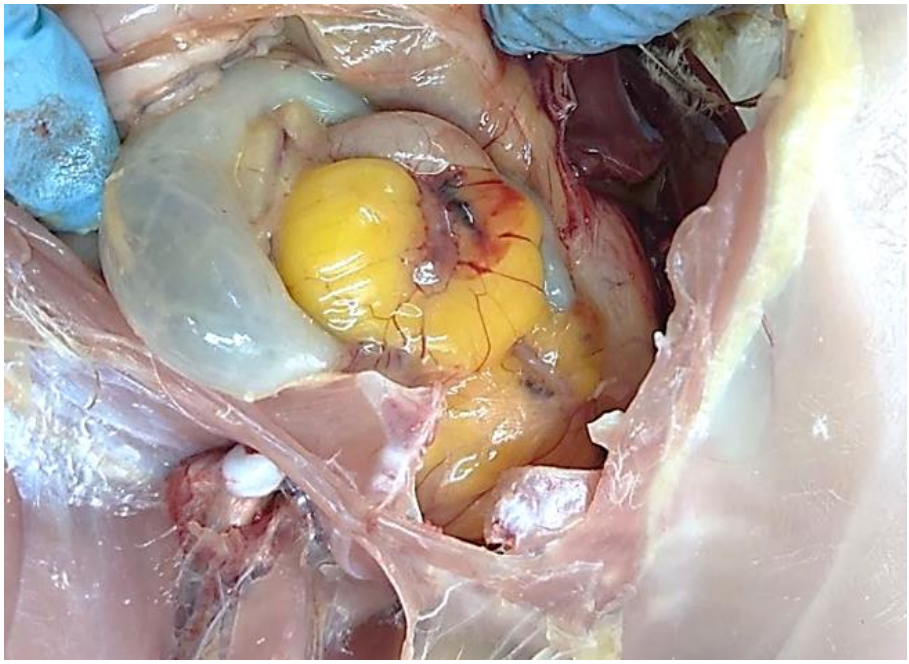

Figure (5) Layer chicken localized infection: Ovaries were affected, mature follicles of ovaries appear flaccid and thecal blood vessesls.

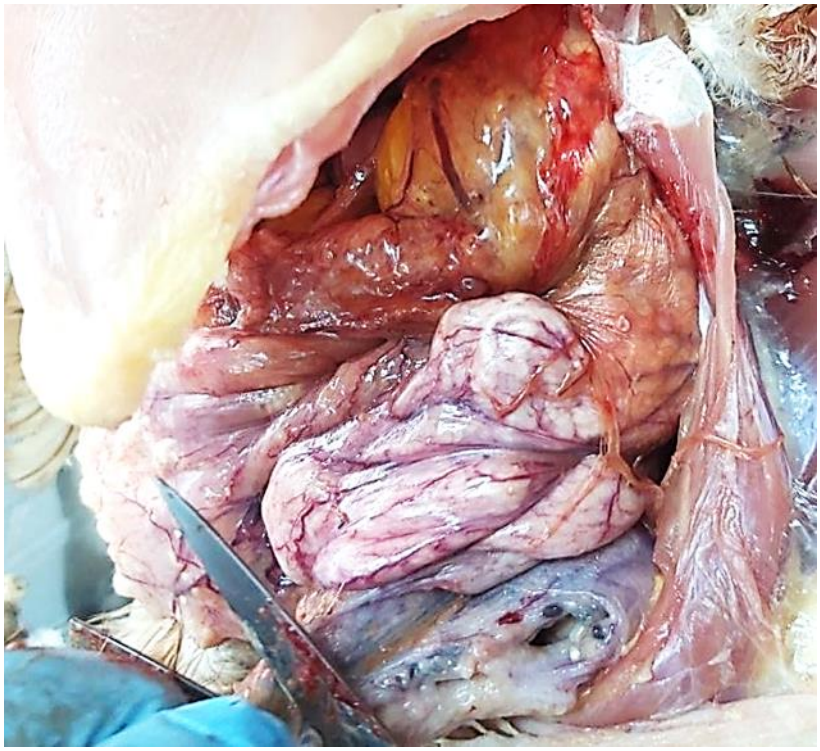

Figure (6) Affected uterus and oviduct of layer hens show petechial hemorrhage and hyperemia

Figure (7) Layer chickens infected with *Pasteurella multocida* show petechial haemorrhage on abdominal fat.

