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Occurrence of lymphoid leukosis in poultry population of Mizoram

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ABSTRACT

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A study were undertaken to survey the prevalence of viral diseases of Poultry in Mizoram during March, 2013 to February, 2014. Out of 476 poultry carcasses examined, 208 (43.69%) cases were diagnosed as viral diseases. Among the viral diseases, 28 (5.88%) cases of lymphoid leukosis were recorded based on clinical history, gross and microscopic changes. The disease was found to occur in adult birds above 12 weeks of age with percent morbidity and mortality of 2-3% and 1.5-2.4%, respectively. The characteristic signs recorded during the study included weakness, diarrhea, dehydration, emaciation, anorexia, pale wattle and enlargement of the abdomen. The significant gross lesions were severe emaciation and dehydrated carcasses, markedly enlarged liver and spleen. Microscopically, liver, spleen and other visceral organs revealed aggregates of large lymphoid cells (lymphoblasts) of variable sizes. Confirmatory diagnosis was done based on characteristic microscopic changes in the affected organs.

Keywords: Diagnosis, Lymphoid leukosis, Mizoram, occurrence

Lymphoid leukosis is the most common naturally occurring B-cell lymphoma of chickens caused by Avian Leukosis Virus (ALVs)[1]. Chickens are the natural hosts and it affects birds above 14 weeks but the incidence is highest at sexual maturity[2]. Transmission of ALV and reticuloendotheliosis virus (REV) occurs both horizontally and vertically[2,3]. In general, sporadic cases appear in all flocks causing approximately 2-3% mortality[4]. Lymphoid leukosis have few typical clinical signs like inappetence, weakness, diarrhea, dehydration, emaciation, pale wattle[3]. Infected chickens become depressed before death. Palpation often reveals an enlarged bursa and liver[1]. Infected birds may not necessarily develop tumors, but there is drop in egg production[5]. Renal tumours may cause paralysis due to pressure on the sciatic nerve[1]. Gross lesions include splenomegaly, renomegaly and hepatomegaly and the liver and spleen were almost twice the size of normal organs[6]. The visible tumours involving whole liver, spleen, bursa, kidney, lung, gonad, heart, bone marrow and mesentery may be seen. Tumours are soft, smooth and glistening, a cut surface appear greyish to creamy white and seldom has area of necrosis. Tumour growth may be nodular, miliary, diffuse or combination of all these forms. In the nodular form, the lymphoid tumours vary from 0.5-5 cm in diameter and may occur single or in large number. The miliary form is mostly seen in liver and consists of numerous small nodules less than 2mm in diameter. In diffused form, the organ is uniformly enlarged, slightly greyish in colour and usually very friable[1,3]. Occasionally, the liver is firm, fibrous and gritty[1].

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Diagnosis is mostly based on history, clinical sign, gross and microscopic changes. For confirmatory diagnosis. Indirect biologic assays such as complement fixation for avian leukosis (COFAL), antigen capture-enzyme linked immunosorbent assay (ac-ELISA), and Radioimmunoassays (RIF) tests are used to detect the presence of ALVs[7,8]. Molecular test like PCR can also be used for detection of ALV[9]. The present communique deals with the occurrence of lymphoid leukosis in poultry in Mizoram.

Both organized and unorganized poultry farms of Mizoram were visited regularly during the study period from March, 2013 to February, 2014 and the morbidity, mortality, age of affection of various diseases were recorded. In case of mortality/outbreak of diseases in the poultry population, the clinical signs exhibited by the individual bird during illness were recorded in details according to the description of the respective poultry farm's owner or attendant. In addition, sometimes some sick/moribund birds were kept under careful observation with feed and water *ad libitum* till death to record the detailed clinical signs along with other abnormalities. Detailed post-mortem examination of all the dead birds was performed and gross changes were recorded. Representative tissue samples from heart, liver, spleen, lungs, kidneys, bursa of Fabricius, trachea, proventriculus, caecal tonsil, brain, feather follicles, etc. showing lesions were collected in 10% formalin for histopathological examination. The formalin-fixed tissues were processed conventionally and stained with Mayer's hematoxylin and eosin[10]. The diagnosis of the disease was made basing on the clinical signs, characteristic gross and microscopic changes.

