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Case Series

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Feline vertebral angiomatosis: two cases

Massimo Frizzi[1], Nicola Ottolini[3], Claudia Spigolon[4] and Giovanna Bertolini[2]

Abstract

Case series summary Two cats aged between 1 and 2 years were presented for paraparesis, general discomfort, back pain and urinary retention. Extradural spinal cord compression at the level of T4 and T8 was evident on CT examination and on MRI. Hemilaminectomy and partial corpectomy were performed to achieve spinal cord decompression. Histopathology of the abnormal bone tissue was suggestive of vertebral angiomatosis. After initially worsening, both cats recovered their normal gait and functional urination. Both cats have been followed-up for >1 year, without any recurrence.

Relevance and novel information This is the first report of vertebral angiomatosis with complete data (CT, MRI, surgical procedures, histopathology and >1 year follow-up) and provides important information about the prognosis of this rare vascular malformation.

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Introduction

Vertebral angiomatosis is a rare vascular malformation with few cases reported in the literature.[1–5] In dogs several forms of angiomatosis have been reported including cutaneous,[6,7] cardiac,[8] meningeal,[9] skeletal[10] and multisystemic forms,[11] whereas in cats it is a little-known disorder.[12] In terms of spinal cord disease in cats or, in general, neurological disorders in feline species, this disease has not previously been considered.[13–15] In the seven previously reported cases, only three cats survived the surgical decompression, with a maximum follow-up of 4 months.[1,2] Only one case had both CT and MRI carried out.[4]

Case series description

Case 1

A 2-year-old neutered, female, domestic shorthair cat presented with a 1 month history of difficulty walking, pain of unknown origin and general discomfort. The use of steroidal and non-steroidal anti-inflammatory drugs (NSAIDs) improved the clinical signs temporarily. The general physical examination was normal, whereas neurological examination revealed paraparesis, diffuse back pain and urinary retention with bladder distension. No abnormality was noted on blood and urine analysis. Serological tests for toxoplasmosis, feline leukaemia virus (FeLV) and feline immunodeficiency virus (FIV) were negative. On digital radiography an irregular T8 profile appeared in lateral view. The cat underwent a CT scan and MRI. General anaesthesia was induced with a combination of methadone (Semfortan; Dechra), midazolam (Ipnovel; Roche) and dexmedetomidine (Dexdomitor; Orion Pharma) and maintained with isoflurane (Isoflo; Zoetis). The CT scan was performed with a 64 slice double gentry scanner (Somaton Definition Flash; Siemens), in the transverse, coronal and sagittal planes, with a bone algorithm, whereas MRI was

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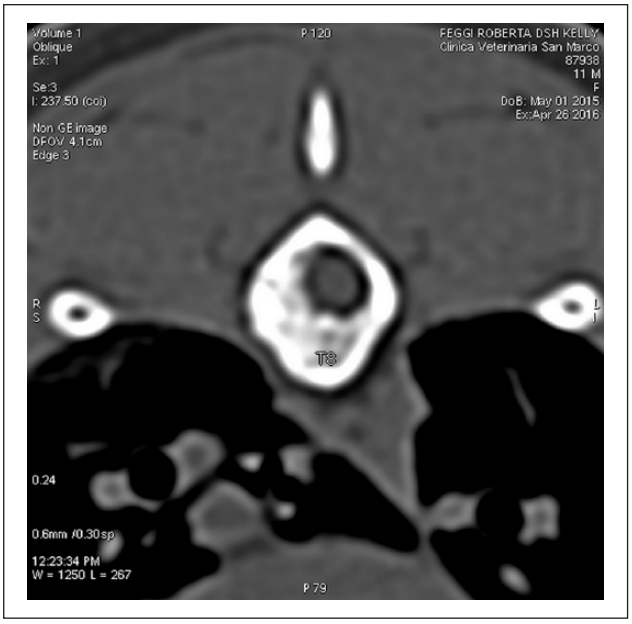

Figure 1 CT scan, transverse plane: abnormal right-sided sponge-like vertebral bone proliferation with soma and arch extension at T8 level (case 1)

