CASE REPORT
Dorsal spinous process impingement syndrome (‘kissing spine’) in a cat: imaging appearance and surgical management

Rodrigo Gutierrez-Quintana MVZ*, Samantha Lindley BVSc, MRCVS, Martin Sullivan BVMS, PhD, Dip ECVDI, MRCVS, Jacques Penderis BVSc, MVM, PhD, Dip ECVN, MRCVS, Annette Wessmann DrMedVet, Dip ECVN, MRCVS

Division of Small Animal Clinical Sciences, School of Veterinary Medicine, College of Medical, Veterinary and Life Sciences, University of Glasgow, Bearsden Road, Glasgow G61 1QH, UK

Spinal pain is an important clinical presentation in feline patients, but the underlying causes can often be difficult to elucidate. Dorsal spinous process impingement syndrome (‘kissing spine’ or in human patients ‘Baasstrup syndrome’) is a significant cause of spinal pain in equine and human patients and radiographically is characterised by a close approximation of adjacent spinous processes with reactive bone sclerosis affecting these spinous processes. In this report we describe the first reported case of dorsal spinous process impingement syndrome in a cat causing spinal pain, and successful surgical management of the syndrome. The affected cat presented at 5 years of age for evaluation of a 7-month history of progressive thoracolumbar pain. Radiographs revealed close approximation of the dorsal spinous processes of the seventh, eighth and ninth thoracic vertebrae (T7, T8 and T9), with associated reactive bone sclerosis. Surgical resection of the T8 dorsal spinous process resulted in complete resolution of the spinal pain before it recurred 2 months prior to re-investigation.

A 5-year-old male neutered Persian cat (4 kg) was referred to the Neurology and Neurosurgery Service of the University of Glasgow Small Animal Hospital for evaluation of a 7-month history of thoracolumbar pain and general discomfort. The owner reported that the cat demonstrated lethargy, unwillingness to jump, stiffness and anorexia. Investigation of the spinal pain performed by a different referral service 6 months previously was reported as unremarkable and included a complete blood count, serum biochemistry, spinal radiographs, serological tests for feline leukaemia virus, feline immunodeficiency virus and feline coronavirus, abdominal ultrasound and magnetic resonance imaging (MRI) of the thoracolumbar spine. Management of the spinal pain with meloxicam (0.1 mg/kg q 24 h) (Metacam; Boehringer Ingelheim, Germany) and gabapentin (10 mg/kg q 12 h) (Gabapentin; Sandoz, UK) resulted in initial resolution of the clinical signs for 3 months. Following a recurrence of the spinal pain, transmucosal buprenorphine (0.1 mg/kg q 12 h) (Vetergesic; Alstoe Animal Health, UK) was added to the treatment regime, but resulted in only a temporary resolution of the spinal pain before it recurred 2 months prior to re-investigation.

On presentation to the Neurology and Neurosurgery Service of the University of Glasgow Small Animal Hospital, the cat was demonstrating thoracolumbar pain and appeared quiet, but all other aspects of the general physical and complete neurological examination were normal. The cat demonstrated a stiff pelvic limb gait and moderate kyphosis. There was significant pain on spinal palpation over the thoracolumbar region. A complete blood count and serum biochemistry profile were normal. Spinal radiography of the thoracolumbar spine was performed under general anaesthesia. Lateral radiographs of the thoracolumbar spine demonstrated a subjective narrowing of the interspinous space between the dorsal spinous processes of T7, T8 and T9 (Fig 1B and C). Moderate sclerosis and bony proliferation were evident over the caudal aspect of T8 and the cranial aspect of T9 dorsal spinous

*Corresponding author. E-mail: r.gutierrez@vet.gla.ac.uk
processes, and mild sclerosis was evident over the caudal aspect of T7 and the cranial aspect of T8 dorsal spinous processes (Fig 1B). The same changes were visible 6 months earlier but less marked and were interpreted as an incidental finding at the time (Fig 1A). MRI of the thoracolumbar spine was performed using a 1.5 tesla MRI unit (Siemens, Magnetom). Sagittal, transverse and dorsal T2-weighted and sagittal T1-weighted and STIR (short T1 inversion recovery) sequences were acquired. The radiographic changes affecting the dorsal spinous processes were evident on the MRI images characterised by narrowed interspinous space and hypointense signal between the dorsal spinous processes and narrowing of the interspinous space (arrows). No other spinal column or spinal cord abnormalities were identified. Evaluation of the MRI study performed 6 months previously did not allow assessment of the dorsal spinous processes due to patient positioning. The radiographic and MRI appearance was consistent with a diagnosis of dorsal spinal process impingement syndrome. Permission to perform cerebrospinal fluid collection was declined by the owner.

