CASE REPORT

Malignant Peripheral Nerve Sheath Tumor with Giant Cells development in a female African Pigmy Hedgehog (*Atelerix albiventris*)

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Malignant Peripheral Nerve Sheath Tumor with Giant Cells development in a female African Pigmy Hedgehog (*Atelerix albiventris*)

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ABSTRACT

A subcutaneous mass was determined at the left abdominal area of African pygmy hedgehog. The case was very few in veterinary clinic since it found in the exotic animal. This valuable finding was then evaluated more detail especially for the morphological aspect. This study was aims to identified the tissue structure and it specific cell to get the best diagnosis the mass. A regular staining method and immunostaining using S100 antibody and PCNA antibody were applied in paraffin tissues sections. The mass has oval in form and covered by a thin transparent connective tissue and imagining glowing nodule. Evaluation on cross section surface showing spot black and white color tissue also a necrose image. The white tissue indicates a solid image and harder in consistent. The Hematoxylin-Eosin staining showed a dense of pleomorphic, spindle-shaped, and some multinucleated giant cells development. The immunostaining result express some cells are slightly positive to S100 (pale brown), while reactivity to PCNA is found strongly positive and it scatter in this tissue mass. Based on the evaluation of the used staining method could be conclude that the mass is Malignant Peripheral Nerve Sheath Tumor/MPNST with multiple foci of giant cells.

Keywords: African pigmy hedgehog, malignant, peripheral nerve sheath tumor.

CASE REPORT

Peripheral Nerve Sheath Tumor/PNST is an abnormal growth or mass of the skin and soft tissue[1]. Because of their similarity in clinical behavior among soft tissue tumors, there are some difficulties to get a conclusion or diagnose to these tumors. Some previous cases were reported that several tumors were found in hedgehogs [2,3,4,5]. The present study examined a subcutaneous mass based on morphological approach and demonstrated by microscopic method using routine, special and an immunohistochemical staining methods to clarify the existing tumor. The subcutaneous mass with ulceration in dimension of 6.5 x 5.5 x 1.2 cm. The mass was found between the left posterior abdominal and left hind limb of a 5-year-old female African pigmy hedgehog (*Atelerix albiventris*) that had been maintained at the owner's property in Bogor district. Because the tumor had growth enlarged and developed an open necrotic area, the veterinarian decided to do surgical work. A preoperative X-ray was performed, and revealed a mass that was localized in the subcutaneous and there was not associated with the skeleton. The extruded mass was process for histopathological examination four weeks after the mass was first noticed by the owner. An examination on cross section of it revealed the greyish-white mass, firm in consistency, consisting of variable-sized and distinct lobules with narrow hemorrhagic streaks and multiple cysts formation. In some parts of the mass were soft and moist with a big area of ulceration and necrosis. A representative tissue were fixed in 10% buffered neutral formalin and embedded in paraffin. Several sections prepared routinely and were stained with hematoxylin-eosin (HE), Periodic Acid Schiff (PAS) and Masson-trichrome. Additional sections were stained by the streptavidin–biotin complex (SAB) immunoperoxidase method. To identify the origin of neoplastic cells, immunohistochemistry (IHC) for vimentin (1:20, mouse monoclonal antibody; Dako, Carpinteria, CA, USA), desmin (1:10, mouse monoclonal antibody; Dako, Carpinteria, CA, USA), S100 protein (1:200, mouse monoclonal antibody; Dako, Carpinteria, CA, USA), glial fibrillary acidic protein/GFAP (1:300, rabbit polyclonal antibody; Dako, Glostrup, Denmark), and proliferating cell nucleic acid/PCNA (1:200, mouse monoclonal antibody; Dako, Glostrup, Denmark) was performed.

