A Clinical and Histopathologic Report of Myeloid Leukosis (ML) in Broiler Breeder in Iran

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Abstract: There are 3 most important neoplastic diseases of poultry, namely Marek’s disease, caused by a herpes virus, and the avian leukosis & reticuloendotheliosis, caused by retroviruses. Among these tumors, the leukosis sarcoma for their epidemiologic characterizes, vertical transmission, variety of virus subgroups and different clinical forms are very important. A case of myeloid leukosis (ML) was observed in broiler breeder flock in north of IRAN. It was initiated from 14 week old with blood blister (hemangioma) in the skin, eyelid and internal organs like liver, ovary and kidneys. This situation have occurred sporadically and continuous to end of the production period and causes about 1% mortality. By increasing the age of flock especially in production period the enlargement of internal organs like liver, kidney… with diffuse and miliary tumor was seen. Also the skeletal tumors which were creamy in color and affected the inner surface of the sternum, ribs, vertebrae and synsacroma was observed. This form of myelocytoma tumor continued for several months and the mortality rate increased near the peak of production and caused about 4% mortality. The diseases continued for several months and cause mortality and lose of performance. Microscopically the skeletal tumors consist of solid masses of uniformity differentiated mature myelocytes with abundant eosinophilic cytoplasmic granules. The liver involvement consisted of marked accumulations of immature granulated myelocytes around portal areas and in the parenchyma .The histopathologic results showed that the microscopic characteristic of cutaneuse lesions and visceral tumor were in agreement respectively with hemangioma and myelocytoma.

Key words: Myeloid leucosis (ML), Histopathology, Broiler breeder, Iran.
INTRODUCTION

Neoplastic diseases of poultry comprise a variety of related and unrelated conditions possessing a single common denominator: neoplastic character. This group of diseases is divided into 2 main categories, depending on whether the etiologic agent is known. One category comprises tumors with known viral etiology. This group of tumors is very contagious and causes economically severe losses in the poultry industry by producing tumor, increasing mortality and decreasing performance in chickens. The second are tumors with unknown agent that occur sporadically and are not economically important. There are 3 most important viruses’ induced neoplastic diseases of poultry, namely Marek’s disease, caused by a herpes virus, the avian leukosis and reticuloendotheliosis, caused by retroviruses. Viruses induced tumors are principally of mesodermal origin and are transmissible. Among the viruses that induced tumor, the leukemia sarcoma viruses for their epidemiologic characterizes, vertical transmission, variety of virus subgroups and different clinical form are very important [2, 6].

The group of leukoses, sarcomas, and related neoplasms induced by a number of closely related avian retroviruses termed the leukemia/sarcoma (L/S) viruses. The term “leukosis” is used because a leukemic blood picture is not always present during the course of leukemia-like proliferative diseases of the hemopoietic system. The various forms of hemopoietic system neoplastic changes induced by the L/S group of avian retroviruses include the lymphopoietic (lymphocytic) system, the erythropoietic (red cell) system, and the myelopoietic (myelocytic) system. Lymphoid leukosis, a lymphoproliferative disease of chickens, affecting primarily the bursa of Fabricius and visceral organs, is the most common form of leukosis that arises from infection with a member of L/S group of viruses known as avian leucosis virus (ALV). Other neoplasms of hematopoietic origin, which can also be seen in ALV-infected chickens, albeit infrequently, include erythroblastosis, myeloblastosis, myelocytomatosis, and certain related neoplasms such as nephroblastoma and osteopetrosis.

However, with the recognition of subgroup J, ALV infection, myelocytomatosis, as a neoplastic condition is frequently detected in affected chickens. This type of ALV, which was called HPRS103 and then coined ALV-J was first isolated from heavy breeders and
characterized in the United Kingdom in 1989 and the first publication concerning this type, appeared in 1991 by Payne et al., in England [3]. Since then this ALV-J type leukemia has been observed in several broiler breeder flocks in USA [1] and all kinds of chickens from all over the world [7, 8, 9]. Investigators have demonstrated that the subgroup J virus appears to be a recombinant of subgroup E (endogenous) and an exogenous avian leukemia virus subgroup [5].

