Malignant Fibrous Histiocytoma in a Fox

Yukio FUJIMAKI, Masahiro SUGIYAMA and Masae ISODA

Department of Fish Pathology, and Department of Veterinary Pathology, Nippon Veterinary and Zootechnical College, Musashino, Tokyo 180, Japan

(Received 22 May 1984/ Accepted 9 October 1984)

ABSTRACT. A malignant fibrous histiocytoma (MFH) appearing in the foreleg of a fox was shown to be composed mainly of storiform, pleomorphic and fascicular areas. Electron microscopy demonstrated fibroblastic and histiocytic cells as well as giant cells, xanthoma cells and undifferentiated mesenchymal cells. The existence of undifferentiated mesenchymal cells suggested that MFH is of undifferentiated mesenchymal cell origin with a broad fibroblastic and histiocytic spectrum.—KEY WORDS: fox, malignant fibrous histiocytoma.

Malignant fibrous histiocytoma (MFH) in man referred to as malignant fibrous xanthoma and fibroxanthosarcoma was originally described by O'Brien and Stout in 1964 [10]. Thereafter attention has been paid to the two morphologically different elements in the MFH, i.e., fibroblastic cells and histiocytic cells in connection with the histogenesis of MFH. The undifferentiated mesenchymal cell origin of this type of tumor was suggested by many workers [1, 3, 4, 14] while histiocye [13], facultative fibroblast [8, 11] and myofibroblast [2] have been referred to as the origin by some authors. In animals only a few cases have been reported as MFH [5, 6, 12].

A 9-year-old male fox, reared at Inokashira Park Zoo, was found to have a pigeon egg-sized mass at the extremity of the left foreleg which was surgically excised. The cut-surface of the mass appeared mostly yellowish-white but partially red and white yellow with necrosis and hemorrhage. The animal died four months after the excision. Tissues, sampled from the mass, was fixed in 10% buffered formalin, embedded in paraffin and stained with hematoxylin and eosin (HE). Selected sections were also stained with periodic acid-Schiff (PAS), azan, silver impregnation, Heidenhein's iron hematoxylin, phosphotungstic acid hematoxylin and oil red 0. For electron microscopy, fresh specimens were fixed in 2.5% glutaraldehyde and post-fixed in 1% osmium tetroxide. The epon sections were stained with uranyl acetate and lead citrate, and examined using a JEM 100 CX-II electron microscope at 80 kV.

The tumor consisted of three different areas 1) storiform, 2) pleomorphic and 3) fascicular, but each area was not clearly distinguishable. The storiform area was composed of plump spindle cells resembling fibroblasts which arranged in a cartwheel or storiform pattern with the presence of mononuclear giant cells and round histiocytic cells (Fig. 1). In the pleomorphic area fibroblastic cells and histiocytic cells were admixed (Fig. 2). Histiocytic cells were more numerous than fibroblastic cells, while these two cell types were not readily distinguishable with many transitional forms. These histiocytic cells with a pale stained round nucleus showed prominent pleomorphism. Two types of giant cells, mononuclear and osteoclast-like, were present. Focal necrosis, hemorrhage and inflammatory reactions were sometimes
recognized. No bacteria were detectable in these lesions. The fascicular areas, which were adjacent to the pleomorphic areas, consisted of fibroblastic cells surrounded by abundant collagen fibers.

Electron microscopy revealed five types of cells: fibroblastic cells, histiocytic cells, mononuclear giant cells, xanthoma cells and undifferentiated mesenchymal cells. The fibroblastic cells were spindle in shape sometimes having invaginated nucleus. In the cytoplasm there were numerous spherical mitochondria and dilated rough endoplasmic reticulum with fine granules. Some cells contained microfilaments as seen in myofibroblasts without marked formation of dense bodies. No special junctional elements were seen between cells (Fig. 3). The histiocytes cells were polygonal having an oval or kidney-shaped nucleus. The cytoplasm contained slightly dilated rough endoplasmic reticulum, many small vesicles and lysosomal
bodies and occasionally lipid droplets. Sometimes small cytoplasmic processes were noticed (Fig. 4). The mononuclear giant cells had an irregular shaped nucleus. The abundant cytoplasm contained dilated rough endoplasmic reticulum, a moderate number of mitochondria and polysome. Sometimes a few filopodia were noticed on the cell surface. The xanthoma cells, which were polygonal and had numerous small or large lipid droplets showing low electron density, had lysosomal bodies as were seen in the histiocytic cells (Fig. 5). The undifferentiated mesenchymal cells had an oval nucleus and very poor cytoplasm with few organelle (Fig. 6).

One of the most remarkable histological features of MFH is its pleomorphism causing difficulty in differential diagnosis of MFH from other pleomorphic soft tissue sarcomas. Pleomorphic liposarcoma can be diagnosed by existence of typical lipoblasts containing a lesser amount of stromal collagen without distinct storiform pattern [2, 3, 9]. Myxoid liposarcoma lacks multinucleated bizarre cells and mitotic figures [3, 9, 15]. The most difficulty is distinction between MFH and pleomorphic rhabdomyosarcoma. The deeply eosinophilic cytoplasm in MFH might be considered that of myoblasts leading to diagnosis pleomorphic rhabdomyosarcoma. However, pleomorphic rhabdomyosarcoma should have either cross striations by light microscopy or Z-bands by electron microscopy [3, 9, 16]. Dermatofibrosarcoma protubersans which shows a distinct storiform pattern occurs superficially lacking necrosis and formation of multinucleated giant cells [3, 9, 16]. In malignant giant cell tumor of soft parts multinucleated giant cells appear predominantly forming osteoids or bones, whereas no xanthoma cells nor storiform pattern are recognized [7].

Many researchers agree with the undifferentiated mesenchymal cell origin of MFH [3-5, 14]. The mesenchymal cell is considered to differentiate into fibroblastic and histiocytic type of cells showing collagen formation and occasionally some phagocytic activity [16]. The findings of the present case might support that MFH is of the undifferentiated mesenchymal cell origin.

REFERENCES


要 約

キツネの悪性線維性組織球腫の 1 例（短報）：藤巻由紀夫・杉山公宏11・石田政憲11（日本獣医畜産大学獣医病理学教室）——9才のキツネの前肢に発症した悪性線維性組織球腫を病理組織学的に検索した。腫瘍は主にストリフォーム、多形性、線維束性の増殖を示す部位から成り、特に多形性の領域では線維芽細胞様の細胞と組織球様の細胞が混在し、巨細胞の出現も認められた。電顕的には線維芽細胞様の細胞、組織球様の細胞、巨細胞、黄色腫細胞、未分化間葉細胞が認められ、未分化間葉細胞起源と思われた。