Histological examination in detail revealed that the subcutaneous mass was multilobular and composed of predominantly pleomorphic cells, accompanied with spindle cells and multinucleated-giant cells (osteoclast-like cells). Thin collagen fibers surrounded individual and/or bundles of neoplastic cells. Neoplastic or pleomorphic cells formed many bundles and sometimes showed in a loose cellular arrangement. These cells have round to ovoid nuclei with distinct nucleoli. Several cells have bizarre nuclei with moderate nuclear pleomorphism. The spindle-shaped cells with short to long processes that scattered throughout the pleomorphic cells and sometimes form an indistinct wave with collagen fibers production. The mitotic figures of the neoplasm were found not many, it has a vary limit in numbers (< 3-5 cells/high power field). There no metastatic cells were found in the lumina of blood capillaries. PCNA immunoreactivities have been used for diagnosis and predict the prognosis in several tumors. Proliferating activities of the present neoplastic (pleomorphic and spindle) cells were moderately found, the cells were positive for PCNA. Multinucleated giant cells have developed in several areas of the neoplastic tissue and showed negative reaction for PCNA. These cells had similarities to osteoclasts, huge and irregular ovoid shaped-cells, had big eosinophilic cytoplasm and multiple round to ovoid nuclei with indistinct nucleoli. The immunohistochemical evaluations of neoplastic cells demonstrated that the pleomorphic and spindle shaped cells were positive immunoreactivities for S100 protein. S100 proteins are normally present in cells derived from the neural crest (Schwann cells, and melanocytes), chondrocytes, adipocytes, myoepithelial cells, macrophages, Langerhans cells, and dendritic cells. On the other hands, the giant cells have negative reactions. Other immunohistochemical staining demonstrated that the neoplastic cells were negative for the expression of vimentin, desmin and GFAP. Knowledge of the exact anatomical location of the subcutaneous tumor after careful examination, there is a possibility that the origin of tumor is synovial cells. It may be considered, since there are several similarities between synovial tumors and other mesenchymal cell tumors, the potential of misdiagnosis is high. It should be also referred that the tumors located at one location of origin cells area, but sometimes arises to the other unexpected sites. Synovial cell sarcomas are very rare reported tumors in animals. Histopathologically, in previous reported cases confirmed the diagnosis of this type sarcoma were positive for

vimentin in indicate a neoplastic cell, and also cytokeratin using immunohistochemical staining methods. Meanwhile the results of this study demonstrated a negative immunoreaction for vimentin of the neoplastic cells. Peripheral Nerve Sheath Tumors (PNSTs) have been sub-classified rather confusingly in veterinary literature, depending on their presumed cell of origin. PNSTs arise from Schwann cell and also perineural cell or both of them and were positive immunoreactive for GFAP, S100 protein and neuro-specific-enolase (NSE)[6,7,8]. Another case of MPNST was no detected cells positive using GFAP immunostaining[9]. Immunohistochemistry works of the present case showed positive reactions for S100 protein. In general Schwann cell tumors consist of densely packed uniform elongated spindle cells with variable densely of collagen matrix. Those cells are positive S100 protein, and rarely arrange in cellular palisading. Giant cell development in the tumor tissue is very rare cases in animals. There are so few documented cases, and some reported cases are not convicting and may represent a fact other bone lesions in which osteoclasts is a prominent feature. In the present tumor, giant or osteoclast-like cells proliferation was identified multifocally in limited areas.

CONCLUSION

In conclusion, based on morphological and immunohistochemical studies the diagnosed of the present case is a type of Malignant Peripheral Nerve Sheath Tumor/MPNST with multiple foci of giant cells. It is also describing that the limitation methods and risks factor associated with applying the currently available diagnosis system in veterinary medicine and highlights the need for new clinical studies to investigate the behavior and prognostic factors. It is very limited knowing about the cell origin, incidence, and anatomic distribution of this tumor in African pigmy hedgehog. Advanced molecular studies would be helpful to identify and do advance characterization cell tumor origin, which can allow more targeted investigations regarding the microscopic, immunohistochemical, and clinical features of this tumor's type.

