



Anatomical pathology and histological of small intestinal organs in broiler infected with *Ascaridia galli*

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Abstract

Infection with *Ascaridia galli* still attacks poultry farms, especially chickens in Indonesia. This study aims to determine the causes of changes in anatomy pathological and histology in small intestine of broiler. The study was taken from Alif which had clinical symptoms of weakness and anorexia on July 5, 2022 in Gresik Jawa Timur. The results of anatomical pathology and histological examination showed changes in the duodenum and jejunum organs showing hemorrhagic and inflammatory cell infiltration. The results of parasite examination found *A. galli* worms in the lumen of the small intestine and *A. galli* worm eggs from feces. In this study, clinical symptoms and anatomy pathological and histology changes of the small intestine in the broiler were caused by infection with *A. galli* worms.

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Introduction

Broiler chickens are a meat-producing chicken breed that is in great demand by people in Indonesia. This is because broiler chickens have more meat, fast growth, short harvest time and prices that are affordable for the public. The number of broiler chicken commodities also continues to increase every year. According to the BAPOK BPS survey, consumption of purebred chicken meat in 2021 is estimated to reach 10.36 kg/capita/year (BPS, 2022).

The growth of the poultry population in Indonesia is increasing from year to year. However, this was also followed by an increase in various infectious diseases in poultry which became obstacles in their breeding. Diseases that attack chicken farms have several impacts, including economic losses due to bird deaths, disease and feed disorders. During 2022, several diseases were reported that attacked chickens which resulted in economic losses, including ND (Newcastle

Disease), IBD (Infectious Bursal Disease), SHS (Swollen Head Syndrome), CRD, NE, Coryza and Colibacillosis, the incidence of which is always high every month. (Infovet, 2023).

Diseases in chicken farms can be caused by various non-infectious or infectious agents. Infectious agents include bacteria, fungi, viruses and parasites. In 2022 there will be 3080 cases of chicken disease caused by parasites of the worm type (Poultry Indonesia, 2023). Chicken parasitic worms tend to be found in the intestines of chickens which cause losses because they can inhibit the digestive process in the chicken.

Based on the description above, this study aims to determine the anatomical pathology of broiler chickens infected by infectious agents, one of which is parasites (worms).

Discussion

This study/case was carried out on July 5 2022 on a broiler chicken belonging to Alif whose address is Jl. Dewi Sekar dice RT.01 RW.02 No. 11, Gresik. Based on the anamnesis, it is known that the chicken is female, aged $\pm$ 3 months, weighing 500 grams. The chickens were kept in cages with a population of 50 broiler chickens, with drums made of wood, the environment was dirty, the food and drink containers had never been washed and had never been vaccinated. During observation, the chicken appeared weak, anorexic (decreased appetite), and had a clear runny nose.

The chicken was then euthanized and passed the ethical suitability test at the Research Ethics Commission of the Faculty of Veterinary Medicine, Wijaya Kusuma University, Surabaya (N0 Certificate: 124-KKE). The chicken is then subjected to a necropsy and anatomical pathology observations on all parts of the organ. During the necropsy of the intestinal organs, several abnormal conditions were found and there were also worms. The worms were then collected to observe the morphology and continued with an examination of the feces attached to the chicken's cloaca (Figure 3).

Examination of anatomical pathology and parasites requires tools including necropsy tools (scalpel, blade, tweezers, blunt sharp scissors, bone scissors), syringe, tray, necropsy table, scales, organ sample pot with formalin, mask and gloves, object glass, cover glass, petri dishes, beakers, mortars and stampers, test tubes, centrifuges, centrifuge tubes and microscopes.

Meanwhile, the materials used in anatomical pathology and parasite examinations are methanol, distilled water, methylene blue, and entelan glue, 10% formalin and emersion oil. The abnormal intestinal organs are then prepared with Haemaktosilin Eosin staining to determine the appearance of the histological changes. The chicken feces that have been obtained are then examined for parasites to find out whether there are worm eggs. The results of anatomical, histological and parasitic

pathology examinations were then analyzed descriptively.

The results of a macroscopic examination of the duodenum organ showed the presence of ptechiaie hemorrhage and gas accumulation (Figure 1), microscopic observation showed that the tissue had ruptured, inflammatory cell infiltration and hemorrhage.

Meanwhile, macroscopic examination of the jejunum organ shows the presence of linear hemorrhage in the sub-mucosal plexus of the jejunal missner, and microscopic observation shows the presence of inflammatory cell infiltration, hemorrhage, and the jejunal mucosa has ruptured (Figure 2).