In light of the failure of medical management to control the spinal pain, surgical resection of the dorsal spinous process of T8 was performed. The dorsal spinous process of T8 was identified by the preoperative injection of 0.1 ml of sterile trypan blue 0.1% solution (Oftalblue; Alfa Intes, UK) under radiographic guidance. A standard dorsal surgical approach to the thoracic spine was performed with the cat positioned in sternal recumbency. The dorsal spinous process of T8 was resected down to just above the level of the dorsal lamina using a high-speed air drill, retaining the dorsal muscular and ligamentous support structures. Routine closure was performed and post-surgical radiographs confirmed complete resection of the dorsal spinous process of T8 (Fig 1D).

Macroscopic examination of the T8 dorsal spinous process revealed a small, well-defined, and smooth concavity on the dorso-caudal surface of the T8 dorsal spinous process (Fig 1B). The same changes were visible 6 months earlier but less marked and were interpreted as an incidental finding at the time (Fig 1A). MRI of the thoracolumbar spine was performed using a 1.5 tesla MRI unit (Siemens, Magnetom). Sagittal, transverse and dorsal T2-weighted and sagittal T1-weighted and STIR (short T1 inversion recovery) sequences were acquired. The radiographic changes affecting the dorsal spinous processes were evident on the MRI images characterised by narrowed interspinous space and hypointense signal between, the dorsal spinous processes of T7, T8 and T9 in all sequences (Fig 2). No other spinal column or spinal cord abnormalities were identified. Evaluation of the MRI study performed 6 months previously did not allow assessment of the dorsal spinous processes due to patient positioning. The radiographic

Fig 1. Radiographic appearance of dorsal spinous process impingement syndrome in a cat. (A) Lateral radiograph of the thoracic spine performed 6 months prior to surgical resection showing mild sclerosis of the dorsal spinous processes and narrowing of the interspinous space (arrows). (B) Lateral radiograph of the thoracic spine showing slightly more severe sclerosis of the dorsal spinous processes and narrowing of the interspinous space (arrows). (C) Lateral radiograph of the thoracic spine of a normal cat for comparison. (D) Post-surgical lateral radiograph of the thoracic spine showing that the dorsal spinous process of T8 has been resected (arrow).

Fig 2. MRI appearance of dorsal spinous process impingement syndrome in a cat. T2-weighted (A) and T1-weighted (B) sagittal images show the radiographic changes as hypointense signal between the dorsal spinous processes and narrowing of the interspinous space (arrows).
cats was 0.76 at T7 relative to the length of T7 vertebral body. The normal aspect of the spinous processes was expressed as a ratio.

The normal interspinous space in the affected cat to the interspinous space in the affected Pers. cat were compared to 13 adult Pers. cats without evidence of neurological disease or spinal pain and in which thoracic radiographs were performed as part of an unrelated clinical investigation. The interspinous distance of T7–T8 and T8–T9 (measured at the most dorsal aspect of the spinous processes) was expressed as a ratio relative to the length of T7 vertebral body. The normal interspinous ratio determined in the control group of cats was 0.76 at T7–T8 (range 0.55–1, standard deviation (SD) ±0.16) and 0.56 at T8–T9 (range 0.4–0.75, SD ±0.1), whereas in the affected cat these were 0.22 and 0.11, respectively, both with a probability of zero for these to represent measurements within the normal population distribution (Student’s t distribution, GraphPad Prism software) (Fig 3).

The exact aetiology of dorsal spinal impingement syndrome is still unclear. Some studies suggest that the condition in human and equine patients is an acquired disease, more consistent with a developmental process that starts in later life. The pain may also be a consequence of pressure damage resulting from appositional forces between the apposed dorsal spinous processes. The poor correlation between the radiographic findings and the clinical signs has added to this debate, with a large proportion of apparently healthy horses demonstrating varying degrees of radiographic, and even scintigraphic, changes despite the absence of consistent clinical signs. It has been suggested that the pain in some cases may arise secondary to soft tissue injury to the surrounding muscles and ligaments. In the cat presented in this report radiographic changes were evident and the caudal aspect of T8 dorsal spinous process appeared macroscopically abnormal, however, no clear evidence of bone reaction was evident on histopathological examination.