FIGURES

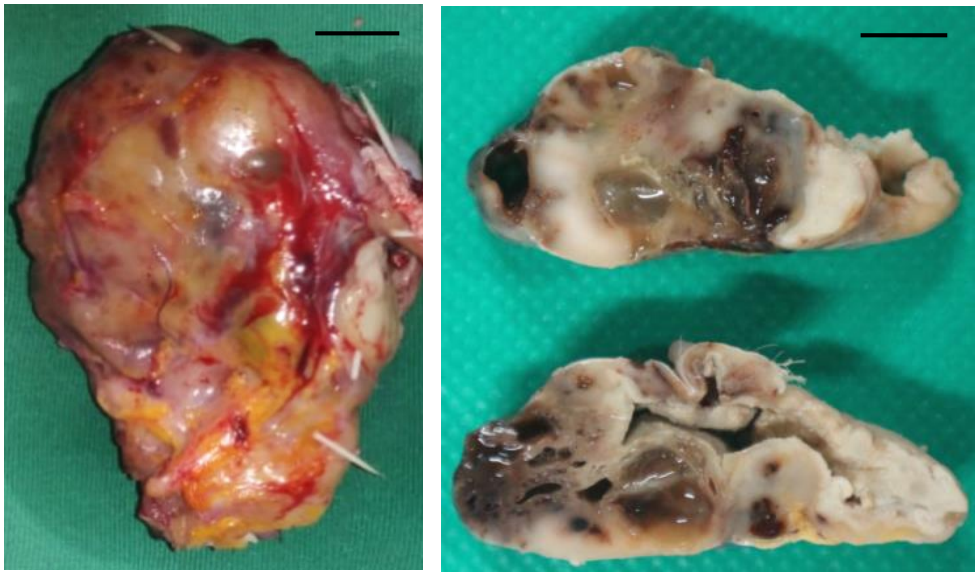

Figure 1. The subcutaneous mass which located at the left abdominal (left). Oval shape with dimension 6.5 x 5.5 x 1.2 cm, imagining glowing nodule. Formalin fixed of the mass (right), longitudinal section indicates irregular nodules, necrotic areas, cysts development and white dense tumor tissue. (Bar = 1 cm).

