A Field Study of Avian Encephlomyelitis in Turkeys

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Abstract

Abstract section. Avian encephalomyelitis (AE) is a worldwide and economically important viral disease of chickens, turkeys, quail, and pheasants. Avian encephalomyelitis is a viral infection affecting the CNS in the species mentioned above. Diagnosis is based on history, clinical signs and histopathology and the isolation of the virus. The clinical lesions were described in some infected flocks of turkey in Lushnje, Albania. The clinical, pathological lesions and histopathology findings of avian encephalomyelitis (AE) were described in variuos tissues of infected turkeys from Lushnje, Albania. There were controlled three flocks and the age of animals were of 42 days old. Encephalomyelitis in turkeys was diagnoses according to clinical signs, necropsy control and histopathology findings. Histopathology diagnoses of AE was done on various affected tissues of animals. In the affected flocks, there were seen animals with clinical signs like as ataxia and rapid tremor of the head and neck giving rise to the former name "epidemic tremor". The other observed clinical signs were depression, anorexia, incoordination of the extremities due to paresis, deformity, dehydration and low weight. In some turkeys were observed ascites, lesion in the kidneys, intestines and gizzard at the necropsy. No gross lesion was seen in the brain of turkeys infected with avian encephalomyelitis.The main histopathology alterations, included oedema and congestion, were seen in visceral organs and in the brain, where there were thickened meninges and a lot of infiltrations of lymphocytes and macrophages. In conclusion of our study, we can confirm that avian encephalomyelitis cause health and economic problems in poultry. The most important finding occurs in the brain, accompanied by thickened of meninges and perivascular cuffing The disease has to been under control by vaccination of the parent stock and the serological control of animals prior to egg production by ELISA, especially in flock with history of AE.

Keywords: Avian encephalomyelitis, histopathology, turkeys

1. Introduction

Avian encephalomyelitis (AE) is a virus disease and it primarly affect poultry. Avian encephalomyelitis virus (AEV) belongs to the *Picornaviridae* family, genus *Tremovirus*, which exhibits tropism by central nervous system of chickens, turkeys, pheasants, quails and pigeons [3], [9], [6], [15].

The AEV is vertically and horizontally transmitted in birds [4]. So, there is variation in tropism and virulence, which can be enterotropic with horizontal transmission or neurotropic with vertical transmission [13]. The infection by the AEV occurs mainly through the oral - fecal route and the clinical signs appear later in animals. Mortality can arrive over 50% of the birds in a flock [5].

Encephalomyelitis in turkeys is not a zoonotic disease but it is important for public [10], [14].

The clinical signs of disease are of the neurological type (ataxia and tremor of head and neck) and muscular atrophy [16]. The most frequent symptoms are depression, ataxia, paresis or paralysis, incoordination of the extremities and tremors of the head and legs [12], [19].

Macroscopically lesions are difficult to visualize, although pale and punctiform areas can be found in the proventriculus and gizzard [4]. Microscopically, the main lesion consists of nonsuppurative encephalomyelitis [18].

Histopathology is considered of essential, and it provides the definitive diagnosis of the disease, as demonstrated by the pathognomonic lesions in various

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tissues, such as the central nervous system, proventriculus, etc. [17].

The disease has to been under control by vaccination of the parent stock and the serological control of animals prior to egg production by ELISA, especially in flocks with history of AE.

This field study describes the clinical and histopathological aspects of the avian encephalomyelitis in some infected turkey farms in Lushnje, Albania.

2. Material and Methods

The study was carried out at the Laboratory of Histopathology, Faculty of Veterinary Medicine, the Agricultural University of Tirana, Albania. There were controlled three flocks and data collected from turkeys of 42 days of age were studied. Samples were taken in some turkey complexes, in Lushnje area. These complexes have been suspected of the avian encephalomyelitis. The clinical history has reported neurological symptoms such as depression, anorexia, neck tremor and incoordination of extremities because of paresis, as well as.

Twenty turkeys of the affected flocks were clinically examined, and clinical signs were noted. Seven turkeys which have demonstrated neurological signs were necropsied and samples of the brain, kidney and small intestine were collected, fixed in formalin buffered solution and processed according to routine methods. The samples were stained with hematoxylin and eosin (Merck-Darmstadt-Germany) and they were observed under the light microscope (MOTIC, BA 210).

During the necropsy in some turkeys were observed ascites, lesions of kidneys, and GI, but not in the brain. There aren't seen gross lesions in CNS.

3. Results and Discussion

The results of this field study of an avian encephalomyelitis (AE) outbreak in turkeys, in Lushnja area are presented. This paper describes the clinical signs, gross lesions and histopathological findings.

The disease affected 3 flocks with about 180 animals (from day one until 50 days) leading to mortality of 6.15% (11/180) of the flock.

Twenty turkeys were clinically examined. Seven animals with neurological signs were necropsied and samples of the brain, kidney and small intestines were collected for histological examination. Clinical signs were observed in approximately 40% of the turkey flocks and included depression, ataxia, head and neck tremors, and motor incoordination.

The diagnosis of AE in turkeys from this study was based on clinical signs, gross lesions and microscopic findings, characteristic of the disease, like those reported in previous studies [18], [8], [2], [5].

There were observed the depression, anorexia, ataxia, neck tremor, and incoordination of extremities and their paresis during the clinical inspection of the three infected flocks.

