NOTE Pathology

Recurrent Sebaceous Carcinoma in an African Hedgehog (Atelerix albiventris)

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ABSTRACT. A 1.5-year-old intact male African hedgehog (Atelerix albiventris) was presented with a firm, non-movable subcutaneous mass on ventral chest area. Microscopically, the tumor was un-encapsulated, invasive up to the muscle layer, and composed of highly pleomorphic polygonal cells arranged in variably-sized lobules. The neoplastic cells had abundant cytoplasm with vacuolation and a large pleomorphic nucleus with prominent nucleoli. Mitotic figures were frequently observed with atypical mitoses. Immunohistochemically, the neoplastic cells were strongly positive for cytokeratin, but negative for vimentin. Based on these findings, a diagnosis of sebaceous carcinoma was made. Three months after the surgery, a recurrent mass was found at the surgical site. On necropsy, the mass has penetrated the underlying intercostal musculature, without metastasis to distant organs. This is the first report of a sebaceous carcinoma in an African hedgehog.

KEY WORDS: hedgehog, immunohistochemistry, neoplasm, sebaceous carcinoma.

Sebaceous carcinoma is a rare cutaneous neoplasm in veterinary species, accounting for only 0.7% and 0.9% of cutaneous tumors in dogs and cats, respectively [5]. Canine sebaceous carcinoma is usually solitary, firm, alopecic, and ulcerative [9], and may be classified as sebocytic or epitheliomatous based on cellular morphology [6]. These tumors are locally invasive and can recur, but distant metastasis is very rare. Sebaceous carcinomas have also been reported in a gerbil [2] and a rabbit [10].

Spontaneous neoplasms are relatively common in aged African hedgehogs (usually more than 1 year old), with frequencies of 29% and 53% in 2 retrospective studies [7, 8]. Most of these tumors were malignant, with most commonly affecting the integument including the mammary glands, hemolymphatic and endocrine systems [7]. To date, however, sebaceous carcinomas have not been described in African hedgehogs. We describe here a recurring, highly aggressive sebaceous carcinoma in an African hedgehog (Atelerix albiventris).

A 1.5-year-old intact male African hedgehog kept indoors as a pet was presented to a local veterinary clinic due to severe weight loss, anorexia and depression. The ventral chest region was found to be swollen and a non-movable firm mass, 1.3 cm in size, was palpated within the area. The entire mass and surrounding soft tissue were surgically removed and submitted to the Department of Veterinary Pathology, College of Veterinary Medicine, Seoul National University, for histopathological examination. On cut section, the mass was tan, oozed purulent exudates from necrotic areas, and infiltrated to the adjacent soft tissues with indistinct boundaries. The specimen was fixed in 10% neutral buffered formalin, routinely processed, embedded in paraffin, sectioned at 4 μm, and stained with hematoxylin and eosin (HE). Microscopically, neoplastic tissue was present in the deep dermis, extending to the underlying subcutaneous adipose tissue and muscle layer. No direct connection to the overlying epidermal cells was observed. The neoplastic tissue was not encapsulated and poorly demarcated with marked infiltration of the tumor tissues to the surrounding tissues including surgical margin (Fig. 1A). The neoplastic tissue consisted of polygonal cells arranged in variably-sized trabeculae and lobules separated by fibrovascular connective tissue stroma and areas of neutrophilic infiltration (Fig. 1A). The neoplastic cells had abundant cytoplasm with a variable degree of vacuolization and distinct cytoplasmic borders and a large, round to oval nucleus with 1 to 3 prominent nucleoli (Fig. 1B). Mitotic figures were frequently observed (up to 8 mitoses per high power field) along with aberrant mitoses (Fig. 1B). In some lobules, occasional neoplastic cells exhibited dyskeratosis. The overlying epidermis showed hyperplastic change. To determine the origin of the neoplastic cells, we performed immunohistochemical staining (IHC) of formalin-fixed, paraffin-embedded tissue sections using a Ventana NexES system (Ventana Medical System, Tucson, AZ) and an I-View DAB detection system (Ventana Medical System, according to the manufacturer’s instructions. Primary antibodies used were pan-cytokeratin (1:200, BioGenex Laboratories Inc., San Ramon, CA) and vimentin (1:500, BioGenex Laboratories Inc.). The neoplastic cells were strongly positive for pan-cytokeratin (Fig. 1C), but negative for vimentin (Fig. 1D).