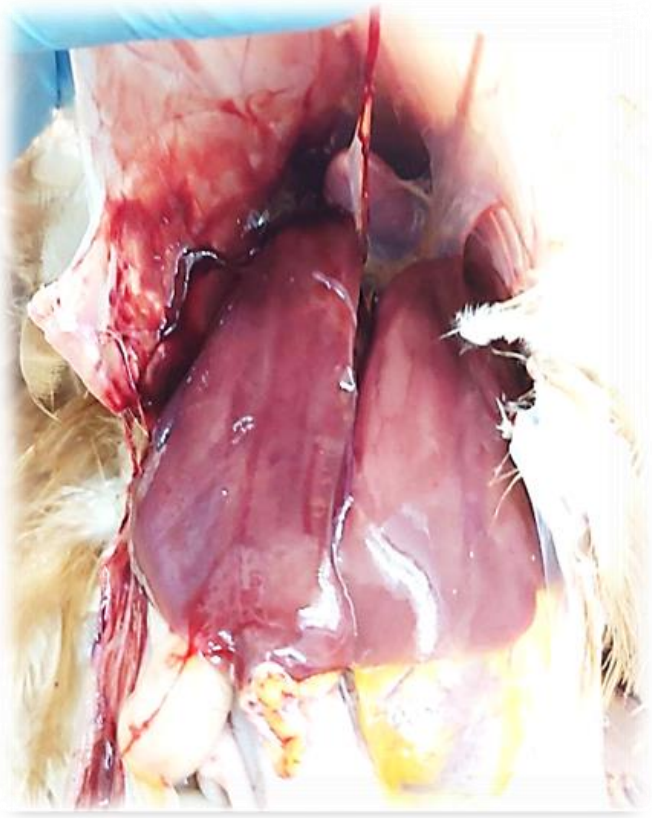

Figure (8) Show liver of layer chickens infected with *Pasteurella multocida* presence of necrotic foci and petechial hemorrhages.

Figure (9) Show liver of layer chickens infected with *Pasteurella multocida* and presence of petechial hemorrhages

Discussion:

Pasteurella considered as etiological factors of multiple infections in various types of animals and humans (Akter, M.et al., 2021). Pasteurella multocida regarded as a serious financial issue in fowls as well as livestock. However, the infection consist of multiple clinical findings and pasteurellosis diagnosis can be challenging (Abbas AM. et al. , 2018).

The clinical findings of infection may be asymptomatic or chronic upper respiratory distress to acute pneumonic infection (Wilson BA. and Ho M., 2013).

Common signs are congestion of the internal organs, nasal discharges, facial oedema, ataxia, nervous signs, high temperature, loss of weight, depression and the high infection ratio, weakness, dullness with mild conjunctivitis (Barrow G.I. and Feltham R.K.A., 1993 ; Abood, M. S. et al., 2021). Respiratory symptoms may cause feed intake reduction that lead to loss of weight as well as progression of infection (Marien, 2007). However, at the acute phase sudden death is the most important signs of the disease, but sometimes showed fever, loss of appetite, ruffled feathers, oral secretions, diarrhea. Increasing breathing rate and bluish in the featherless area. Also there were decrease in feed consumption and a decrease in production (Mahanam, 2005), this coincided with the results of present study. While, in chronic phase, it was showed localization of infection where it was noticed swelling of the wattles, sinuses, leg and wing joints, foot pads, paleness of the crest and wattles, this agreed with the findings of current investigation.

In cases of acute avian cholera, the discovery of a large range of dead fowls without symptoms is usually the initial symptom of infection. The chronic phase is recognized by localizing infection swollen joint (Ramya, R., et al., 2024).

Upon postmortem examination general congested carcass and hepatomegaly with necrotic foci can observed in liver parenchyma as well as other organs for instance petechial haemorrhage in heart and kidney (Barrow G.I. and Feltham R.K.A. (1993). Congestion is observed throughout the body,

petechial hemorrhage on the abdominal fat and mucous lining of the intestine. The liver is slightly enlarged with necrotic spots (Mahanam, 2005), that agreed with the results of current study.

The small intestine was found hyperemic and compressed by excessive mucus exudate while the colon was free of these changes. Petechiae were also observed in the pericardial and abdominal fat. (Goswami, P. 2022), these results are in harmony with the findings of current research.

The gross lesions were as similar to the findings of Srinivasan, et al., 2011) (Srinivasan P. et al., 2011) Experimental induction of fowl cholera in vanaraja bird was showed similar lesion to our findings (Kannaki T.R. et al., 2021).

Ovary of layer chickens are affected, mature follicles can show flaccid thecal blood vessels that always noticed and thickening of their membranes and sometime some of them ruptured The gross lesion is also may be characterized by localization of infections, this caseous material is also observed in the wattles (Mahanam, 2005), that can coincided with the findings of present trail.

Conclusion

The current trail provides comprehensive information about clinical and gross postmortem lesion of layer chickens infected with *Pasteurella multocida* of Babylon province. Moreover, the observed data may provide an overview on the significant threat of pathogen on layer chickens industry. Therefore, this investigation was important in order to make novel strategy to control the prevalence and prevent fowl cholera, so contributing to the major prophylaxis of bird health.

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