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## Myeloid leucosis in a backyard chicken

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### Abstract

A rare case of myeloid leucosis was diagnosed based on characteristic gross and histopathological lesions in a backyard chicken which was presented for post-mortem examination to the Department of Pathology, College of Veterinary Science, Korutla. Grossly, multiple, soft, friable, cream coloured nodules of varied size were noticed on inner surface of ribs, sternum, at costochondral junction, pelvis, vertebral column, keel bone, on the serosal surface of peritoneum, liver, lungs, air sacs, heart and kidneys. Cut section of the nodule was grey to white colored, soft and granular in consistency. Liver and spleen were enlarged, fragile and yellowish grey colored. Kidneys were markedly swollen and had light grey to white colored tumour masses on its surface. Histopathological examination of the affected tissues revealed marked intravascular and extravascular proliferation of solid masses of uniform mature myelocytes. The tumor cells had a large, hyperchromatic, vesicular, eccentrically placed nucleus and few eosinophilic cytoplasmic granules.

**Keywords:** Myeloid leucosis, myelocytes, chicken, nodules

### 1. Introduction

Avian leucosis or sarcoma group of viruses induce erythroid, myeloid and lymphoid leucosis in chicken. Myeloid leucosis is a neoplastic disease of poultry caused by subgroup J of ALV belongs to retroviridae family. It is an uncommon disease and generally occurs as a sporadic disease in adult birds [1]. The infection mostly found in breeders and commercial layers because of its long incubation period upto 14 weeks [2] but it is also recorded in broiler flocks [3]. The transmission of virus occurs by both horizontal and vertical route. It has economic importance because it decreases yield in meat type chicken and also increases mortality. It may occur as myeloblastosis or myelocytomatosis. In myeloblastosis form, grossly liver, spleen and other organs are enlarged. In myelocytomatosis form, cream-coloured myelocytomas are noticed on the skeleton, particularly on the inner aspect of the sternum and on the skull. Myelocytomas can also be seen in the oral cavity, trachea and eye. ALV-J has a tropism for chicken bone marrow cells and induces their neoplastic transformation [4]. The myeloblastosis form is comprised of immature myelocytes with few cytoplasmic granules and tumour cells are present both extravascularly and intravascularly in various organs. Myelocytomatosis form affects more mature myelocytes and tumour cells vary from well differentiated myelocytes with conspicuous eosinophilic granules to poorly differentiated myelocytes with few or no granules. In both myeloblastic and myelocytic forms the bone marrow is replaced by neoplastic myeloid cells [5].

Present communication describes a rare case of myelocytomatosis form of myeloid leucosis in naturally infected backyard chicken which was diagnosed on the basis of pathognomonic gross and microscopic lesions.

### 2. Materials and Methods

A backyard chicken was presented for necropsy to the Department of Veterinary Pathology, College of Veterinary Science, Korutla. A detailed history was collected from the owner and clinical signs were noted. Then post-mortem examination was performed and gross lesions were recorded. For histopathological examination, respected tissue samples from the tumour masses over various organs were collected in 10% neutral buffered formalin. Tissues were fixed for 24 hours in 10% neutral buffered formalin. After fixation, tissues were washed in running tap water for overnight, dehydrated in ascending grades of alcohol, cleared in xylene and then embedded in paraffin. Rectangular paraffin blocks were made by using L-shaped moulds. 5µm thick sections were cut from the paraffin blocks using microtome. Sections were taken on to a clean and dry slide which was smeared with egg albumin and glycerine.

Then sections were dried and stained with Haematoxylin and Eosin as per the standard protocol [6].

