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Pathological Studies of Fowl Glioma and the Associated Lesions

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"Fowl glioma" is histologically characterized by multiple nodular gliomatous growths associated with disseminated nonsuppurative encephalitis. Whether these nodular lesions have autonomic neoplastic growth or reactive gliosis in a setting of chronic encephalitis has not been resolved. The etiology of the disease also remains unclear. The object of the present study was to observe and discuss pathological findings in affected chickens.

A flock of 72 Japanese bantams (Gallus gallus) and chickens of other breeds was kept in a zoo. Two birds mainly showed signs of general weakness or anemia, and all 72 birds were pathologically examined.

Seventeen bantams had significant pathological lesions. They comprised 9 males and 8 females, 2 to 4 years old. The main histological lesions were fowl glioma (4/17), nephroblastoma (2/17), renal adenoma (1/17), systemic lymphoproliferative foci (17/17) and systemic arteriosclerotic changes in arterioles (16/17).

Histologically, the cerebral lesions were composed of densely aggregated fibrillary and gemistocytic astrocytes with a nonsuppurative inflammatory-like response characterized by anastmosing blood vessels with marked perivascular lymphocytic infiltration.

Phosphotungstic acid hematoxylin stain, Masson's trichrome stain, and silver impregnation demonstrated that the nodular gliomatous foci were composed of mixed proliferation of gliomesenchymal tissues. Intranodular cell components partially showed faintly positive reactivity for glial fibrillary acid protein. Most of the intranodular cells showed positivity for proliferating nuclear cell antigen and avian leukosis/sarcoma virus (ALSV) antigen. Electron microscopically, there were retrovirus-like particles with budding processes in the cytoplasm of the intranodular cells.

These findings suggest that fowl glioma is the neoplastic proliferation of gliomesenchymal cells, caused by ALSV infection.

Lymphoploliferative foci were found in various organs including the thymus, bone marrow, liver, spleen, kidney, heart and spinal cord of 17 bantams. The foci often included lymphoid follicles, suggesting that the lymphocytes were of B-cell origin. The lymphoproliferative foci were also observed in the brain of the bantams affected with fowl glioma. These findings suggest the possibility that the lymphocytic infiltration and aggregation associated with the fowl glioma are part of a systemic lymphoproliferative disorder rather than a nonsuppurative inflammation. As far as we know, the distribution and nature of these lesions are not consistent with any entity already known in chickens.

From these results, it is suggested that "fowl glioma" is a neoplasm of the central nervous system caused by ALSV infection, and that the background lesions are associated with a systemic lymphoproliferative disorder, which has not hither to been described.