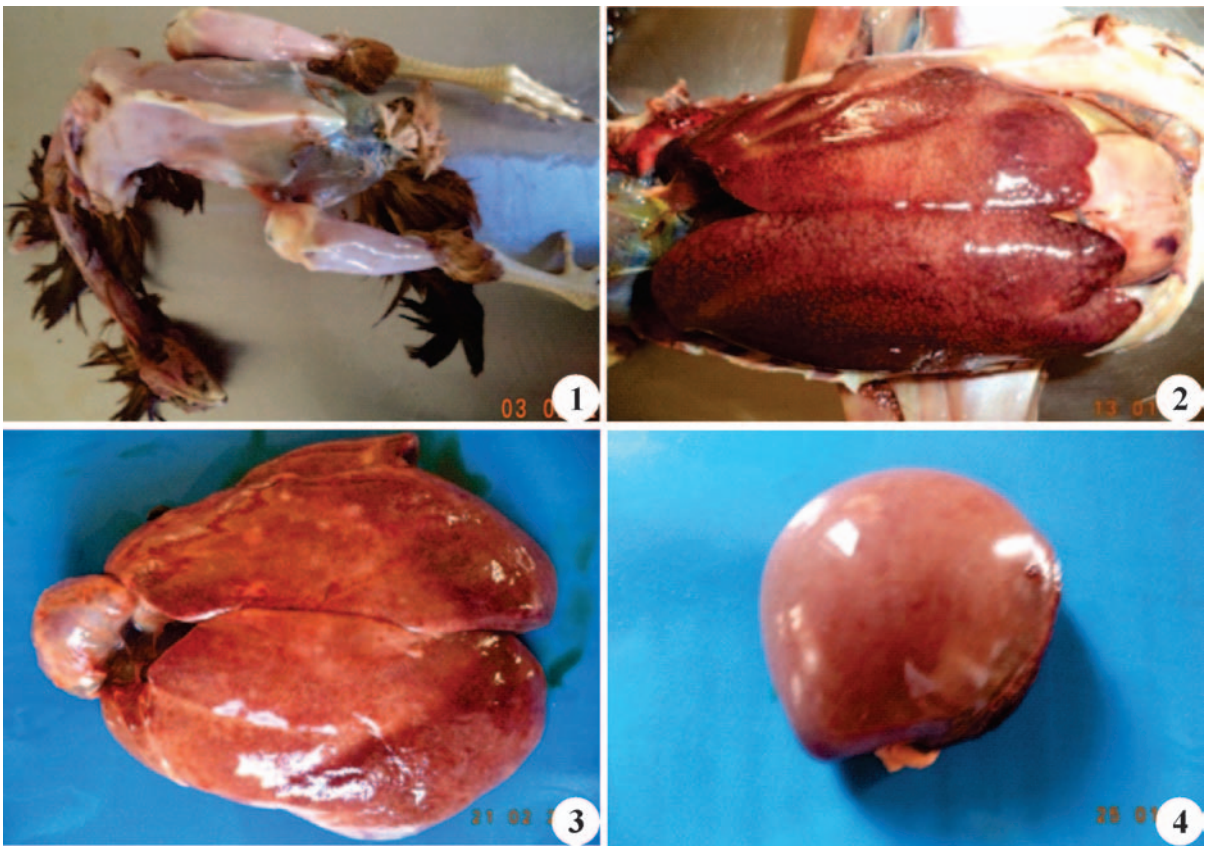

Fig.1. Carcass of a layer bird showing severe emaciation and dehydration; **Fig.2.** Enlargement of liver occupying the whole abdomen; **Fig.3.** Enlarged liver withnodular lesions; **Fig.4.** Marked enlargement of spleen

Out of 476 poultry carcasses examined, 208 (43.69%) cases were diagnosed as viral diseases. Among the viral diseases, 28 (5.88%) cases of lymphoid leukosis were recorded based on clinical history, gross and microscopic changes. In the present study, the cases of lymphoid leukosis were seen in adult birds above 12 weeks of age, mostly at sexual maturity, which is in accordance with earlier workers[2,11,12] who observed that in field outbreaks, lymphoid leukosis can occur at any time after 14 weeks but the incidence is highest at sexual maturity. The morbidity (2-3%) recorded during the present study was nearly similar to the earlier report[1], while the mortality (1.5-2.4%) was relatively lower, although it lent support to the findings of another worker[13] who observed that sporadic cases of lymphoid leukosis generally appear in all flocks causing approximately 2-3% mortality. The lower incidence of the disease recorded in the present study might be due to the wide spread occurrence of infectious bursal disease in this region, as the bursa is required as a target organ for the initial transformation to lymphoid cells[1,11,12].

The affected birds showed clinical signs of weakness, diarrhea, dehydration, emaciation, anorexia and pale wattle, which showed similarity to those observed by previous workers[3]. Infected chickens became depressed before death. Palpation often revealed a markedly enlarged bursa and liver, which resulted into distension and enlargement of the abdomen, supporting the earlier descriptions[1]. Drop in egg production was also seen in some layer bird, corroborating with the earlier observations[5].

Most of the carcasses showed severe emaciation and dehydration (Fig. 1), which might be due anorexia and diarrhea during the disease course. There was marked enlargement of liver that occupied the whole abdominal cavity (Fig. 2). Visible tumors were found on the liver surface, which were soft, smooth and glistening (Fig. 3). The cut surface of the tumors appeared greyish to creamy white and seldom had area of necrosis. Similar gross lesions have been described by the early researchers[1,3]. In most cases, the spleens were significantly enlarged, which were almost twice the size of normal organs (Fig. 4). The kidneys were congested, enlarged and nodular in appearance (Fig.5). The lungs were congested and consolidated in most of the cases. These findings supported the observations ofearlier workers[6], who recorded similar changes. The bursa of few birds had congestion, enlargement and nodular in appearance (Fig. 5), which agreed with the previous report[14].

