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Basal Cell Carcinoma in a Domestic Hedgehog

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Abstract : A 1-year-old female hedgehog was presented with subcutaneous mass in the right forelimb. Grossly, an elevated subcutaneous mass approximately 4 cm in diameter was located in forelimb. Central dark brown area was surrounded by peripheral milky white zone in the cut surface of mass. Histopathologically, numerous neoplastic cells formed irregular cords or sheets in dermis. Most of neoplastic cells showed palisading features to basement membrane with or without central caseous necrosis. These neoplastic cells showed invasive tendency to adjacent tissues. According to immunohistochemistry, the neoplastic cells demonstrated strong positive signals for pancytokeratin, and negative for vimentin. Based on the gross, histopathology and immunohistochemistry, this mass was diagnosed as basal cell carcinoma in a hedgehog.

Key words **:** basal cell carcinoma, hedgehog, immunohistochemistry, pancytokeratin, subcutaneous mass.

Introduction

Basal cell carcinoma (BCC) is currently defined as a low-grade tumors arising from the basal cells of either the interfollicular epidermis or the hair follicles and may represent a neoplastic transformation of stem cells (2,5,9). It is the most common cutaneous malignant epithelail tumors in human. BCCs are common in cat, uncommon in dog and rare or unknown in other animal species (2,6). BCCs comprise 1.25% and less than 0.3% of skin tumors in cats and dogs, respectively (2).

Hedgehog used to be commonly kept in zoological parks, but recently have become popular as exotic pets in Korea. According to previous retrospective studies, the prevalence of neoplastic diseases has ranged from 29% to 53% (7,8). The integument system is the most common site of tumor involvement in the hedgehog (3,7). Reported histologic types in integument system include schawannoma, plasmacytoma, hemangiosarcoma, fibrosarcoma, osteosarcoma, undifferentiated sarcoma, and mammary gland tumors (3,7). Maxillary squamous cell carcinoma (SCC) in a 4.5-year-old male African pigmy hedgehog was reported in Korea (4). Here we describe the histopathologic features of uncommon BCC in a hedgehog in Korea.

Case

A 1-year-old, female, hedgehog with subcutaneous mass in the right forelimb was submitted for diagnosis in a local animal hospital. Grossly, an elevated subcutaneous mass approximately 4 cm in diameter was located at the right forelimb. The mass was surgically excised in local animal hospital, fixed in 10% buffered formalin, and referred to Veterinary Pathology Laboratory in Jeju National University. On the cut surface, central dark brown area was surrounded by peripheral milky white zone (Fig 1).

The sample was processed routinely for histopathologic examination and tissue sections were stained with hematoxylin and eosin (H&E) for light microscopic examination. Additional paraffin-embedded tissue sections were used for immunohistochemistry (IHC), streptavidin-biotin peroxidase complex method. To reveal the origin of tumor cells, several antibodies including mouse anti-pancytokeratin (AE1/AE3, Dako, Denmark) and mouse anti-vimentin (Dako, Denmark) were used.

On histopathologic examination, the subcutaneous mass unfortunately did not contained epidermis, but was well circumscribed with thin connective tissues. Numerous neoplas-

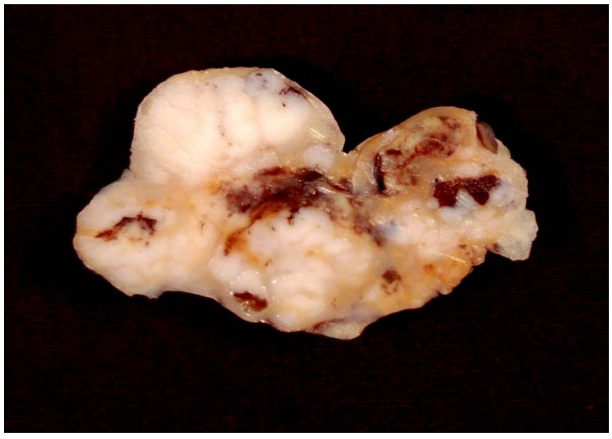

Fig 1. Central dark brown area was surrounded by milky white nodules in the cut surface of mass.