Case Presentation

Clinical Report: The hemangioma and myelocytoma was observed in a broiler breeder flock. The disease was started from 14 week old with blood-filled cystic masses (blood blisters) in the skin and in visceral organs (liver, kidney and ovary). This situation have occurred sporadically and continuous to end of the production period and causes about 1% mortality. Also the tumor of internal organ in liver, spleen, ovary, and mesentery, serosal surface of intestines and on the inner surface of the sternum, ribs, vertebrae and synsacroma was observed. This form of myelocytoma tumor continues for several months and the mortality rate increased near the peak of production and caused about 4% mortality.

The clinical feature of disease first started with skin lesions as hemangioma nodules or blood blisters. Sometimes the hemangioma nodules were ruptured and made feathers bloody and attract other birds to pick the lesion and cause fatal hemorrhage. These tumors were found in the skin, eyelid, and visceral organs (Fig. 1). After started the internal tumors the mortality rate increased, flock's performance decreased and some affected birds became weak and recumbent.

Figure 1: Hemangioma of the upper eyelid with dark tumor nodule and bloody feathers around it.
**Gross and Microscopic Lesions:** Hemangioma were found in skin, eyelid and visceral organs like liver, kidneys and ovary as blood-filled cystic masses or more solid tumors and consist of distended blood-filled spaces lined by endothelium or as more cellular, proliferative, lesions. The cavernous form was characterized by greatly distended blood spaces with thin walls composed of endothelial cells.

The most frequent gross lesions associated with myelocytoma include: skeletal myelocytoma (Fig. 2) which were creamy white in colour and affected the inner surface of the sternum, ribs, vertebrae and synsarcum, moderate to great enlargement of the liver caused by diffuse or miliary tumor infiltration, miliary tumor infiltration of mesentry and serosal surface of intestine (Fig. 3).

![Figure 2: Myelocytoma on the inner surface of sternum and ribs](image1.jpg)
Tumors are also found in the kidney, spleen, and ovary. Microscopically the skeletal tumors consist of solid masses of uniformity differentiated mature myelocytes with abundant eosinophilic cytoplasmic granules. The liver involvement consisted of marked accumulations of immature granulated myelocytes around portal areas and in the parenchyma (Fig. 4).

Figure 4: Immature granulated myelocytes from area of diffuse myelocytomatosis in liver

DISCUSSION

Myeloid leucosis (ML) or myelocytomatosis/myeloblastois are caused by a retrovirus in the avian leucosis/sarcoma group of retrovirus (ALV). This ALV subgroup J virus which is identified as the etiologic agent for ML, has caused substantial losses in heavy breeders and characterized in the United Kingdom in 1989. All strains of heavy breeders are susceptible, to a degree, to ML [4]. Commercial leghorn chickens are also susceptible to infection, but appear to be resistant to tumor development and genetic difference among lines of white leghorn
chickens, including presence or absence of EV21, can influence response of chicken to infection with ALV-J [7]. Also Xu et al. have reported mortality from myeloid leucosis in commercial layers in northern china [9].

ALV-J appears to have as its target the bone marrow cells, the meylocytes, which is somewhat different from the classic lymphoid leukosis viruses which affected primarily the bursal cell. Consequently the predominant tumor caused by ALV-J is a meylocytoma or meyloblastoma, while the classic lymphoid leukosis causes lymphoblastic tumor. The ALV-J tumors are frequently found under the sternum, on the ribs and vertebrae, but also can be found in the liver, spleen and kidneys. In addition to meylocyтомas and meyloblastomas, one can find haemangiomа, fibросарcoma, histocytesarcoma and occasionally erytroblastoid tumors.

REFERENCES