

Spindle Cell Carcinoma in a Rat: Histopathologic and Immunohistochemical Study

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Introduction

Several spindle-shaped cell tumors were located in cutaneous and subcutaneous areas e.g. peripheral nerve sheath tumor/ PNST (Kim *et al.* 2003; Sturgeon *et al.* 2008) or Schwannoma (Ottinger *et al.* 2009), fibrosarcoma (Liu *et al.* 2004), leiomyosarcoma (Bailey *et al.* 2003), hemangiopericytoma (Handharyani *et al.* 1999), and spindle cell tumor (Ramos-Vara, 2001). This study was performed to examine the morphology of the mass using routine staining and immunohistochemistry.

Material And Method

A Spraque-Dawley rat, female, seven-month-old, came from a breeding colony was submitted to Veterinary Teaching Hospital, Bogor Agricultural University. The rat has five-month history of mass, located at anterior region of chest. At the last three months became bigger and made the rat difficult to breath. An examination results from the clinician indicated that she has a subcutaneous mass, resemble mammary tumor, multilobulated, and was 9.0 x 5.5 x 4.4 cm in sized. Finally, the rat was euthanized at the owner's request and then submitted to The Laboratory of Veterinary Pathology. The masses and multiple organs were collected for histopathologic and immunohistochemical examination.

Representative tissues were fixed for an undetermined period in 10% buffered neutral formalin and embedded in paraffin. Five-micrometer sections were stained with Hematoxylin-Eosin (HE), Masson trichrome and periodic acid Schiff (PAS). For immunohistochemistry, paraffin sections were placed on

positively charged slides and stained with primary antibodies to mouse anti-vimentin (Dako Corp, Glostrup, Denmark), mouse anti-human desmin (Dako Corp, Carpinteria, USA), mouse anti-Proliferating Cell Nuclear Antigen/PCNA (DakoCytomation, Glostrup, Denmark), rabbit anti-Glial Fibrillary Acidic Protein/ GFAP (Dako Corp, Carpinteria, USA) and mouse anti-AE1/AE3 cytokeratin (Millipore). These immunohistochemistry works were performed by using the streptavidin-biotin complex (SAB) immunoperoxidase method (Nichirei, Tokyo, Japan).

Results and Discussion

Examination on cross section showed two kinds of tumors; the central mass was pale-brown in color, with mild hemorrhagic streaks, had small areas of necrosis and firm in consistency. The neoplasm was 5.5 x 4.0 x 3.4 cm in sized, and tumor tissue was well demarcated. This mass was surrounded by multiple masses, which multilobulated, white in color and firm in consistency.

Histopathologically, the neoplasm was composed of pleomorphic spindle-shaped cells with short-to-long, have pale eosinophilic cytoplasmic processes and often vacuolated cytoplasm. The neoplastic cells were spindle-shaped and have vesicular oval nuclei, contained one or more inconspicuous nucleoli, with a lacy-to-moderately coarse chromatin pattern. Collagen fibers were found surrounding individual and bundles of neoplastic cells by performing Masson trichrome stain. These cells arranged in wavy and interlacing bundles; in several areas the cells located surround new

blood capillaries. The neoplastic mass contained moderate hemorrhages, multifocal various-sized areas of necrosis. This mass showed a high mitotic appearance; 3-5 cells per high power field (HPF). By using immunohistochemistry, the cells of central mass were severely positive for vimentin and PCNA; but they were negative immuno-reactivities for desmin, GFAP, and cytokeratin. PCNA immunoreactivities have been used as a useful diagnosis tool to predict of the prognosis in canine mammary tumor (Lohr *et al.* 1997); and this antibody detects proliferating activity include the resting cells. According to the characteristic pattern of pleomorphic spindle-shaped cells in HE sections and severely positive against the vimentin antibody on mass, the present case should be diagnosed as spindle cell carcinoma.

The cells of peripheral tumor consisted of epithelial glands or cuboidal cells which have round nuclei with indistinct nucleoli, and surrounded by eosinophilic stroma. The cells were positive for cytokeratin; and diagnosed as adenoma simple type. There are some neoplasms which have spindle-shaped cells. Specific characteristic for hemangiopericytomas have whorls or "finger-print" pattern of cells around blood vessels (Handharyani *et al.* 1999). PNSTs have cells arranged around a central structure resembling an axon or a vascular structure (Kim *et al.* 2003; Sturgeon *et al.* 2008). In some cases of the spindle-shaped cells in PNST are arranged in interlacing fascicles; the classic Antoni A configuration and Verocay bodies; it has been considered the hallmark of benign PNSTs (Schwannomas) in humans. The histopathological description of present tumor has similar findings in spindle-shaped cells with PNSTs, but in addition it is showed pronoun immunopositivity to vimentin.

Conclusion

Based on histopathological and immunohistochemical findings the present tumor may conclude as spindle cell carcinoma. The presence of a high mitotic figures (3-5 cells/HPF) on routine sections could be a good indicator suggesting the tumor's malignancy.

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