Malignant Basal Cell Tumor in a Djungarian Hamster

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ABSTRACT. A malignant basal cell tumor was found in the skin of the abdomen of a female Djungarian hamster of unknown age and weighing 40 g. Histologically, the tumor mass was composed of cells resembling the basal cells of the epidermis, and these cells exhibited solid type proliferation. In the tumor tissue and necrotic foci, horn cysts were observed. Immunohistochemically, cytokeratin was present in the tumor cells and horn cysts. By electron microscopic examination, the tumor cells had scanty cell organelles and a few desmosomes. This paper describes a rare malignant basal cell tumor in a Djungarian hamster. — KEY WORDS: Djungarian hamster, malignant basal cell tumor.


Basal cell tumors are common benign tumors in dogs and cats [3, 10], whereas malignant basal cell tumors have infrequently been found in dogs [4]. Spontaneous tumors in hamsters are uncommon, and skin tumors rarely occurred in hamster [9]. According to the classification of basal cell tumors, there is a basosquamous variety sometimes with foci of keratinization [12]. We report here a rare case that was diagnosed as malignant basal cell tumor with basosquamous varieties as a result of histological, immunohistochemical and electron microscopic examinations of a mass in the abdominal skin of a Djungarian hamster.

In a Djungarian hamster of unknown age and weighing 40 g, a mass of about 4.8 × 3.5 × 1.8 cm was found in the abdominal skin. The hamster died the day after extirpation of the mass.

After fixation in 10% buffered formalin, tissue from the mass was embedded in paraffin wax, cut into sections, and stained with hematoxylin and eosin(HE), and Masson’s trichrome. Other sections were used for immunohistochemical staining, and processed for the streptavidin biotin (SAB-PO) method using a SAB-PO kit (NICHIREI, Tokyo). Primary antibodies used were anti-human keratin/cytokeratin (NICHIREI, Tokyo). For electron microscopy, formalin-fixed tissue pieces were refixed in 1% glutaraldehyde and 4% formalin, and postfixed in 1% osmium tetroxide 0.1 M cacodylic acid buffer fixative solution. The samples were processed routinely and embedded in epoxy resin. Ultrathin sections were cut, stained with uranylacetate and lead citrate, and examined with an electron microscope (JEM 1200 EX).

Macroscopically, the mass was about the size of a small egg, and its surface assumed a color of yellowish gray. The cut surface was subdivided into lobules by fibrous tissue.

Microscopically, the mass was composed of a solid proliferation of cells resembling the basal cells of the epidermis. These tumor cells were large, and they had an orbicular or oval hyperchromatic nucleus. The cytoplasm was scant and the mitoses were numerous (Fig. 1). Masson’s trichrome stain, revealed that the connective tissue subdivided the mass into lobules. At the verge of the lobules, the tumor cells exhibited a fence-like arrangement. Large necrotic foci were present in the central and surrounding areas of these lobules (Fig. 2). Marked neutrophil infiltration and calcification were observed in the necrotic foci. Occasionally, spindle cells with dark nuclei were found at the verge of the necrotic areas. Horn cysts with squamatization existed in these lobules and necrotic foci (Fig. 3).

Immunohistochemically, the tumor cells (Fig. 4) and the horn cysts (Fig. 5) were positive for cytokeratin.

Electron microscopy revealed the large pale nuclei and scanty cell organelles in the tumor cells. The cytoplasm was filled with numerous free ribosomes. A moderate amount of chromatin clumpings was present in the nucleoplasm. A small number of desmosomes were detected (Fig. 6).

Basal cell tumors arise from cells resembling the basal cells of the epidermis and its appendages [5]. Most basal cell tumors can be subclassified on the basis of their histological appearance, and they have been subdivided into solid, cystic, ribbon (adenoid), and medusoid types [10]. Usually, they are slow growing, noninvasive, often encapsulated, and rarely metastasize. But the solid basal cell tumors are more aggressive than the other histological types [6, 10]. Fukui et al. [4] reported two cases of canine malignant basal cell tumor. One of them occurred in the abdominal skin, showed fast growth, and its histological pattern was the solid and adenoid types. In this case, pulmonary and adrenal metastases were noted. The other tumor originated from the skin of cervical area and showed a keratinizing tendency and severely invaded the surrounding tissues. Since the Djungarian hamster examined by us died the day after excision of the mass, the recurrence, metastasis and growth rate of the tumor were unknown. Histologically, however, this tumor showed aggressive solid type proliferation, and horn cysts were present, similar to those malignant basal cell tumors reported by Fukui et al.
In immunohistochemical staining, we used the primary antibodies that react extensively with keratin to determine the distribution of keratin in the present tumor [2, 8]. As a result, the tumor cells and horn cysts were positive for cytokeratin. The existence of cytokeratin is characteristic of basal cell tumor, and cytokeratin seems to exist in different squamous cell nests [8, 11]. Electron microscopy demonstrated that tumor cells in the present case resembled the basal cells of the epidermis, showing scanty cell organelles and a large amount of free ribosomes in the cytoplasm. Chromatin clumps were distributed in the nucleoplasm, and a small number of desmosomes were observed [1, 7]. It thus appeared that electron microscopy confirmed and extended the results obtained by the light microscopic examinations.

REFERENCES