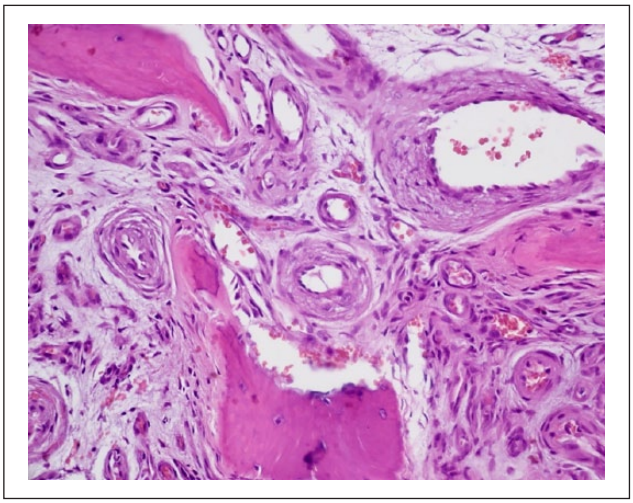

Figure 2 Histopathological section of the bone lesion, stained with haematoxylin and eosin. Note the new bone formation with marked benign proliferations of well-differentiated, small-calibre blood vessels (case 1)

performed with a 0.4 Tesla open magnet (Aperto Lucent, SN, X418; Hitachi) in T1-weighted sagittal and transverse planes, T2-weighted sagittal, dorsal and transverse planes, T2 fluid-attenuated inversion recovery (FLAIR) dorsal plane and 3D T1 transverse plane. T1 images in the transverse plane and T2 FLAIR images were also acquired following administration of intravenous contrast (0.1 mmol/kg gadodiamide [Omniscan; GE Healthcare]). The CT scan showed a right-sided bone proliferation (attenuation value of 709 Hounsfield units [Hu] vs 368 Hu for the normal adjacent bone) at the T8 level, extending from the right vertebral arch to the cranial right articular facet and pedicle, in the T7–T8 intervertebral space.

MRI confirmed an extradural lesion with a hyperintense pattern on T2 images (relative to spinal cord) with irregular enhancement after contrast injection. No focal myelopathy was detected. Right hemilaminectomy was performed, covering the whole T8 vertebral arch. The intraoperative appearance confirmed the sponge-like proliferation. Bleeding was controlled using a jelly sponge, followed by routine closure. Bone tissue was examined for histopathology and culture sensitivity. No bacterial growth was seen. Histopathology revealed bone fibrosis with benign proliferations of well-differentiated, small-calibre, arterial and venous blood vessels, consistent with vertebral angiomatosis.

After initially worsening, the cat recovered its normal gait, walking and urinary function on day 15 after surgery. Currently, 1.5 years after surgery, no clinical signs are visible.

Case 2

A 22-month-old neutered, female Siamese cat presented with a 1 month history of movement reluctance and difficult defaecation. The use of NSAIDs had not improved the clinical signs. The general examination was normal. The neurological examination revealed paraparesis, back pain in the thoracic region and urinary retention with bladder distension. No abnormality was noted on blood and urine analysis except low thyroid-stimulating hormone, total thyroxine and free thyroxine levels (free triiodothyronine [T3]/reverse free T3 normal) and a high plasma cortisol concentration, consistent with euthyroid sick syndrome and chronic pain. Serological tests for toxoplasmosis, FeLV and FIV were negative. On digital radiography an irregular T4 profile appeared in the lateral and dorsoventral view. The cat underwent a CT scan and MRI. General anaesthesia was induced using the same protocol as in case 1 and the CT and MRI were carried out using the same methods as in case 1. The CT scan showed a left-sided bone proliferation (attenuation value of 651 Hu vs 351 Hu for the normal adjacent bone) at the T4 level, extending from T3 to T5 and covering the soma of T4. MRI confirmed an extradural lesion, displacing the spinal cord dorsally and contralaterally, with a hyperintense pattern on T2 images (relative to spinal cord) and irregular enhancement after contrast injection. A small focal myelopathy was detected.