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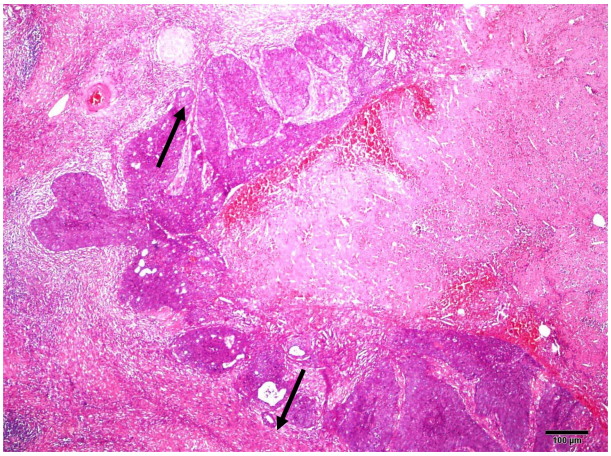

Fig 2. Neoplastic cells formed irregular cords or sheets in dermis. Note invasive tendency (arrows) of neoplastic cells to the adjacent tissues. H&E, Bar = 100 μm.

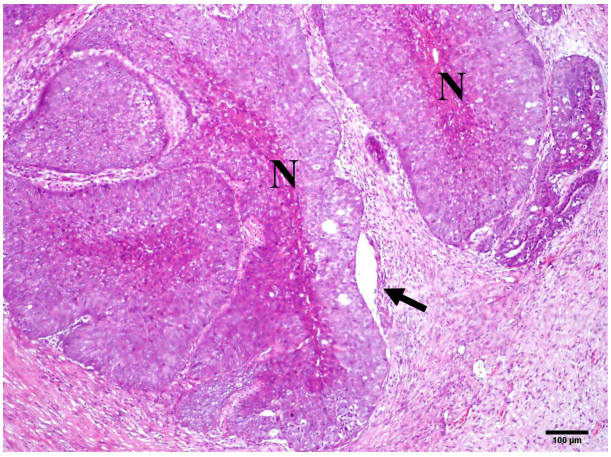

Fig 3. Note neoplastic epithelial aggregates with central caseous necrosis (N) and peripheral clear cleft (arrow). H&E, Bar = 100 μm.

tic cells formed irregular cords or sheets in dermis (Fig 2). Dermal mass was composed of variable size and shape multiple epithelial cell aggregates, and showed palisading features to basement membrane with or without caseous necrosis (Fig 3, 4A). Because of the production of mucin-like materials by neoplastic epithelial cells, there was clear cleft between the epithelial aggregates and the stroma (Fig 3). These neoplastic cells showed invasive tendency to adjacent tissues (Fig 2). Most of neoplastic cells were small to medium sized, basophilic cells with little cytoplasm and hyperchromatic nuclei. Intercellular bridges were not seen in the border of neoplastic cells (Fig 4A). Moderate proliferation of fibroblasts was observed adjacent of neoplastic foci in dermis. Severe multifocal necrosis and inflammation with cholesterol clefts were also noted in the mass. Immunohistochemically, the neoplastic cells demonstrated strong positive reactions for AE1/AE3, but negative reactions for vimentin (Fig 4B, C). According to IHC results, these neoplastic cells were originated from epithelial cells. Based on the gross findings, histopathologic and immunohistochemical features, this case was diagnosed as BCC in a hedgehog.

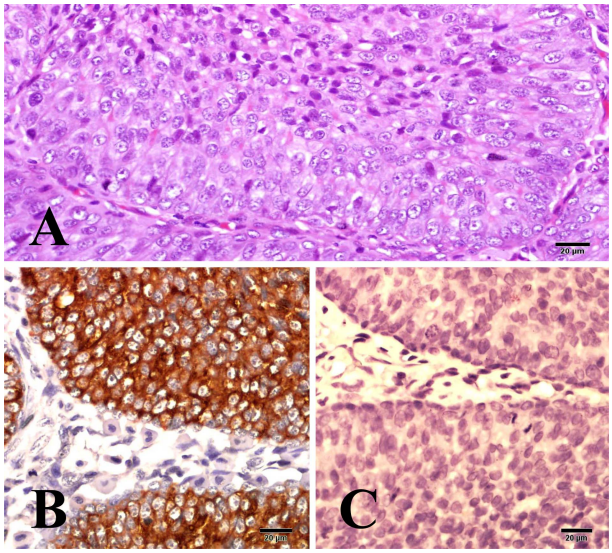

Fig 4. Histopathologic and immunohistochemical findings of basal cell carcinoma. Note peripheral palisading of neoplastic cells without intercellular bridge (A). H&E, Bar = 20 μm. Note strong positive immunoreactivities for pancytokeratin (B) and negative for vimentin (C). Streptavidin-biotin peroxidase stain, Bar = 20 μm.