At necropsy, turkeys with neurological signs didn't show gross lesion on the brain. In some turkeys were observed ascites, lesions in the kidney, and intestines at the necropsy. The kidneys were dehydrated and it was suspected for nephritis or renal necrosis. The presence of the liquid was observed at the GI. There were hyperemic blood vessels of the cerebral cortex.

Histopathological findings observed in the central nervous system were characterized mainly by thickened meninges, hyperaemia of blood vessels, and perivascular patches (cuffs), (figure 1a); indicating virus encephalitis, suggestive of AEV [4], [13], [5], [14].

Microscopic findings in the **brain** consisted of hyperaemia from the meningeal and cortex' blood vessels (Figure 1b). There were thickened meninges and there was lymphocytic inflammatory infiltrate in the perivascular spaces in the grey matter of the cerebral cortex. These infiltrations are known as perivascular patches and they are one of the most characteristic findings of AE [4], [13], [5].

The areas containing macrophages, and diffuse mononuclear inflammatory infiltration which there were also observed in the brain stem.

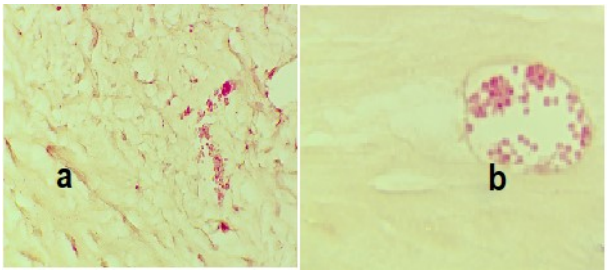

Figure 1. a. Lymphocytic perivascular patches in the brain. H-E, X40.

b. Brain vessels with congestion. H-E, X40.

Kidney: There was congestion throughout the kidney as it can see in the figure 2a. There are affected both cortical and medullary parts**.** In figure 2b, the kidney

tubules are accompanied by congested vessels and light necrosis.

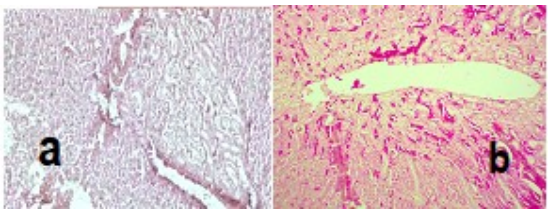

Figure 2. a. Kidney congestion. H-E, X40.

b. Kidney tubules accompanied by congested vessels. H-E, X20.

Intestinal tract: The serous layer of intestine is thickened and it can see in figure no 3a. There was congestion in blood vessels of small intestine and it can see in figure no. 3b.

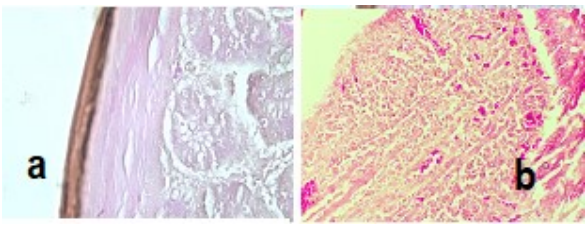

Figure 3. a. Thickening of the serosa. H-E, X40.

b. Intestinal congestion. H-E, X40

In our study were described the spontaneous cases in turkeys diagnosed with encephalomyelitis. AE practically occurs all over the world [18], [16].

The diagnosis of AE in laying hens from this study was based on clinical signs, gross and microscopic findings characteristic of the disease, like those reported in previous studies [18], [8], [2], [5], [11]. Histopathological findings observed in the central nervous system were characterized mainly by hyperaemia, and perivascular cuffs, indicating virus encephalitis, suggestive of AEV [4], [13], [5],

Although birds of all ages can be affected by AEV, in this study turkeys about 40 days of age presented clinical signs, which was also observed by [8], [20].

So far, in Lushnja area, there were no recent reports of AE in turkeys. Thus, the possibility of the emergence of new strains of *Tremovirus* for which there is no cross-immunity with the vaccination currently used should be better investigated such as recommended by [5]. However, it is more likely that the cases of AE described in this study are due to mistakes during the vaccination process of the light fowl that do not allow adequate transmission of immunity to the progeny resulting in clinical disease.

However, with the occurrence of recent cases of this disease in the Lushnje area and because the virus has great stability in the environment, leading contaminated areas to be infected for long periods, poultry producers and veterinarians should be aware of suspected cases.

It should be considered in the differential diagnosis of AE, Newcastle disease, as well as. In Newcastle disease, turkeys infected with viruses present neurological signs including muscle tremors, limb paralysis and torticollis. Microscopically the lesions consist of lymphoid necrosis and nonsuppurative encephalomyelitis with neuronal degeneration, gliosis, perivascular cuffs, and endothelial cell hypertrophy. These lesions usually occur in the cerebellum, brainstem, spinal cord [1], [7]. Based on the clinical and pathological findings, it was possible to diagnose of avian encephalomyelitis in commercial turkeys from owners.

4. Conclusions

In conclusion, we underline that encephalomyelitis causes health and economic problems in turkeys. AE is a nervous disease that mostly affects chickens, turkeys, pheasants and Japanese quails. The cause of this increase is not yet clear, but vaccine or vaccination failures are suspected. The findings of histopathology for AEV could be considered as a definitive diagnosis of the disease.

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