Chondrosarcoma of the Mandible and Falx Cerebri in a Chinese Hamster (*Cricetulus griseus*): Report of a Case

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A Chinese hamster (male, 1-month-old) was found to have a large nodular mass at the left mandible. The tumor appeared to replace the entire left mandible, extending from the third molar to the incisor. The tumor mass occupied most of the oral cavity to compress the tongue ventrally. Histologically, the neoplasm was composed of islands of chondrocytes with bizarre and enlarged nuclei which were surrounded by poorly differentiated mesenchymal cells. The tumor involved the falx cerebri to compress the frontal crest of the cerebrum. On the basis of histological features, this tumor was diagnosed as chondrosarcoma.

Numerous spontaneous tumors of hamsters have been described by various investigators and summarized by Pour et al. [4, 5, 6, 7]. Chondrosarcoma which arises from bone or cartilage is rare in experimental animals and has been better described in humans [2] than in animals [1]. The only report of chondrosarcoma in a hamster was by Taylor [9], who documented that the neoplasm arose from the humerus of a Syrian hamster and had been transplanted successfully in 220 animals through passages over a period of 3.5 years. This report describes the morphological features of chondrosarcoma in a Chinese hamster.

Colony Background: A colony of approximately 300 to 500 Chinese hamsters been maintained in a breeding facility at the Mitsubishi Kasei Life Science Institute. The colony, which came from the National Institute of Genetics in 1973, has been maintained as a “limited random bred” colony for 6 to 8 generations. The animals are maintained under standard husbandry practices and are provided with a commercially available pellet diet (Oriental Yeast Co. Ltd.) and tap water *ad libitum*. Sterilized sawdust is used as bedding. The room is lighted for 14 hours daily and the animals are housed in groups of three to four per cage.

Gross pathology: A 1-month-old male Chinese hamster was killed with an overdose of anesthetic ether because of a large nodular growth (approximately 15×8×7 mm in size) on its left mandible (Figs. 1 & 2). The nodule was solid on palpation. On dissection, the tumor appeared to have replaced the entire left mandible and extended from the left third molar to the incisor. Oral examination revealed a firm sessile growth arising from inside the left mandible, occupying most of the oral cavity, and compressing the tongue ventrally. The affected mandible was asymmetrically enlarged, firm and had a smooth surface. The right mandible appeared normal. The cut
surface of the tumor was tan and solid. The tumor tissue was fixed in 10% neutral-buffered formalin before decalcification by KC-2, embedded in paraffin, cut at 5 µm in a transverse direction, and stained with hematoxylin and eosin, periodic acid–Schiff (PAS), and Azan Mallory.

Histopathology: The mandibular tumor was composed of poorly differentiated mesenchymal cells surrounding islands of hyaline cartilage in various stages of differentiation. Lacunae varied greatly in size and often contained several chondrocytes of various sizes (Fig. 4). Some of the chondrocytes had large hyperchromic nuclei with hypertrophic nucleoli. Their cytoplasm was intensely PAS-positive. Mitotic figures were rare among the chondrocytes. Foci of calcification were sporadically present in the chondral tissue. The same histological features were also seen in the nodules found in the falx cerebri, which extended to both sides to compress the frontal crest of the cerebrum (Figs. 2 & 3).

From the morphological features mentioned above, the present tumor was diagnosed as chondrosarcoma. The neoplasm closely resembled mesenchymal chondrosarcoma, from which it could not be easily differentiated. The cartilaginous cellular elements of chondrosarcoma are larger and more pleomorphic than those of mesenchymal chondrosarcoma [8]. In addition, the stroma of the latter neoplasm is spindly, dominates the histological picture, and imparts an impression of reticulum cell sarcoma and/or fibrosarcoma [8]. This neoplastic lesion showed no mature bone formation by tumor cells, making it easy to differentiate from the chondroblastic type of osteosarcoma. Therefore, the histologic evidence seemed sufficient to qualify this neoplasm as chondrosarcoma. The spontaneous chondrosarcoma described here occurred in the mandible and falx cerebri of a very young animal. It seems to be an especially rare occurrence in an experimental animal, because tumors of this type usually involve bones of the pelvis, rib, femur, humerus, spine, and other long bones [3]. It is unclear whether these neoplastic lesions are multicentric or metastatic. In agreement with Shimo-oku's opinion [8], sporadic calcification in the cartilaginous portions of the tumor might be a result of metaplasia in well-differentiated chondrocytes.

References

シャイニーズハムスター（Cricetulus griceus）の下顎および大脳镰に発生した軟骨肉腫

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シャイニーズハムスター（雄・1カ月齢）の頭蓋（下顎および大脳镰）に発生した腫瘍について病理組織学的に検索した。肉眼的にはこの腫瘍は下顎の殆どを占め頬袋および口腔にまで侵入していた。特に口腔に侵入した腫瘍塊は口腔を埋め尽くしており、舌はそのため腹側に圧迫され変形していた。組織学的には、軟骨細胞と少量の化骨した軟骨細胞および未分化な間葉系の細胞で構成されており、軟骨肉腫と診断された。

Explanation of Figures

Fig. 1. Gross appearance of the left mandible. The cheek pouch was cut along the surface of the tumor

Fig. 2. Transverse section of the cranium. Note the neoplastic tissue occupying the left mandible and invading the oral cavity to compress the tongue ventrally. Arrow shows a lesion at the falx cerebri

O: orbit, C: cerebri, M: right mandible, T: tongue, Mm: m. masseter. Azan-Mallory, ×1

Fig. 3. Higher magnification of the portion of the falx cerebri shown by arrow in Fig. 2. Azan-Mallory, ×20

Fig. 4. Cartilage from a chondrosarcoma. The cartilage cells have occasional malignant-appearing nuclei. The nuclear features are characteristic of well-differentiated chondrosarcoma. Azan-Mallory, ×50