

Malignant Tumor of Peripheral Nerve Sheath in the Thoracolumbar Region in a Cat

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ABSTRACT

Background: In veterinary medicine, peripheral nerve tumors (PNST) are classified from the cellular pattern and as benign and malignant (MPNST). The majorities of cases are benign and usually involve the skin and subcutaneous tissue of the head, neck, and limbs. Animals with MPTNS usually have spinal cord and spinal canal involvement and are also described in the small and large intestine, oral cavity, perirenal region, and urinary bladder. Treatment is performed according to the location of the neoplasm and metastasis is rarely described. The present article aims to report a case of a malignant tumor in the peripheral nerve sheath of a cat.

Case: A 8-year-old domestic cat was presented with a history of progressive paresis in the pelvic limbs. On neurological evaluation, proprioceptive ataxia and proprioception deficit in the pelvic limbs were observed, suggestive of thoracolumbar injury. Blood work and serum biochemistry showed results within the reference for the species and the bi-directional immunochromatography test for FIV and FeLV were negative. The radiographs of the thoracolumbar segment did not show significant changes. Myelography with iodinated contrast and collection of cerebrospinal fluid (CSF) were performed. On myelography examination, iodinated contrast loss was found between the 6th and 7th thoracic vertebrae, while the CSF analysis was normal. The patient underwent laminectomy and durotomy for excision of a mass found dorsally to the spinal cord, with intradural location. The tumor was sent for histopathological examination. Microscopic analysis showed neoplastic proliferation of spindle-shaped cells with predominance of the Antoni A pattern. Immunohistochemical analysis demonstrated intense cytoplasmic staining of the neoplastic cells for vimentin and S100 protein. Based on these findings, the diagnosis of malignant peripheral nerve sheath tumor was made. Radiotherapy was suggested as adjuvant treatment after surgical procedure. However, the owner refuse to follow this recommendation due to cost restriction. The patient had a satisfactory clinical recovery, he has no longer presented proprioceptive ataxia or proprioception deficits in three months after the surgical procedure.

Discussion: In the case described, the feline patient presented a history, clinical signs, and findings in the myelography exam related to MPNST in the region of the vertebral canal. This neoplasm usually involves the spinal canal or spinal cord, but has been described in other locations, such in the small and large intestine, oral cavity, perirenal region, and urinary bladder. Based on the findings of the physical examination and complementary exams, a surgical procedure was recommended. Then, laminectomy and durotomy were performed to remove the mass. The treatment described in the literature in cases of MPTNS is surgery, which can be curative, but in some cases, the use of radiotherapy may be necessary. The histological patterns observed in this neoplasm are the Antoni A and B, in the case described the Antoni A pattern was observed. The definitive diagnosis was made by immunohistochemistry with vimentin and S100 protein. MPNST are few described in the thoracolumbar region in cats. The surgical treatment was curative, where improvement of the clinical signs could be observed three months after surgery. In addition, monitoring of patients is recommended to ascertain relapses and metastases.

Keywords: feline, neurosurgery, histopathology, immunohistochemistry.

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INTRODUCTION

The peripheral nerve sheath tumours (PNST) originate from a single or a mixed population of cells, including perineural cells, Schwann cells, and intraneural fibroblasts [12]. In veterinary medicine, they are usually classified as benign or malignant (MPNST) [6]. The majority of cases are benign and usually involve the skin and subcutaneous tissue of the head, neck, and limbs [12]. Although MPNST usually involves the spinal cord and vertebral canal, they are also described in the small and large intestine, oral cavity, perirenal region, and urinary bladder [2,3,9-11]. The occurrence of metastasis is rarely described. The surgical resection can be curative, and it may vary according to the localization of the neoplasm, however, there are a few reports that monitor the patient's evolution for a long period after the surgical treatment [10].

The aim of the present study was to report a case of malignant peripheral nerve sheath tumor in a cat.

CASE

A 8-year-old male neutered cat was presented with a history of 2 weeks of progressive paresis in the hindlimbs and three days of hyporexia. On physical examination, the patient was alert with no behavior changes. Proprioceptive ataxia was observed in the hindlimbs, with asymmetric proprioception deficit (absent on the left, and decreased on the right limb), nociception was present and spinal reflexes were preserved. No changes were observed on the thoracic limbs or with the cranial nerves' reflexes. Based on the clinical suspect of a thoracolumbar injury, complementary exams were recommended.

Blood work and serum biochemistry showed results within the reference for the species and the bi-directional immunochromatography test for FIV and FeLV were negative. The radiographs of the thoracolumbar segment did not show significant changes. Myelography with iodinated contrast and collection of cerebrospinal fluid (CSF) were performed. Myelography showed an interruption of the contrast line in the region between the sixth and seventh thoracic vertebrae (T6 - T7), while the CSF analysis was normal.

