Computed Tomography evaluation of peripheral nerve sheath tumor in an American Staffordshire Terrier – Case study

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Abstract
A 1 year old intact American Staffordshire Terrier male was brought to consultation being suspicioned by cervical compression. The neurological examination show proprioception deficiency of the front and hind legs and a diminution of the superficial proprioception was noted. Base on the neurological evaluation the lesion was located in the cervico-toracal area of the spine. A native CT was performed to identify the changes of the spine. The CT reveal a craniodorsal left paravertebral soft tissue mass associated with the segmental nerves of the brachial plexus and with extension into the vertebral canal through the left intervertebral foramen T2/3. A fine needle aspiration was performed from a formation localized intrathoracic in the close proximity of the nerve sheath tumor and the examination showed cell characteristically for a mesenchymal malignant process.
Keywords*: nerve sheath tumor, neurofribrosarcoma, dog, computed tomography*

Introduction

Peripheral nerve sheath tumor (PNST) in dogs can have origin in the Schwann cell, or other cell that surround the axons of peripheral nerves (3, 5, 7, 9, 10). Classification of those tumors was made in 1999 by the World Health Organization. PNST are divided into benign PNST (BPNST) and malignant PNST (MPNST) according to morphologic features and biological behaviour (1, 5, 6, 7, 11). Tumors of the peripheral nervosa system are not very common in animals, as location those usually can appear between C6 and T3, other locations are cited by the literature (2, 8, 10). The classification and terminology is confusing both in humans and animals medicine, the classification of peripheral nerve tumors in veterinary medicine is base of the type of cell that is involved and in cases of controversial ontogeny is simplified as malign or benign (10).

The purpose of this report is to describe the imagistic feature of a peripheral nerve sheath tumor in a young dog and to show the importance of CT examination in evaluation and diagnostic of peripheral nerve sheath tumor. The occurrence of nerve sheath tumor is often seen in middle to old age (3, 10).

Material and method

The biological material was represented by a 1 year old intact American Staffordshire Terrier male that was brought to consultation being suspicioned by cervical compression.

The CT evaluation was performed with the patient under sedation and restrained in a dorso-ventral decubitus. The CT examination was performed using a Siemens SOMATOM SCOPE CT (Siemens), with soft tissues and bone reconstruction windows. The images were obtained using 130 kV and a pitch factor of 1. After the CT, was performed an ultrasound guided fine needle aspiration, having as a target the metastatic formation located under nit the spine in the thoracic cavity.

Results and discussion

Computed Tomographic Findings

There is an elongated soft tissue attenuating craniodorsal mediastinal mass lesion of 5.5 cm length and 2.5 cm diameter to the left of the cranial thoracic vertebrae. Small multifocal intralesional mineralization is seen (fig. 1, fig. 2, fig 3).

