

Newcastle disease in local hens – A case report

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ABSTRACT: Traditional local chicken farming, as opposed to commercial poultry breeds, faces numerous disease-related challenges, with one of the prominent threats being the Newcastle disease virus. This case report describes 8-week-old local hens infected with the Newcastle disease virus detected through epidemiological aspect, pathological, and virology investigations. The morbidity of this farm was 65%, with 20% mortality and 30.7% case fatality rate. The anatomopathology and histopathology examination revealed pathological changes in various organs. Laboratory tests using the Haemmagglutination-Inhibition and Haemmagglutination assays confirmed the presence of the Newcastle disease virus. Based on clinical symptoms, anatomopathological findings, histopathological analysis, virus isolation, and identification, it is concluded that the affected hens were infected with viscerotropic velogenic Newcastle disease.

Keywords:

Newcastle disease, traditional local chicken farming, epidemiology, anatomopathology, virology

■ INTRODUCTION

Newcastle disease (ND) is caused by the Newcastle disease virus from the Avulvavirus genus, Paramyxovirinae subfamily, Paramyxoviridae family causing respiratory, digestive, and neurological organ destruction (Hartaputera *et al.* 2023; Kencana *et al.* 2012). Newcastle disease is endemic in Indonesia (Kencana *et al.* 2016), including in Bali, and is known as tetelo or gerubug (Kencana *et al.* 2012). The high incidence of ND cases found in farms, particularly in native chicken farms, is suspected to be due to the community's lack of awareness regarding Newcastle disease, which can infect native chickens. There is a prevailing belief that native chickens are more robust and resistant to diseases than commercial breeds, leading to negligence in addressing ND on these farms. The existence of the ND virus has been reported in Marga, Tabanan, Bali (Kencana *et al.* 2018), near the location of this case. This study reports the incidence of ND in traditional local chicken farming in Penebel, Tabanan, Bali.

■ CASES

Signalement and anamnesis: Four 8-week-old local hens in Penebel, Tabanan, Bali, Indonesia died and were brought to the Veterinary Pathology Laboratory, Faculty of Veterinary Medicine, Udayana University. According to the farmers' statement, the hens had greeny diarrhoea, loss of feathers, depression, and anorexia before they died. The hens were caged in traditional battery cages in the farmer's backyard. The hens had never been vaccinated. **Epidemiological aspect:**

The farmer has 20 hens, and nine hens have the same clinical signs as the dead hens. **Pathological examination:** An anatomopathological and histopathological examinations were performed. **Virology tests:** Virology tests, including Haemmagglutination-Inhibition (HI) and Haemmagglutination (HA) assays, were performed. Viruses were cultivated and propagated in embryonated chicken eggs.

■ RESULT AND DISCUSSION

Based on epidemiological calculations, the morbidity of this farm was 65%, with 20% mortality and 30.7% fatality rate. This result seems to be below the average compared with Newcastle disease infection in commercial poultry breeds. Commercial poultry breeds have morbidity and mortality averages of 90-100% (Kencana *et al.* 2019).

The results of anatomopathological examination showed that the hens had respiratory tract and visceral infections, including haemorrhage and congestion in the brain. Histopathological examination showed lymphocyte infiltration in the respiratory and visceral organs, including necrotic meningitis (Figure 1). The features of the brain were perivascular oedema, gliosis, lymphocyte inflammatory cell infiltration, necrosis, haemorrhage, and congestion. Even though the

Received: 30-11-2023 | Revised: 15-01-2024 | Accepted: 19-01-2024



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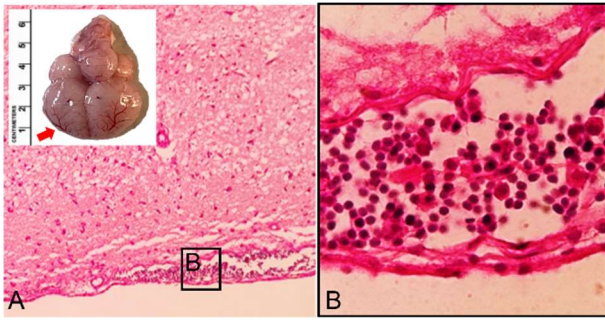


Figure 1. Anatomopathology and Histopathology of hen brain. (A) showing congestion (red arrow) in the hen brain blood vessels, and (B) meningitis necrotica.

chickens did not show neurological symptoms clinically, microscopic observations showed lesions in the brain. This finding indicates that the viruses may reach the brain just before the hens die, thus causing the hen not to have time to show these clinical signs.

The chicken embryo died within two days after virus cultivation and propagation and showed the chicken embryo had hemorrhage over the body (Figure 2A). The HA/HI test result showed that the Newcastle disease virus infected the hens with 2^6 HA unit titers.

The trachea is one of the first tissues encountered by the Newcastle disease virus. The virus is spread by macrophages (leukocytic trafficking) to regional defense glands. The virus replicates in the regional defense glands, followed by primary viraemia. Secondary viraemia occurred after the primary viraemia. The lymphoid system spreads the virus until it reaches the epithelial cells of the respiratory tract mucosa, kidney mucosa, digestive tract, and the nervous system (Ma'arif *et al.* 2022).

The symptoms observed by the owner in the case animal were greenish diarrhoea that can occur due to viruses replicating in the mucosal epithelium of the digestive tract and damaging the intestinal villi (Figure 2B). This condition disrupts the nutrient and water absorption processes. The greenish colour of faeces is caused by disruption of the liver and pancreas in the production of bile and digestive enzymes (Hewajuli & Dharmayanti 2011).

According to previous studies by Adi *et al.* (2010) and Adi *et al.* (2019), the pathotype of the virulent ND virus that was spread in Indonesia, especially in Bali, was dominated by the viscerotropic velogenic type because it was dominated by changes that occur in the gastrointestinal tract. However, it also shows changes in the central nervous system, which usually occurs in chronic cases. In addition, Kencana *et al.* (2019) stated that the seroprevalence of Newcastle disease in local hens in Kerambitan, which is part of Tabanan, was 11.9%.

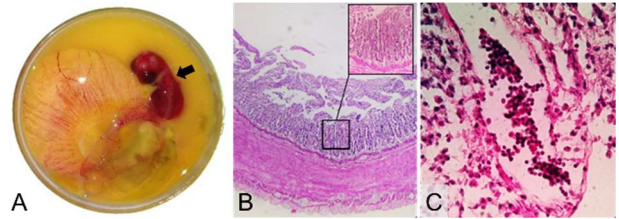


Figure 2. Viruses cultivation in embryonated chicken eggs. (A) Died chicken embryo. A general hemorrhage over the chicken embryo body were examined (black arrow), (B) Histopathology of the hen intestines, and (C) showing enteritis necrotica.

CONCLUSION

Based on anamnesis, clinical symptoms, epidemiological data, anatomopathological changes, histopathological changes, confirmation of the diagnosis by using HA/HI test results, it can be concluded that the hen was positively infected with the viscerotropic velogenic ND virus.

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