The patient was hospitalized to have a dorsal laminectomy and a durotomy performed as surgical treatment, with a sagittal incision of the 1st and the 10th thoracic vertebrae, opening of thoracolumbar fascia

and removal of the dorsal spinous process of the 6th thoracic vertebra. The mass was in the dorsal region of the spinal cord, with an intradural presentation (Figure 1). Therefore, it was necessary to perform a durotomy, characterized by the longitudinal opening of the dura mater. The excised mass measured of 1.0 x 0.3 cm presenting with colouring and irregular surface. This material was submitted to histopathological examination.

In the microscopic evaluation, the tissue is characterized by a neoplastic proliferation of spindle-shaped cells arranged in various directions, sometimes with swirl formation, with predominance of the Antoni A pattern (Figure 2). The cytoplasm is sparse, with indistinct cytoplasmic borders, elongated nucleus, and single evident nucleolus. Moderate anisocytosis and anisokaryosis and rare mitosis figures are observed, besides discrete multifocal areas of hemorrhage and discrete inflammatory infiltrate composed of neutrophils.

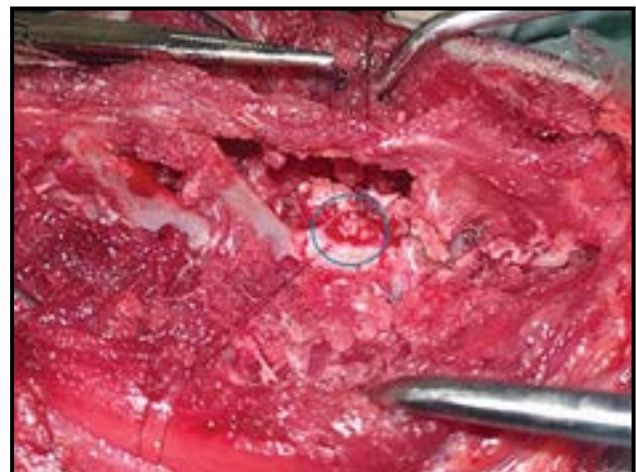


Figure 1. Neoplastic mass in the intradural region in the sixth thoracic vertebra (blue circle) in a domestic cat.

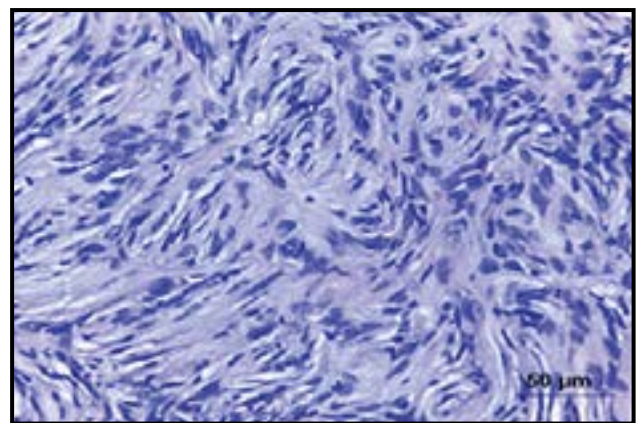


Figure 2. Microscopic pattern of malignant tumor of peripheral nerve sheath in thoracolumbar region in a cat. There is proliferation of spindle cells in different directions and in the form of swirls (Antoni A pattern) [H&E].

The histological changes were compatible with malignant peripheral nerve sheath tumor. Sections of the neoplasm were submitted to immunohistochemistry (IHC) technique for the antibodies S100 protein and vimentin, according to established protocol [4]. On IHC evaluation, intense cytoplasmic staining was observed in the neoplastic cells for vimentin (Figure 3) and S100 protein (Figure 4).

Radiotherapy was suggested as adjuvant treatment after surgical procedure. However, the cat owner refused this recommendation due to elevated costs. The patient had a favorable recovery, being prescribed methadone¹ [0.3 mg/kg - SC, q6 h during 1 day] as analgesic and nutritional support. It was then discharged with tramadol² [2 mg/kg - *per os*, q12 h during 5 days] prescription and activity restrictions. Physiotherapy was advised after 10 days. After 3 months of the surgical procedure, the cat recovered pelvic limb movements. Also, it has no longer presented proprioceptive ataxia or proprioception deficits.