### 3. Results

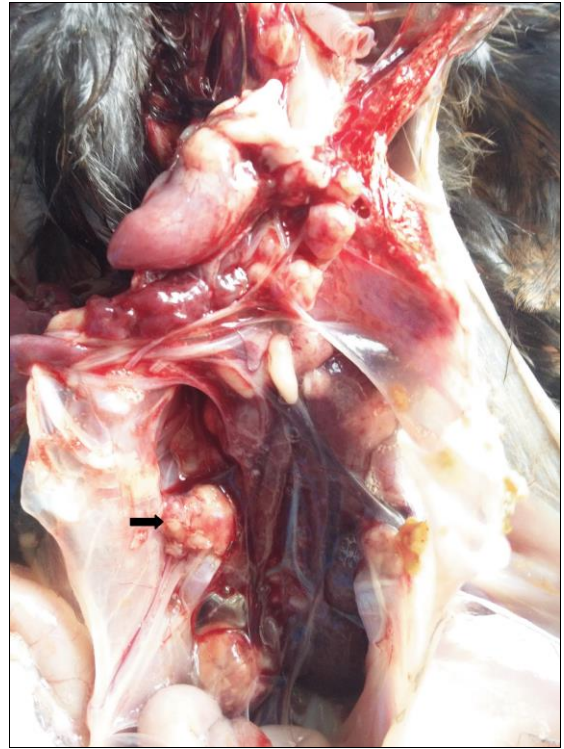
**3.1 Clinical signs:** History taken from the owner revealed that the affected bird showed some non-specific clinical signs including depression, anorexia, pale combs and wattles, emaciation and anaemia.

**3.2 Gross lesions:** On post-mortem examination, variable sized, multiple, soft, friable and cream coloured nodules were noticed on inner surface of ribs, sternum, Costochondral junction (Fig. 1), visceral surface of the pelvic bones, vertebral column and keel bone. The tumorous growths were also observed on the serosal surface of peritoneum, liver, lungs, air sacs, heart and kidneys (Fig. 2). Cut section of the nodule was grey to white colored, soft and granular in consistency. Liver and spleen were enlarged, fragile, mottled and yellowish grey colored. Kidneys were markedly swollen and had light grey to white colored tumour masses on its surface.

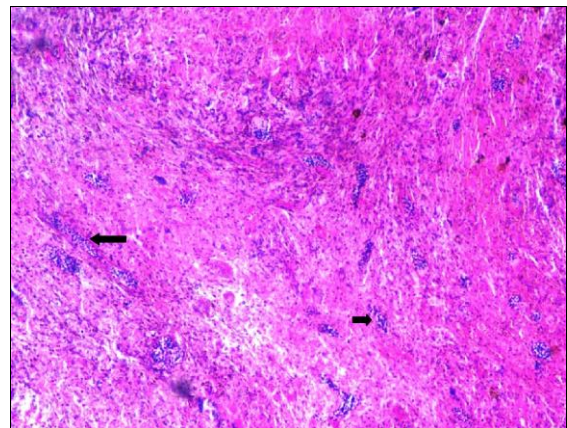
**3.3 Histopathological Lesions:** On histopathological examination, the sections taken from the tumorous growths over the ribs, sternum, pelvic bones, vertebral column, keel bone, peritoneum and lungs revealed a marked intravascular and extravascular proliferation of solid masses of uniform mature myelocytes (Fig. 3 & 4). The nucleus in neoplastic myelocytes was large, round, hyper chromatic, basophilic, vesicular and eccentrically placed. The cytoplasm of tumour cells was slightly basophilic and contained few eosinophilic pinkish granules (Fig. 5). There was increase in nucleus: cytoplasmic ratio and marked nuclear pleomorphism was observed in tumour cells. In liver, diffuse infiltration of proliferating myelocytes was noticed within and around the blood vessels of portal triad and also in hepatic parenchyma which replaced most of the hepatic cells. Focal areas of necrosis were also noticed. In kidney, tumour cells infiltrated in between the tubules. In spleen, neoplastic cells were widely distributed in both the red pulp and the white pulp.



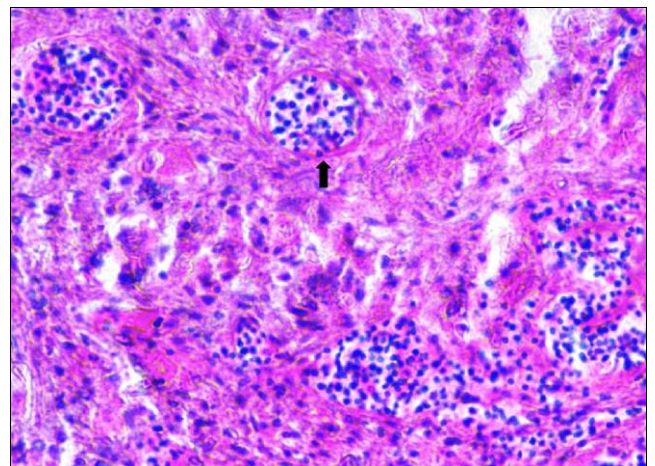
**Fig 1:** Multiple, variable sized, soft, friable and cream coloured nodules on inner surface of the ribs, sternum and at costochondral junction in myelocytomatosis (arrow)



