**Summary**

A 3.5-year-old cat presented with hind limb paresis of 2-months’ duration. Neurological examination revealed a T3-L3 spinal cord tract lesion. Survey radiographs identified a modified aspect of the fifth lumbar vertebra, and the contrast medium used in the myelography did not progress cranially to that point. Computed tomography (CT) myelography confirmed the presence of a right-sided extra-dural mass. As the lesion was surrounded by adipose tissue based on the magnetic resonance imaging (MRI), surgery was attempted to remove the mass.

Angiomatosis was confirmed by histopathology. To our knowledge, this malformation is rare in cats. This case includes many interesting features, including the age at diagnosis, the lumbar localisation and the first report of an MRI investigation. MRI represents the gold standard for visualisation of nervous tissue, hence an additional interest of this study, for which the impact of the lesion on the spinal cord could be visualised before surgery. The underlying process of angiomatosis is also discussed.

**Keywords:** Cat, Vertebra, Angiomatosis, Paresis, Malformation, MRI, CT

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**Case History**

A 3 year and 6 month old neutered domestic short-haired cat presented with a 2-month history of difficulty jumping and dragging of the hind limbs. The owner reported that the cat seemed to experience no discomfort or pain. The use of non-steroidal anti-inflammatory drugs and several sessions...
of osteopathy did not improve the abnormal gait. The cat did not present with any signs of systemic disease or penetrating wounds, and his water and food intake remained unchanged.

PHYSICAL AND NEUROLOGIC EXAMINATION

The general physical examination revealed, hydrated mucous membranes, a capillary refill time below two seconds, a heart rate at 120 beats per minute, a respiratory rate of 20 respirations per minute, no tension on abdominal palpation and a rectal temperature of 38.5°C. A hands-off neurological assessment revealed a marked hind limb ataxia, with a normal fore limb gait. The hands-on examination showed subtle proprioceptive deficits of the hind limbs, intact segmental spinal reflexes, cranial nerves assessment within normal limits and no focal pain upon palpation of the spine or motion of the neck. The lesion was localised to the T3-L3 segmental spinal cord segments.

DIAGNOSTIC PROCEDURES

For further investigations, the cat was induced with a combination of diazepam (0.2 mg/kg, Diazepam; TVM, Lempdes, France) and propofol (6 mg/kg, Propolipid 1 %; Fresenius Kabi, Oslo, Norway) intravenously, and anaesthesia was maintained with isoflurane (Vetflurane; Virbac, Carros, France) through an endotracheal tube.

On a lateral digital radiograph, the body of the fifth lumbar vertebra appeared thinner, and the vertebral canal diameter was enlarged with evidence of increased mineral opacity of the laminae (Figure 1).

Myelography was performed by injection of a contrast medium (20 mg/kg, Iopamiron 300; Iopamidol, Courcouronnes, France) through a 22G spinal needle into the ventral subarachnoid space at L6/L7; however, the procedure was difficult. Repeated radiographs immediately after the contrast injection revealed a subarachnoid filling defect at the level of L5 with no contrast media observed cranially to the body of the fifth vertebra (Figure 1).

A myelo-CT scan was performed to better define the osseous lesion. A right-sided extradural compressive mass deviated the spinal cord to the left and obstructed the contrast column cranially. The mass appeared hyperattenuating, with small punctate lucent areas arising from the medial aspect of the bone along the entire length and height of the vertebral body of L5 (Figure 2A, B, C).

MRI was advised 10 days later to determine whether surgery was warranted. On this occasion, a cerebro-spinal sample from the cisterna magna was obtained. The protein concentration was increased (4.7 g/L, normal < 0.2 g/L) with no nucleated cells present, despite an erythrocyte contamination of 2000 cells.