Two left hemilaminectomies were performed, covering the T3–T4 and T4–T5 intervertebral spaces, with partial corpectomy of T4. The intraoperative appearance confirmed a sponge-like proliferation. Bleeding was controlled using a jelly sponge and routine closure was performed. Bone tissue was examined for histopathology

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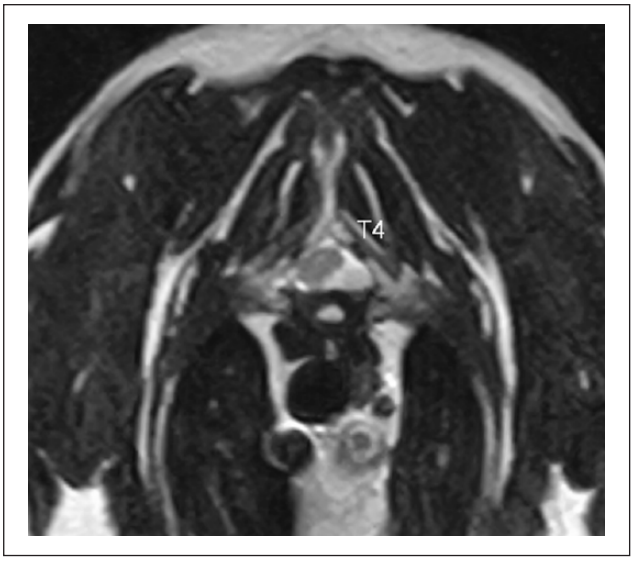

Figure 3 MRI scan, T2-weighted, transverse plane: a left-sided extradural lesion at the T4 level, with a hyperintense pattern (relative to spinal cord). Note the dorsal and contralateral spinal cord displacement (case 2)

and culture sensitivity. No bacterial growth was seen. Histopathology revealed new bone formation with marked benign proliferations of well-differentiated, small-calibre, arterial and venous blood vessels, consistent with vertebral angiomatosis.

In this case, serious clinical worsening led to non-ambulatory paraparesis. Despite this situation, the cat had recovered its normal gait, walking and urinary function 2 months after surgery. Currently, 1 year after surgery, no clinical signs are present.

Discussion

Angiomatosis is a rare condition in cats that is characterised by benign proliferations of well-differentiated blood vessels. While the pathogenesis is not understood, based on its histological appearance and CT/MRI, the vertebral angiomatosis can be considered as a solitary intraosseus vascular congenital malformation with arteriovenous shunts and without systemic involvement.[1,16,17] So, despite its common use in previous studies, the term angiomatosis is not properly used to describe this lesion.

The age of presentation has previously been stated to be between 1 and 2 years,[1–3] except for one case that was 3.5 years of age on presentation.[4] The clinical presentation is quite similar in all cases with a history of chronic back pain, discomfort and difficulty walking.[1–4] The neurological condition always includes different degrees of paraparesis and proprioceptive deficits.[1–4] In our cases urinary retention with bladder distension were also present. There does not appear to be any correlation with FIV/FeLV infections, as 4/7 previously reported cases were negative,[1–3] as were our two cases. A radiograph does not allow for a precise diagnosis but enables identification of the pathological site.[1–4] The CT and MRI appearance of the lesion is similar in all cases; CT shows a bone proliferation, with a different density to healthy bone,[3] and MRI shows a T2-weighted hyperintense (relative to spinal cord) extradural lesion with irregular enhancement.[4] The vertebral site of previous cases was always in the thoracic region,[1–3] except for one case (the 3.5-year-old cat)[4] and the bone proliferation may extend to the vertebral body, arch, articular facets and pedicle[1–4] but never to the spinous process, as in other feline vertebral bone disorders (eg, osteochondromatosis). Culture sensitivity, when performed, is always negative.[3] Histopathology is similar and repeatable in all cases.[1–4] Surgery was performed in 5/7 previous cases reported in the literature.[1–4] In one case the cat was euthanased during surgery,[4] one case died 2 h later[3] and surgery was only successful in three cases.[1,2] Unfortunately, the follow-up of these previous cases only lasted up to 4 months.[1,2] Our two cases were followed up for at least 12 months, with initial worsening after surgery but complete recovery of ambulatory and urinary functions. This provides important information about the long-term prognosis of this rare condition.

Conclusions

In cases of young cats with back pain, paraparesis and urinary retention, vertebral angiomatosis should be included in the list of differential diagnoses, particularly when a thoracic vertebral bone lesion is suspected on radiographs. The combination of CT and MRI enables a precise preoperative diagnosis, owing to well-defined and repeatable imaging. The long-term prognosis after surgical treatment is good, despite any initial worsening. The correlation with retrovirus infections appears inconsistent. Histology is mandatory to confirm the diagnosis.

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