Figure 1. Duodenum examination results. Description: a. Duodenal hemorrhage, b. Villous rupture, c. Inflammatory cell infiltration, d. Hemorrhage

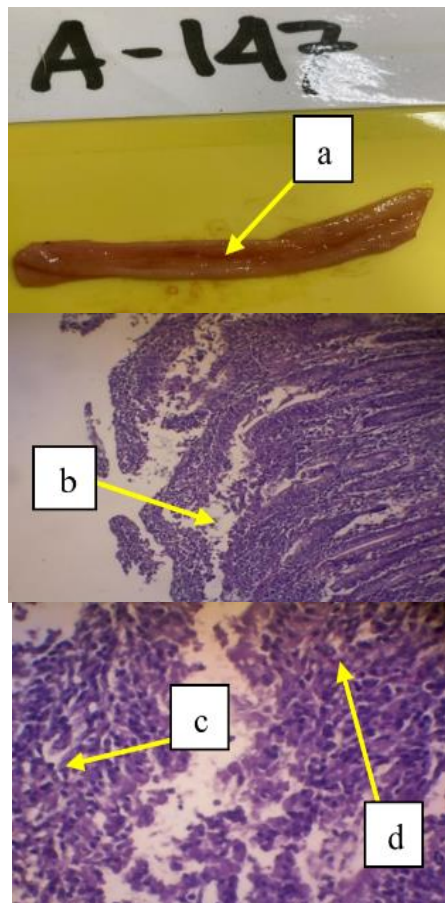


Figure 2. Jejunum examination results. Description: a. Linear hemorrhage of the jejunum, b. Villous rupture, c. Inflammatory cell infiltration, d. Linear hemorrhage.

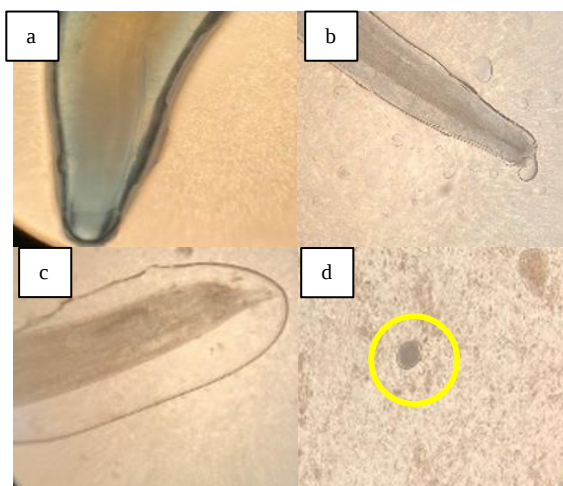


Figure 3. Results of examination for the parasite *Ascaridia galli* (bottom). Description: a. Worm anterior, b. Posterior of male worm, c. Posterior female worm, d. Egg Stage.

The small intestine, including the duodenum and jejunum, has paneth cells which play a role in the natural defense

mechanism against pathogenic microorganisms. Paneth cells are found in the basement membrane of the Lieberkuhn crypt and produce immunoglobulins, lysosomes and bacteriolytic enzymes (Eristiawan et al., 2021). The results of the examination of the intestinal organs on the mucosa macroscopically showed hemorrhage, this was caused by rupture of the capillaries due to endotoxin activity. Zainudin's (2014) research also states that in the same macroscopic condition, there is a picture of thickened intestinal villi that makes the intestine look like a towel and systemic bleeding is visible. Thickening of the small intestine or large intestine can be caused by neoplasia, inflammation, infection, or ischemic conditions (Hidayati, 2019).

The presence of epithelial rupture in the intestine is associated with endoparasite infection. Intestinal examination revealed *A. galli* worm infestation in the intestinal lumen, and microscopic images showed villous erosion, hemorrhage and inflammatory cell infiltration. Inflammatory cell infiltration and epithelial erosion can occur due to inflammatory processes caused by organism activity. Heavy worm infestations cause rupture of the intestinal villi because the worms absorb nutrients from the intestinal villi. This is in accordance with the clinical symptoms of chickens looking weak which could be the result of a lack of nutritional intake. Organisms that attack the intestinal villi will cause a vascular and cellular response to infectious agents, resulting in an inflammatory process. Hemorrhagic conditions can also be caused by damage to the blood vessel endothelium due to the activity of worm larvae so that blood extravasates into and out of the interstitial villi (Haryo et al., 2021).

In this study, *A. galli* worms were found in the duodenum and jejunum of chickens. This is in accordance with Taylor et al. (2016), stated that *Ascaridia galli* will be found when examining the small intestine of poultry parasites, including chickens. *Ascaridia galli* is not a highly pathogenic worm, and while the effects are usually seen in young birds aged around 1-

2 months, adult birds appear relatively unaffected. The main effect is seen during the prepatent phase, when the larvae are in the duodenal/intestinal mucosa. In the duodenum it causes enteritis, which is usually catarrhal, but in very severe infections can become hemorrhagic. In moderate infections, adult worms can be tolerated without clinical symptoms, but if present in large numbers, the large size of these worms can cause intestinal occlusion and death. Nutritional deficiencies can predispose birds to infection (Taylor et al., 2016).

Conclusion

There were changes in the anatomical and histological pathology of the chicken small intestine in this study due to *A. galli* worm infection. *A. galli* infection can cause chickens to appear weak, anorexia (decreased appetite) and also lead to decreased chicken production. It is necessary to regularly administer antiparasitic treatment as a preventive measure.

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