Discussion

Differential diagnoses for BCC comprise other epithelial tumors including sweat gland tumors, sebaceous gland tumors, SCC, and trichoblastoma (2,6,10). Base on the absences of tubular differentiation, lipidized cytoplasm of tumor cells, and keratin pearls in this case, we can successfully rule out sweat gland tumors, sebaceous gland tumors, and SCC. Identification of intercellular bridges may be helpful in the diagnosis of SCC (2,10). However, we could not find any evidences of intercellular bridge in this BCC case of hedgehog. The neoplastic cells and the peripheral palisading pattern of cells in trichoblastoma closely resemble those of BCC (2,5,6). Spindling and whorled aggregations of epithelial cells are typical of trichoblastoma but are uncommon in BCC (2). Neoplastic cells in BCC usually formed irregular cords or sheets in dermis and showed palisading arrangement to basement membrane with caseous necrosis and local invasion. BCC has three major histologic variants in dogs and cats; solid, keratinizing, and clear cell type (2). Overall histopathologic characteristics in this case of hedgehog were very similar to solid BCC in dogs and cats.

The incidence of recurrence and metastasis of BCC in cats is very low, and metastasis of canine BCC has not been documented (2). There was no evidence of metastasis in this hedgehog BCC case.

As in actinic keratoses and squamous cell carcinomas, chronic exposure to ultraviolet radiation is the main risk factor associated with the genesis of human BCCs (1,2), whereas a similar etiopathogenesis has not been established for animals. The risk attributed to solar radiation for malignant keratinocytic neoplasms may reach 90% (1). Interestingly, one case report for basal cell carcinoma developing as a complication of chronic solar dermatitis was recently

described in a seven-year-old male dog (9). Chronic cutaneous lesions and skin mass of BCC were located on the ventral aspect of the body trunk and posterior legs. This dog lived outdoors, spending much time lying in lateral recumbency in the sun. The authors suggested that BCC may have to be included in the list of the complication of chronic exposure of the canine skin to the solar radiation. However, the exact pathogenesis of BCC in other animals still remains unknown.

It is believed that the development of BCC occurs in period of 10 to 50 years after sun damage in human (1). The large majority of BCCs occur in cats at least 10 years old and in dogs at least 8 years old (2). According to literature, hedgehogs live up to 3 or 4 years in the wild but in captivity may live up to 10 years (7). The average age of hedgehogs with neoplasia in one study was approximately 3.5 years. Therefore BCC in this case was occurred in very young aged hedgehog. To the author's best knowledge, this is the first case of basal cell carcinoma in hedgehog in Korea.

Acknowledgments

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국내 고슴도치에서 발생한 기저세포암종

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요 약 : 1세령 암컷 고슴도치의 앞다리 피하에서 종괴가 발견되어 내원하였다. 육안적으로 앞다리 피하종괴는 직경 약 4 cm 크기로 융기되어 있었다. 종괴의 단면상에서 중심 부위는 암적색이었으며, 그 주위에 유백색 결절이 무수히 매몰되어 있었다. 병리조직학적으로 진피층에는 다량의 종양세포들이 불규칙한 줄 또는 시트형태를 이루고 있었다. 대부분의 종양세포들은 기저막에 울타리 모양으로 배열되어 있었으며, 종양세포무리의 중심부에서는 건락괴사를 관찰할 수 있었다. 또한 종양세포들은 주변조직으로의 침습성을 보이고 있었다. 면역조직화학염색을 실시한 결과, 종양세포들은 vimentin에는 음성반응을 보인 반면, pancytokeratin에는 강한 양성반응을 보였다. 이상의 육안적인 특징, 병리조직학적 소견 및 면역조직화학적 검사를 바탕으로 본 증례는 기저세포암종으로 진단하였다.

주요어 : 고슴도치, 기저세포암종, 면역조직화학염색, 판싸이토케라틴, 피하종괴