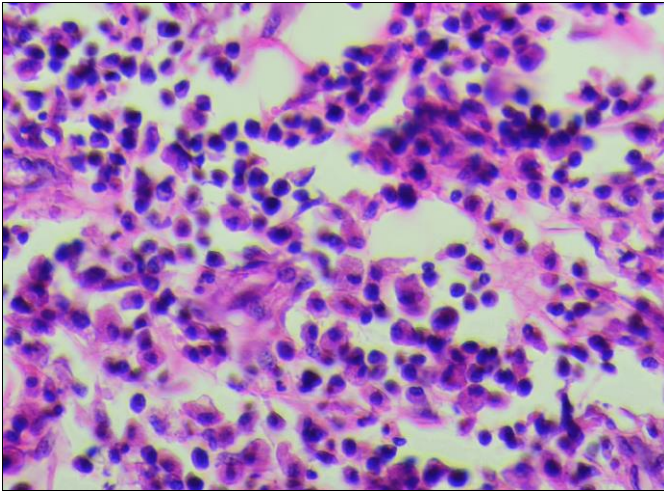
**Fig 2:** Tumorous growths on bones around the kidneys in myelocytomatosis (arrow).



**Fig 3:** Section from tumorous growths over the rib showing marked intravascular proliferation of solid masses of uniform mature myelocytes (arrow). H&E x10



**Fig 4:** Section from tumorous growths over the rib showing marked intravascular proliferation of solid masses of uniform mature myelocytes (arrow). H&E x40



**Fig 5:** Section from tumorous growths over the rib showing neoplastic myelocytes with large, round, hyper chromatic, eccentrically placed nuclei and cytoplasm with few eosinophilic pinkish granules. H&E x40

#### 4. Discussion

ALV subgroup J was first reported in the United Kingdom in 1989 [7]. It is having tropism for cells of the myeloid lineage in chicken bone marrow and induces their neoplastic transformation [8] hence in present case; the tumorous nodules may be formed on inner surface of the various bones like ribs, sternum, pelvic bones, keel and vertebrae. Similar types of gross lesions were recorded by previous researchers [9-11]. The proliferating neoplastic myelocytes from the bone marrow may invade the blood and reach the liver, spleen and kidney [12] hence in present study; microscopic infiltration of myelocytes was noticed in liver, spleen and kidneys along with the various bones. The neoplastic myelocytes had large nuclei of different shapes with evident nucleoli and their cytoplasm was filled with eosinophilic granules. Similar features were also observed by earlier workers [1, 10, 11, 13-16]. ALV-J is broadening its host range and its occurrence was also reported in ducks. 25-30% mortality, 20-30% drop in egg production and 60-65% drop in hatchability was reported in ducks affected with ALV-J [17]. Recently most cases of ALV-J infection reported in Chinese local chicken [18]. In present case also the infection was reported in backyard local chicken. ALV-J inhibits the growth and causes damage to immune organs in infected chickens [19]. In present study the spleen was infiltrated with neoplastic myelocytes and showed severe degenerative changes that may be resulted in immunosuppression and death in infected chicken.

#### 5. Conclusion

In conclusion, we report here a rare case of myelocytomatosis form of myeloid leucosis in a backyard fowl which was diagnosed on the basis of gross and characteristic histopathological findings. It is one of the rare neoplastic disease which causes huge mortality in poultry farms and it can be controlled by applying strict hygienic measures, by removal of the infected birds as it is transmitted by both horizontal and vertical routes and so far no vaccines are available in India to prevent myelocytomatosis.

#### 6. Acknowledgements

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