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Clinical Report

Asymmetric Lumbosacral Transitional Vertebra (LTV) Type-3 in a German Shepherd Dog: A Case Report

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Abstract

Case Description- In the present study, a seven-year-old German shepherd female dog was referred to Veterinary Hospital of Shahid Chamran University of Ahvaz, with a two-week history of intermittent lameness and lumbosacral pain.
Clinical Findings- On general examination, the vital parameters were within normal limits. A ventrodorsal (VD) radiograph of the pelvis and lumbosacral spine was taken and asymmetric lumbosacral transitional vertebra (LTV) type-3 was diagnosed. The authors describe a case of LTV in detail, on the basis of the clinical and radiological findings.
Treatment and Outcome- In the present study, we suggested surgery (laminectomy), but the owner requested euthanasia for the high-cost of medical care.
Clinical Relevance- Lumbosacral transitional vertebra is a heritable disease that is frequently diagnosed in German shepherd dogs. This disorder is a risk factor for the development of vertebral instability and cauda equina syndrome (CES). This condition is thought to have clinical significance and should be selected against in breeding, especially in the German shepherds. It should be considered not to use these dogs as working dogs.
Key words: lumbosacral transitional vertebra (LTV), Radiography, Dog, Ahvaz.

Case Description

A seven-year-old German shepherd female was referred to Veterinary Hospital of Shahid Chamran University of Ahvaz. The dog had a two-week history of intermittent lameness and lumbosacral pain. The owner reported that the dog had lameness and pain for at least two weeks and that she was unable to posture for urination. The dog also had been leaking urine in

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her floor. The dog was initially positioned in dorsal recumbency. Complete physical examination, orthopedic and neurologic assessments were performed. A ventrodorsal (VD) radiograph of the pelvis and lumbosacral spine was taken. On general examination, the vital parameters were within normal limits. On abdominal palpation, bladder was normal and urine was expressed with only gentle palpation. In orthopedic examination, a marked pain response was noted on extension of the coxofemoral joint and on tail jack. The pelvic limb could not be manipulated or extended without a marked pain response. The left pelvic limb's proprioception was not determined due to full flexion. The patellar and withdrawal reflex, cranial tibial response, thoracic limb reflexes and common peroneal reflexes were normal. The perineal reflex was decreased bilaterally. No other orthopedic abnormalities were demonstrated. Asymmetric lumbosacral transitional vertebra type-3 was diagnosed in radiographs. Left sacral-like transverse process had complete contact with the ilium and there was no free tip. Left femoral head subluxation and osteophyte formation were seen as well. Left lumbusacral joint seemed normal (Fig. 1 and 2). Spondylosis deformans were not noted at the intervertebral disc spaces. No other abnormality was found in the abdominal radiography.

Figure 1. Ventrodorsal radiography from the pelvic region of the dog with blocked asymmetrical LTV (type 3). Left femoral head subluxation and osteophyte formation (arrow head) are seen.

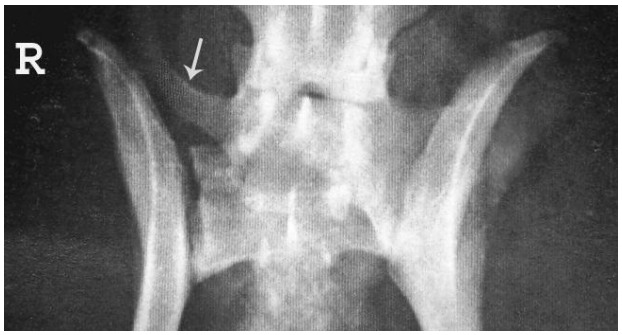

Figure 2. Close up of lumboscral region of Fig 1. There is a lumbar-like transverse process on the right (arrow) and blocked sacral-like transverse process on the left.

Treatment and outcome

In the present study, we suggested surgery (laminectomy), but the owner requested euthanasia for the high-cost of medical care.

