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An Unusual Pleomorphic Sarcoma in a Hybrid Mallard

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ABSTRACT: An unusual pleomorphic sarcoma from a hybrid mallard (*Anas platyrhynchos*) is described. Rhabdomyosarcoma was considered in the original differential diagnoses but rejected due to lack of specific characteristics generally seen in these tumors. The histologic characteristics described are consistent with mammalian sarcomas recorded in the literature as malignant fibrous histiocytoma.

Key words: Avian, Anatidae, duck, oncology, sarcoma, case report.

A poorly classified group of undifferentiated pleomorphic sarcomas in mammals have been given a variety of names including malignant fibrous histiocytoma, giant cell tumor of soft parts, dermatofibrosarcoma protuberans, malignant fibrous xanthoma, fibrous xanthoma, malignant xanthogranuloma and reticulum cell sarcoma of soft tissues (Lattes, 1982). Recently these tumors have been classified as variants of malignant fibrous histiocytoma based on a common, although controversial, histogenesis. All of these tumors are malignant and have histiocytic and fibroblastic components. Such tumors are well documented in man (Lattes, 1982), and recently have received more attention in the veterinary literature concerning cats, horses, dogs, and rodents (Gleiser et al., 1979; Render et al., 1983; Renlund and Pritzer, 1984). Similar mixed-cell sarcomas have been described by Campbell (1969) in chickens although there are histologic differences. Reviews of tumors of waterfowl have not included malignant fibrous histiocytoma (MFH) or its variants (Rigdon, 1972; Siegfried, 1983). The histologic characteristics of MFH include consistent evidence of both histiocytic and fibro-

blastic differentiation (Limacher et al., 1978) with the inclusion of variable numbers of multinucleated giant cells (Lattes, 1982). The histologic appearance varies depending on the section cut from almost completely fibroblastic to almost completely histiocytic (Limacher et al., 1978).

An adult male hybrid mallard (non-Pekin), reared in a captive situation, was presented with a large inguinal mass preventing adduction of the limb. The bird was euthanatized and necropsy completed within 2 hr of death. Routine histologic sections were stained with hematoxylin and eosin, Gomori's reticulin, a Gomori's trichrome, PTAH, and periodic acid-Schiff. Formalin preserved tissues were prepared also for electron microscopy.

On gross examination, a 14 × 17 × 9 cm mass was attached from the right medial thigh muscle and fascia to the right lateral abdominal wall. Aside from the loose superficial muscular, vascular, and fascial attachments, a firm fibromuscular stalk (6 mm diameter) attached the mass to the caudomedial femoral epicondyle (Fig. 1). The ventral wall was formed by a thin (2 mm) smooth capsule and encompassed a bloody, fluid-filled cystic space. The lateral one-third of the mass was solid and composed of extremely friable tan to brown tissue with bloody fibrin-like material and blood clots. No significant lesion was found in other organs.

A generally encapsulated tumor of non-cohesive cells ranging from large numbers of multinucleated giant cells and small polygonal cells to lesser numbers of spindle-shaped cells in a scanty collagenous stroma was observed upon microscopic examina-



FIGURE 1. Pleomorphic sarcoma attached to medial epicondyle of the right femur of a hybrid mallard. $\times 2/3$.

tion. Varying amounts of necrosis, fibrin, blood, and fibrous connective tissue were throughout the tumor. The tumor cells were characterized by extreme pleomorphism and prominent cell individualization. In most areas the cells had a rounded appearance (histiocytic) with

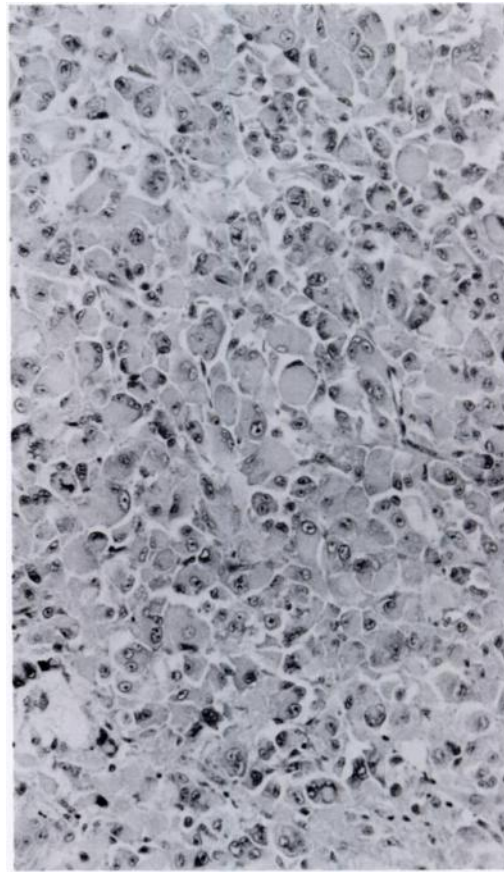


FIGURE 2. Light microscopic features of a pleomorphic sarcoma in a hybrid mallard. Histiocytic area. H&E. $\times 66$.

varying amounts (generally abundant) of clearly defined, slightly granular eosinophilic cytoplasm (Fig. 2). Cells had one to numerous variably sized nuclei characterized by vesiculation, clumped chromatin, irregular shape, and prominent nucleoli. Multinucleated giant cells were common (Fig. 3). Bizarre forms, as indicated by swollen homogeneous or vesiculated nuclei, folded nuclear and cytoplasmic membranes, and prominent stellate mitotic figures were common. Few elongate cells were mixed with the generally rounded, irregular forms, although some areas had a predominance of spindle-shaped cells.