MR imaging of the lumbar spine with a 0.2 T permanent open magnet confirmed that the lesion was extramedullar because a thin layer of epidural fat was present between the abnormal tissue and the spinal cord on the dorsal view (Figure 3a) and transverse view (3b). T1-weighted (T1W) images in the sagittal and transverse planes and T2-weighted (T2W) images in the sagittal plane were obtained. T1W images in the transverse and dorsal planes and short tau inversion recovery (STIR) were also acquired post-intravenous contrast administration (0.1 mmol/kg bodyweight, gadopentetate dimeglumine (Magnevist i.v; Bayer, Loos, France). The mass showed homogeneous contrast enhancement immediately after contrast administration (Figure 3c).
TREATMENT

Following its first presentation the cat was discharged with a course of prednisolone (Microsolone; Merial, Lyon, France) initially at 0.4 mg/Kg per day and then progressively tapered for a period of 10 days. The treatment did not induce any change in the clinical presentation. Consequently, following the MRI, a dorsal laminectomy was performed that extended ventrally to the right. After burring the bone away, a haemorrhage was continuous from the surgical site and did not easily cease. The surface of the cortex of the lamina appeared irregular and presented new bone. The abnormal tissue was invasive and the owner elected to have the cat euthanised during the surgery because the suspected neoplastic tissue could not be completely removed.

DIAGNOSIS

Differential diagnosis of this bony vertebral proliferation included benign neoplasia, osteomyelitis, granuloma or congenital intraosseous vascular malformation. Fragments of the abnormal bone were submitted for histopathology. The were placed in 10% phosphate buffered formalin solution, dehydrated with the use of solutions of ascending concentrations of ethanol, cleared with butanol, embedded and stained with Haematoxylin and Eosin. The sections revealed a mesenchymal proliferation, primarily vascular, with a redundant vascular network (Figure 4). The vascular cells were well differentiated with heterogeneous nuclear chromatin, anisokaryosis and very little atypia. The perivascular stroma contained lymphocytes, plasmocytes and fusiform cells organised in bundles or layers, some of which appeared continuous with the vessel walls (Figure 5).

This mesenchymal neoformation invaded the bone medulla, displacing haematopoietic cells, which were not easily observed. No lysis was evident, and the bony lamellae progressively vanished when in contact with the lesion (Figure 4). A few thrombi were also observed. These findings were consistent with vertebral angiomatosis.

Discussion

Of the 5 previously reported cases, one cat presented with diffuse spinal discomfort/pain, 3 cats displayed hind limb proprioceptive deficits without pain or discomfort, and one cat presented with both pain and proprioceptive deficits as the primary complaints. Therefore, it is likely that spinal pain/discomfort and proprioceptive deficits are the two main clinical signs presented in suspected cases of angiomatosis. Our case only showed a hind limb ataxia with proprioceptive deficits consistent with the majority of previous reports.

The 5 cats described in the literature [8, 12, 16] were between 1 and 2 years old. Cutaneous angiomatosis has been
reported in adult cats [5], but this is the first case of an older cat with vertebral angiomatosis.

All previous reported lesions localised to the caudal thoracic vertebra. This is the first report of a vertebral angiomatosis in the lumbar spine.

Although this is the third report describing the CT appearance of vertebral angiomatosis in cats, to date, no other reports offer an MRI description of this benign malformation. Despite an in-existent subarachnoid space that prevented the contrast media from progressing cranially to the lesion, epidural fat remained between the abnormal tissue and the spinal cord. Considering the vascular nature of the neoformation, it is likely that the contrast media was homogeneously absorbed within the abnormal tissue.

Angiomatosis is considered a vascular malformation rather than a neoplastic disease, whereby multiple angiomias (tumour forming blood vessels) develop within a tissue [11]. The main features differentiating angiomatosis from neoplasia are the presence of various well-defined cell populations, including differentiated endothelial cells and the lack of mitotic figures. Both conditions were observed in the sample submitted.

Although the lesion can appear lytic on survey radiographs, this feature is not observed by histopathology [12]. In humans, angiomatosis is more likely to develop in HIV infected individuals [2]. Unfortunately, the FeLV/FIV status of our cat was not known. In previous studies, 2/5 of cats tested negative for FeLV/FIV.

The malformative nature of the disease, the lack of neoplastic features of the endothelial cells, the suggested association in literature of an infectious agent and the older age of the cat presented, raise an additional question regarding the nature of the disease process. The HIV in humans and the FeLV/FIV in cats may suggest that this disease is acquired. However the other features previously mentioned could suggest that this slowly growing vascular network, remains a developmental anomaly. More cases are necessary to shed light on the underlying cause of this unusual disease.

In conclusion, in young cats with paraparesis, spinal hyperaesthesia, or a combination of both and a proliferating bone lesion in the lumbar spine, the differential diagnosis should include angiomatosis; however, angiomatosis cannot be excluded in an adult cat. Although the cat in this report was euthanised as instructed by the owner, previous reports describe an uneventful recovery following surgical management.

References