About 3 months after surgery, the hedgehog was referred
again to the local veterinary clinic due to a palpable mass at the surgery site, along with severe weight loss and depression. Due to poor clinical prognosis of the animal, the owner elected to euthanize the hedgehog, followed by necropsy on site. At necropsy, the mass was about 3 cm in diameter, severely necrotic, and admixed with thick purulent exudates. The mass showed ambiguous margins to the surrounding normal tissue similar to the original tumor mass and extended to the neck area. The left elbow joint was dislocated to the dorsal direction due to the mass. The neoplastic mass solidly adhered to the thoracic wall, invaded the underlying intercostal muscles and the second to fifth ribs (Fig. 2A). Parietal pleura and the thoracic cavity were grossly normal. Microscopic features of the recurred mass were identical to those of the original tumor mass, but with more prominent necrosis and neutrophilic infiltration. Isolated trabeculae and islands of neoplastic cells were found in the intercostal musculature as well as in the marrow spaces.
of the ribs (Fig. 2B). No gross or microscopic evidence of metastases to distant organs including regional lymph nodes were noted.

Based on its anatomical location together with the results of microscopic and immunohistochemical findings, we were able to reach a diagnosis of sebaceous carcinoma. In dogs, sebaceous carcinomas are classified as sebocytic or epitheliomatous based on the degree of sebaceous differentiation, but the relationship between histologic subtype and clinical outcome is not known. This tumor had microscopic features compatible with the canine sebocytic subtype sebaceous carcinomas. In humans, cytokeratin cocktails and androgen receptors have been used as diagnostic markers for sebaceous carcinoma [1]. In dogs, cytokeratins such as 34-E12 have been adopted as biomarkers for canine sebaceous gland tumors [4]. However, the markers of sebaceous carcinoma can varied from animal species. In the present study, we selected pan-cytokeratin as marker.

In the differential diagnosis of the tumor, we considered liposarcoma, due to the highly vacuolated nature of the neoplastic cells. Liposarcoma, however, was ruled out based on the immunoreactivity of the tumor cells, since tumor cells of liposarcomas are negative for cytokeratin and positive for vimentin. Another differential diagnosis considered was squamous cell carcinoma with similar histological features and immunohistochemical findings. This possibility was ruled out due to the marked vacuolation, the presence of central ducts, and the lack of normal keratinization or keratin pearl.

At the time of presentation of the original tumor mass, the animal had a poor prognosis due to the presence of neoplastic cells extending to the surgical margins. Tumor recurrence or distant metastasis was highly probable due to the invasiveness and anaplastic features of the neoplastic cells, including their high mitotic index. Indeed, the tumor recurred only three months after surgery, with invasion to the thoracic wall and ribs. Similarly, canine sebaceous carcinomas are locally invasive with frequent recurrence and regional lymph node metastasis, although distant metastasis is extremely rare. Sebaceous carcinomas primarily occur on the head and neck in dogs, and on the head, thorax and perineum in cats [3]. The sebaceous carcinoma in our hedgehog was found in the ventral chest region.

Skin tumors reported in hedgehogs include hemangiosarcomas, fibrosarcomas, schwannomas, malignant metastatic plasmacytomas, and benign and malignant mast cell tumors mostly being mesenchymal in origin [7]. In addition to these integumentary tumors, we found that highly anaplastic recurring sebaceous carcinoma can occur in hedgehogs, suggesting that this tumor be added in the list and differential diagnosis of skin tumors in hedgehogs.

REFERENCES