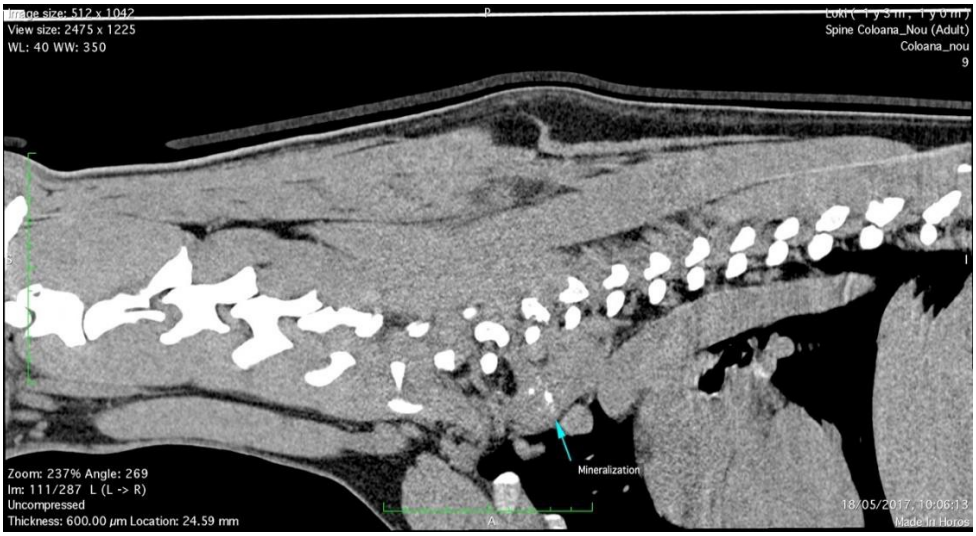

Fig. 1 Small multifocal mineralization

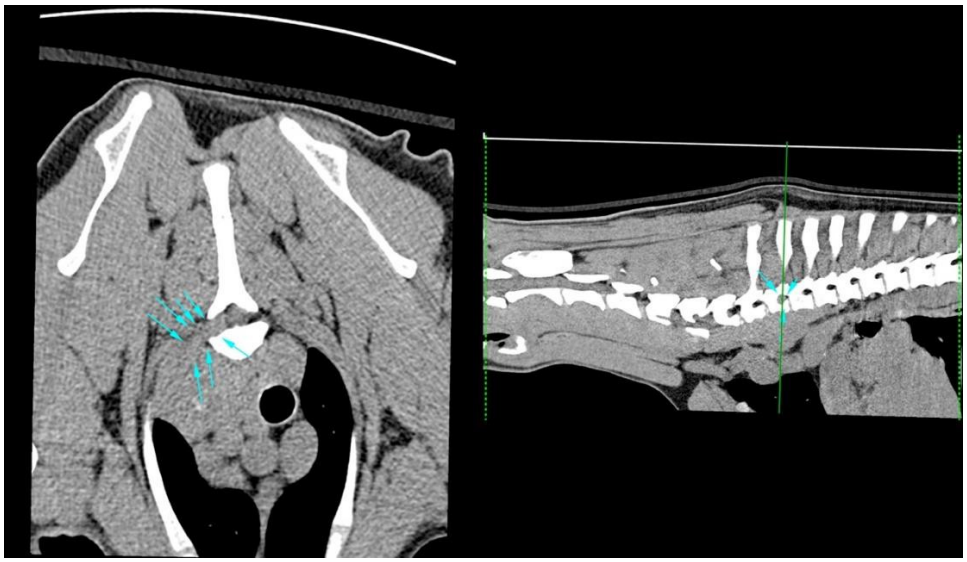

Fig. 2 Enlarged nerve root with presence of intramediastinal mass

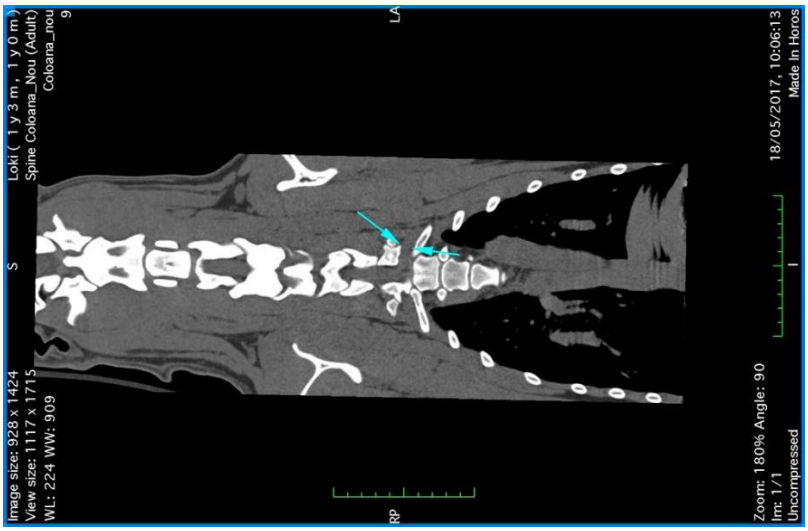

Fig. 3 Enlargement of the nerve rooth

The mass presents multiple thin finger-like extensions which appear to merge with the radicular spinal nerve branches of the brachial plexus nerves. The left spinal nerve root at T2/3 specifically presents marked centrifugal thickening and can be traced through the widened left neuroforamen. There is a moderate intradural mass effect onto the spinal cord from the mass at the same level.

The cranial mediastinal lymph nodes reveal moderate asymmetric enlargement at up to 2 cm diameter with faint mineralizations (fig. 4). The walls of the aortic root and brachycephalic trunk present faint mineralization as well.

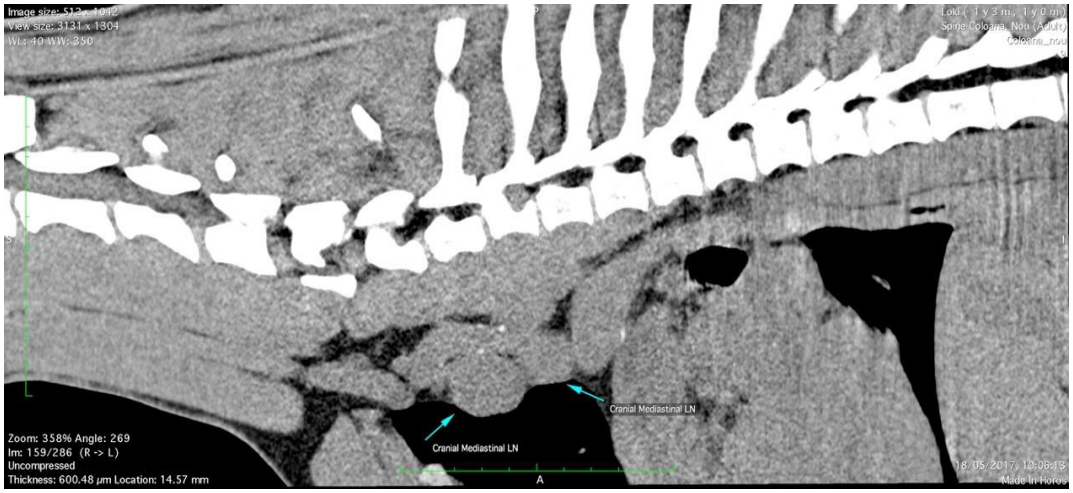

Fig. 4 Enlargement of the mediastinal limphnodes

Computed Tomographic Diagnosis

Craniodorsal left paravertebral soft tissue mass associated with the segmental nerves of the brachial plexus and with extension into the vertebral canal through the left intervertebral foramen