Dorsal spinous process impingement syndrome is most commonly reported in equine patients. Studies in horses have used local anaesthesia as a diagnostic procedure to determine whether dorsal spinous process impingement was associated with clinically-relevant back pain, with a good predictive value for selecting patients that would respond favourably to surgical intervention. Surgical resection of the summits of one or more dorsal spinous processes is also generally recommended when conservative treatment, such as rest, analgesia, intrallesional corticosteroids and physiotherapy, has failed. Long-term follow-up in 209 horses treated surgically demonstrated a return to full work following surgical resection in 72% of cases. The decision to proceed with surgical resection of the dorsal spinous process of T8 in the cat presented here was based on the

Fig 3. Scatter plot demonstrating the normal interspinous distance for T7–T8 and T8–T9 in a population of 13 Persian cats with no evidence of neurological disease or spinal pain (open circles, median represented as a solid line) and the interspinous distance in the affected cat. The calculated probability for the interspinous distance in the affected cat to represent measurements within the normal population distribution was effectively zero (Student’s t distribution).
absence of a satisfactory response to prolonged medical therapy. The surgical technique was relatively straightforward, with no complication and an excellent outcome. The complete resolution of the thoracolumbar pain following surgical resection would support dorsal spinous process impingement syndrome as the cause of the thoracolumbar spinal pain in this case. Dorsal spinous process impingement syndrome should, therefore, be considered as part of the differential diagnosis list in cats presenting with spinal pain and surgical intervention should be considered in cases refractory to medical management of the spinal pain.

References

1. Pinto PS, Boutin RD, Resnick D. Spinous process fractures associated with Baastrup disease. Clin Imaging 2004; 28: 219–22.
2. Rissanen PM. ‘Kissing spine syndrome’ in the light of autopsy findings. Acta Orthop Scand 1962; 32: 132–9.
3. Bywaters EGL, Evans S. The lumbar interspinous bursae and Baastrup syndrome: an autopsy study. Rheumatol Int 1982; 2: 87–96.
4. Jeffcott LB. Disorders of the thoracolumbar spine of the horse – a survey of 443 cases. Equine Vet J 1980; 12: 197–210.
5. Raftery GR, Griffon DJ, Johnson AL, Blevins WE, Valler VE. Bilateral iliopsoas muscle contracture and spinous process impingement in a German shepherd dog. Vet Surg 2009; 38: 946–53.
6. Erichsen C, Eksell P, Roethlisberger Holm K, Lord P, Johnston C. Relationship between scintigraphic and radiographic evaluations of spinous processes in the thoracolumbar spine in riding horses without clinical signs of back problems. Equine Vet J 2004; 36: 458–65.
7. Sinding MF, Berg LC. Distances between thoracic spinous processes in Warmblood foals: a radiographic study. Equine Vet J 2010; 42: 500–3.
8. Maes R, Morrison WB, Parker L, Schweitzer ME, Carrino JA. Lumbar interspinous bursitis (Baastrup disease) in a symptomatic population. Spine 2008; 33: E211–5.
9. Jeffcott LB. Radiographic features of the normal equine thoracolumbar spine. Vet Radiol 1979; 20: 140–7.
10. Erichsen C, Eksell P, Widstrom C, Roethlisberger Holm K, Johnston C, Lord P. Scintigraphic evaluation of the thoracic spine in the asymptomatic riding horse. Vet Radiol Ultrasound 2003; 44: 330–8.
11. Walmsley JP, Pettersson H, Winberg F, McEvoy F. Impingement of the dorsal spinous processes in two hundred and fifteen horses: case selection, surgical technique and results. Equine Vet J 2002; 34: 23–8.
12. Roethlisberger Holm K, Wannerstrand J, Lagerquist U, Eksell P, Johnston C. Effect of local analgesia on movement of the equine back. Equine Vet J 2006; 38: 65–9.
13. Desbrosse FG, Perrin R, Launois T, Vandeweerdt JME, Clegg P. Endoscopic resection of dorsal spinous processes and interspinous ligament in ten horses. Vet Surg 2007; 36: 149–55.
14. Roberts EJ. Resection of thoracic and lumbar spinous processes for relief of pain responsible for lameness and some other locomotory disorders in horses. Proc Am Assoc Equine Practr 1968; 14: 13–30.
15. Jeffcott LB, Hickman J. The treatment of horses with chronic back pain by resecting the summits of the impinging dorsal spinous processes. Equine Vet J 1975; 7: 115–9.
16. Perkins JD, Schumacher J, Kelly G, Pollock P, Harty M. Subtotal osteotomy of dorsal spinous processes performed in nine standing horses. Vet Surg 2005; 34: 625–9.