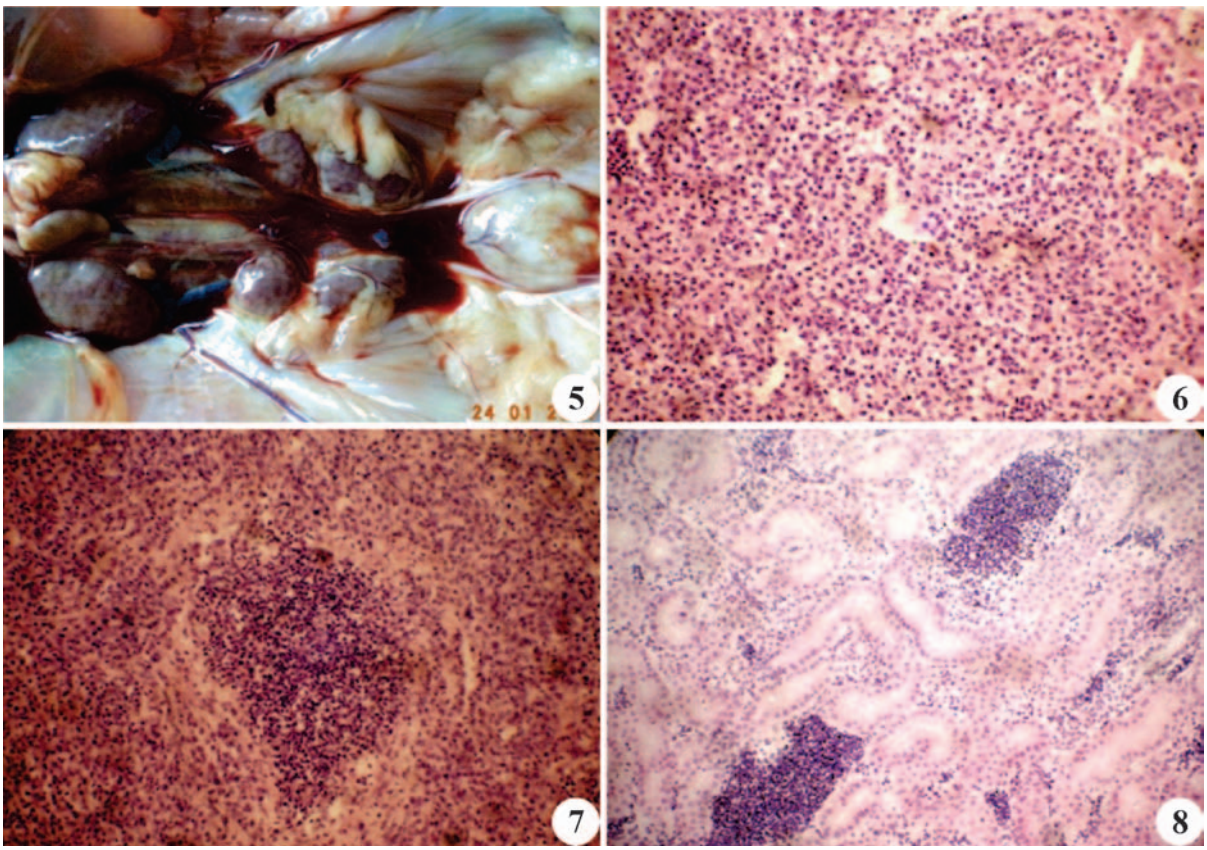

Fig.5. Enlarged, congested and nodular kidneys and bursa of Fabricius; **Fig.6.** Liver section showing proliferation of lymphoid cells. H&E x200; **Fig.7.** Spleen showing proliferation of cells.H&E x200; **Fig.8.** Kidney exhibiting aggregates of proliferating lymphoid lymphoid cells. H&E x200.

Microscopically, the sections of the visceral organs such as liver, spleen, lungs and kidneys showed aggregates of proliferating lymphoid cells, which displaced and compressed the parenchymal tissue of the organs (Fig. 6,7,8). These findings were similar to earlier observations of several researchers[3,6,14,15,17]. Some sections of the kidneys showed congestion, swollen and degenerated tubular epithelial cells and lymphoid aggregation in the interstitium, which were in congruence with previous reports[18]. Sections of bursa revealed diffused lymphoid proliferation in the follicles, which agreed to the description of earlier workers[1,19,20]. Caecal tonsils showed thickening of the lamina propria and villi which might be due to lymphoproliferation.

In conclusion, from total 476 birds examined, 28 (5.88%) cases of lymphoid leukosis were diagnosed based on characteristic microscopic changes of proliferating lymphoid cellaggregates in the affected organs.

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