DISCUSSION

MPNST in cats affect the spinal canal and spinal cord, although it has been described in other anatomical regions in the species [2,10]. In the reported case, a neoplasm was observed in the thoracolumbar region, like that described by Okada *et al.* [8], which developed in the vertebral canal in the intradural region.

The clinical signs are consistent with the neurological and systemic clinical changes reported in the literature [5-8]. The development of MPNST in the thoracolumbar region can result in pain, paresis, ataxia or paralysis of the pelvic limbs, deficit in proprioception, presence of pain perception and presence of spinal reflexes. The clinical signs described tend to occur progressively, leading to hypoxia and prostration [7]. However, these signs can vary depending on their anatomical location [5].

Myelography can be used to identify compressions and extrusions that affect the vertebral canal [1]. It was observed that the patient presented alterations compatible with intradural-extramedullary compression, due to the interruption of the contrast progression between T6-T7, like the case of a cat described by Okada *et al.* [8], who presented the tumor in the spinal canal with intradural-extramedullary characteristic in the thoracolumbar region.

In the histological analysis, the changes found were compatible with MPNST. Veterinary medicine,

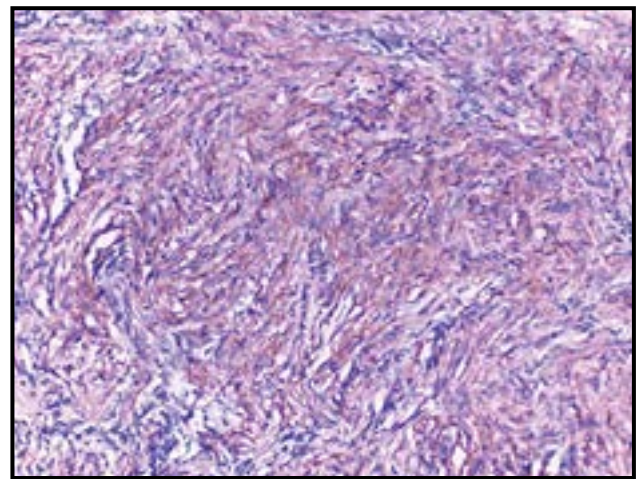


Figure 3. Immunohistochemical aspect of malignant tumor of peripheral nerve sheath in thoracolumbar region in a cat. Immunostaining for vimentin. Immunohistochemistry, chromogen 3-amino-9-ethylcarbazole [obj.20x].

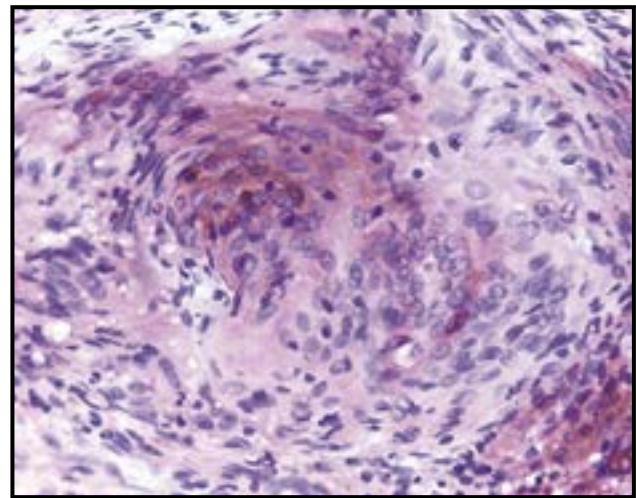


Figure 4. Immunohistochemical aspect of malignant tumor of peripheral nerve sheath in thoracolumbar region in a cat. Immunostaining for S100 protein. Immunohistochemistry, chromogen 3-amino-9-ethylcarbazole [obj.40x].

peripheral nerve sheath tumors are classified as benign and malignant [6]. Their histological characteristics are the Antoni A or B pattern. The Antoni A pattern consists of the presence of aligned schwann cells and, occasionally, in the form of whirls or swirls; while in the Antoni B pattern, schwann cells, fibroblasts and perineural cells with a myxoid matrix are noted [12]. In the microscopic evaluation of the case described characteristics similar to the Antoni A histological pattern were observed.

The IHC technique assisted in the diagnosis of MPNST, with immunostaining for vimentin and S100 protein. These markers are widely used in the diagnosis of peripheral nerve sheath tumors [4,10,12]

MPNST are few described in the thoracolumbar region in cats. In the case reported, the survival of 3 months after surgical treatment of dorsal laminectomy and durotomy at T6 can be observed. Despite the surgical treatment proving to be effective in the period in which the animal was evaluated, adjuvant treatments should be combined when necessary. In addition, monitoring of patients is recommended to ascertain relapses and metastases.

MANUFACTURERS

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