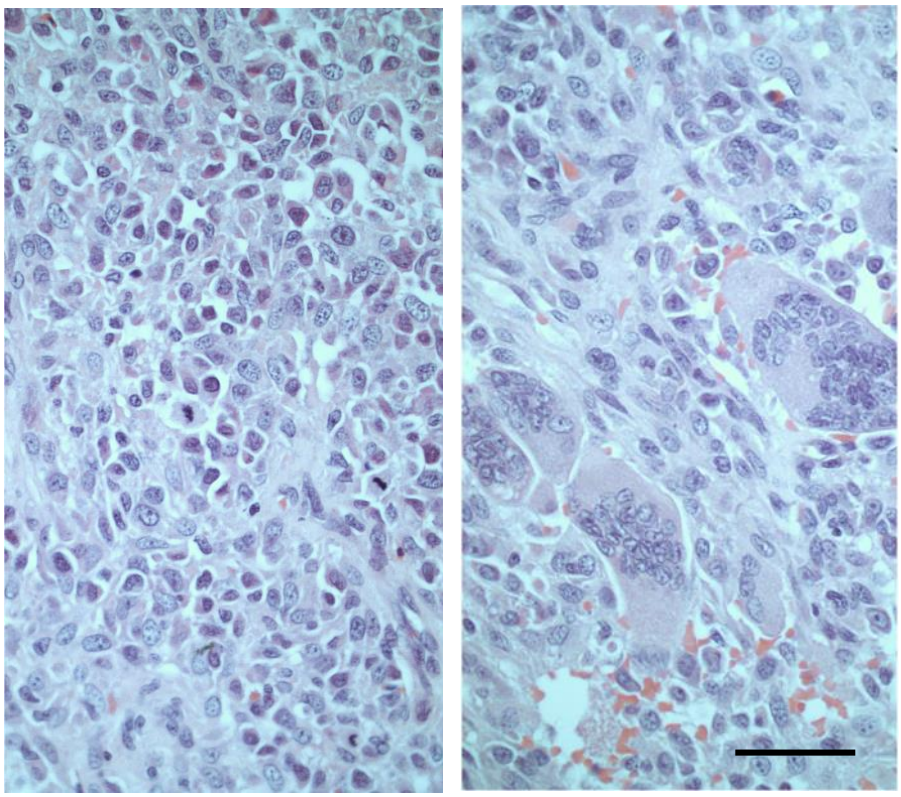

Figure 2. Histological image on Hematoxylin-Eosin staining. The subcutaneous mass consists of dense pleomorphic and spindle cells which forming giant cell structure (left). The tissue contains groups cell in territorial matric or large cell that imagining multinucleated-giant cells (right). Giant cells are clearly identified among the cells, in addition mild hemorrhage image also found in this tissue. Bar = 50 µm.

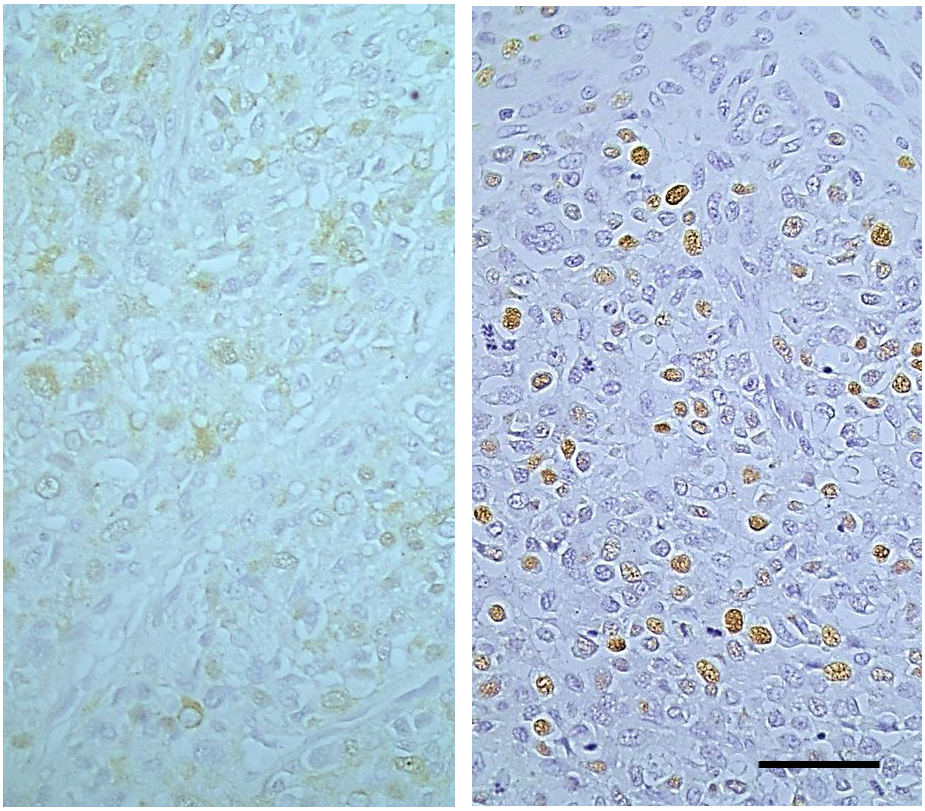

Figure 3. Immunostaining image using S100 antibody (left), the immunoreactivity of S100 showing some cells are slightly positive (pale brown) in cytoplasm's. There a number cell's nuclei are positive immunoreactivities for PCNA antibody (right). Bar = 50 µm.

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