T2/3. Moderate secondary compressive myelopathy at the same level. Cranial mediastinal lymphadenomegaly meeting neoplastic criteria.

Computed Tomographic interpretation

We consider a primary neurogenic neoplasm such as peripheral nerve sheath tumor/neurofibrosarcoma with metastatic spread to the regional lymph nodes versus a secondary neoplasia such as lymphoma.

As to the patient demographics (age) and the involvement of the cranial mediastinal lymph nodes a round cell neoplasia seems more likely here.

The overall prognosis is guarded to poor as the lesion is probably not fully resectable due to the involvement of the component inside the vertebral canal and metastatic spread is very likely at this point.

The clinical signs are likely due to the spinal cord compression by the mass.

Fine needle aspiration

The content extracted from the formation by ultrasound guided biopsy was smeared on a glass blade and stained using Diff-Quik technique. A well-represented cell population is formed, consisting of round, elongated, fusiform, neoplastic cells arranged in groups. These shows marked cellular and nuclear polymorphism, anisocytosis, anisocaria. The nuclei are large, located centrally or paracentral, presenting large nucleoli, evidences of granular aspect of chromatin and presence of single or multiple nucleoli is marked. In some places, many multinuclear tumor cells can also be seen. There is also numerous mitosis. The cytological aspects described plead for a poorly differentiated malignant tumor of mesenchymal origin (sarcoma) (fig. 5, fig. 6, fig. 7).

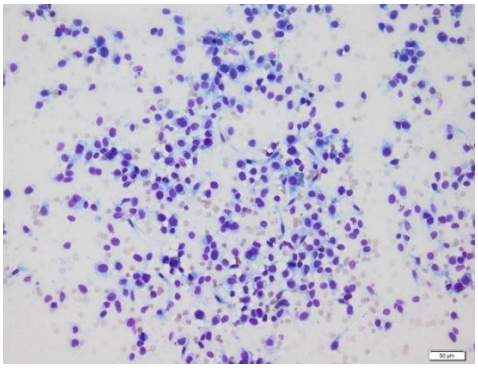

Fig. 5 Neoplastic Cell with various shape and size

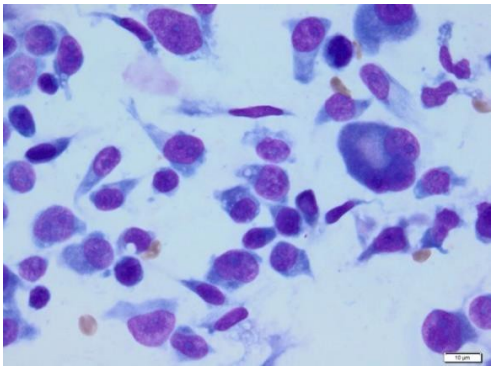

Fig. 6 Cellular and nuclear polymorphism

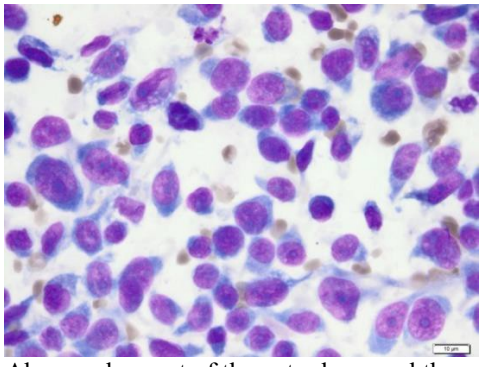

Fig. 7 Abnormal aspect of the cytoplasm and the nucleus

Conclusion

The neoplastic process located in the nerve root region is not limited to middle age or old individual but also can occur in younger individual. The aspect of cell (3) indicate a process with high aggressivity. The presence of calcification is not uncommon, being described along with the round and fusiform cell type in case of MPNST (3, 5). The presence of osteogenic tissue can mislead the diagnostic, but there is not presence of bone lysis, the new tissue being a result of PNST malignancy. The presence of cell with granular aspect is another indication that the origin of the tumor is of nervous origin (3, 4).

The fine needle aspiration technique is not sufficient to make possible an exact identification of the tumor classification. Taking in consideration the CT and cellular characteristic we can say that the most possible diagnostic in this case is schwannoma/neurofibrosarcoma.

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