The surrounding capsule was a thick band of fibrous connective tissue. The pe-

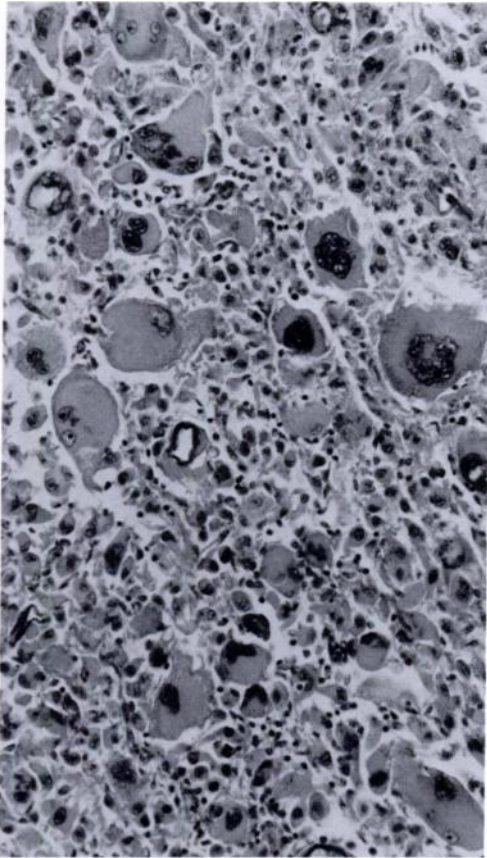


FIGURE 3. Light microscopic features of a pleomorphic sarcoma in a hybrid mallard. Multinucleated giant cells. H&E. $\times 66$.

duncular stalk attaching the mass to the medial epicondyle of the femur was an admixture of skeletal muscle fibers and fibrous connective tissue. Distinctly separate tumor cells were present in small groups or individual cells between muscle fibers in this fibromuscular stalk. Staining characteristics (H&E, PTAH) of the neoplastic cells were markedly different from skeletal muscle.

Electron microscopic examination revealed noncontributory details of the three main cell types. Cross striations consistent with a tumor of skeletal muscle origin were not found.

The histologic and electron microscopic morphology and type of cell differentiation is consistent with descriptions of ma-

lignant fibrous histiocytoma, malignant giant cell subtype (Lattes, 1982). The use of the term malignant fibrous histiocytoma is controversial particularly for tumors of non-human origin. The term is used by some (Renlund and Pritzer, 1984) who classify the tumor on the basis of fibroblastic and histiocytic cell differentiation and the presence of multinucleated giant cells in the absence of criteria for other classifications. Rhabdomyosarcoma was rejected based on staining characteristics, and lack of (1) cross striations, (2) irregular interlacing bundles, and (3) multinucleated cells with a centrilinear nuclear arrangement typically seen in tumors of skeletal muscle.

Metastases have been reported for MFH. Based on seven studies in man, about 30% of such tumors metastasize. However, no reliable histologic criteria, including mitotic rate, have been found to predict metastatic behavior (Limacher et al., 1978). In this animal, a few cells resembling histiocytic tumor cells were found in the connective tissue of the lung; however, these were inadequate for a diagnosis of metastatic disease. Metastases were not otherwise detected in the lung or liver. The malignant nature of this tumor was indicated by local invasion into the fibromuscular attachment to the femur.

Although viral etiologies for domestic fowl neoplasms are common, electron microscopic examination of malignant fibrous histiocytomas in other species has not revealed any viral particles (Renlund and Pritzer, 1984). Examination of several tumor sections in this study also did not reveal viral particles.

Recent investigation has centered upon the histogenesis of these soft tissue sarcomas. Present tissue culture evidence supports a common stem cell differentiating into both fibroblasts and histiocytes (Maruyama et al., 1983) and is based on detection of a primitive undifferentiated cell type and the phagocytic activity of fibroblasts. In the present study, rare spin-

dle-shaped cells were found with phagocytosed material. Polygonal cell pleomorphism was marked and produced a wide range of organelle numbers and composition. Although a specific undifferentiated cell population was not apparent because of this pleomorphism, undifferentiated cells may have been an undetected component of the tumor cell population.

Paraffin embedded blocks of the sarcoma described herein have been deposited in the Armed Forces Institute of Pathology, Washington, D.C. 20306, USA (AFIP #2082747).

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