Discussion

Anomalies of the vertebral column are common and include congenital and developmental malformations. Significant feature of transitional anomalies is the increased incidence of lumbosacral disc disease and nerve root compression that occurs in dogs with a lumbosacral

transitional malformations. Lumbosacral disease is characterized by lumbosacral pain, varying degrees of pelvic limb paresis, radiculopathy and urinary or fecal incontinence. It is a relatively common diagnosis for large breed dogs, especially German shepherd dogs, exhibiting back pain and neurologic dysfunction.[1,2,3] The lumbosacral transitional vertebra is classified based on the radiological appearance of the transverse processes. Type-1, or lumbar type, indicates no sacroiliac fusion; type-2, or intermediate, indicates partial fusion but with the tip of the process free; and type-3, or sacral, indicates complete fusion.[4,5] In the present study, we diagnosed LTV type-3 in a German shepherd dog.

The prevalence of transitional vertebra is calculated about 0-22% in dogs, depending on the breed.[4] The incidence of LTV in the general dog population is 3.5% and male dogs are more likely to develop lumbosacral disease secondary to LTV. [6] Ventrodorsal (VD) radiograph of the pelvis are the views most commonly used for the evaluation of the canine hip joints.[7,8] In our report, lumbosacral transitional vertebra was detected radiographically by assessing: the outline of the cranial margin of the wings of the sacrum; the shape of the transverse processes of the last lumbar vertebra; the separation of the spinous process of the transitional vertebra from the assembly of the sacrum; presence of an intervertebral disc space between transitional vertebra and caudal adjoining vertebra, and separation of the cranial articular processes of the transitional vertebra from the assembly of the sacral wing.[8]

Transitional vertebra are frequently considered as incidental findings.[9] lumbosacral transitional vertebra have been described as clinically important in the role that they play in the suspected etiology of the cauda equina compression syndrome.[7] A transitional segment may predispose adjacent Intervertebral discs to early degeneration and potential disc protrusion, vertebral instability or malalignment, and neural compression by hypertrophy of adjacent soft tissue.[2,9] In one study, of 92 dogs with lumbosacral disease, 15 dogs had lumbosacral transitional vertebra (LTV).[5]

Breit et al. in 2003 were studied the differentiation between lumbosacral transitional vertebra, pseudolumbarisation, and lumbosacral osteophyte formation in ventrodorsal radiographs of the canine pelvis. Those alterations closely resembling the radiographic appearance of transitional vertebra were identified to be: calcification of the dorsal and ventral sacroiliac ligaments, which might be interpreted as a costal process at S1 and osteophyte formation at the lumbosacral junction simulating separation of the cranial articular processes from the assembly of the sacral wing as seen in transitional vertebra.[10] Heritability could not be tested in this study, but in German shepherd dogs it turned out to be approximately as high as the heritability.[7] It must be considered not to use these dogs as working dogs and especially not for breeding.

Significant changes were detected between clinically sound dogs with radiographic lumbosacral changes and dogs with no radiographic abnormalities. The highest transverse range of motion (ROM) was achieved by markers T6, T13, and L3, and in the vertical direction by S3; however, there were no significant differences in ROM in horizontal angulations.[11] In another survey by Scharf et al. (2004) no correlation between the neurological and the radiographic findings were found. Their study demonstrated that even prominent radiographic LS abnormalities were of minimal value in the evaluation of LS disease in the German shepherd dogs.[12] Asymmetric LTV are more likely to have rotation and the vertebra is usually rotated in the sagittal plane towards the side with the shorter sacroiliac attachment with disc protrusion tending to be contralateral.[2] A Lumbosacral transitional vertebra is a relatively common diagnosis for large breed dogs, especially German shepherd dogs. Cocker spaniels are relatively uncommon breeds.[2,4] The dog in the present report, was female, German shepherd breed, seven-year-old with clinical signs (lameness and

lumbosacral pain). There is no apparent gender predisposition to LTV, although some authors have reported a higher prevalence in females or in males.[6] In our case, the different types of transverse processes was not detected.

Lumbosacral transitional vertebra can predispose to abnormal lumbosacral motion, which can be caused sclerosis of the LS endplate, osteophyte formation on the articular facets, hypertrophy of the interarcuate ligament of the annular facet joint capsule, and bulging of the dorsal annulus. [6] The lesion causing the clinical signs of lumbosacral disease is always between the last normal lumbar vertebra and the LTV.[5] Disc bulging has been reported in clinically normal dogs encompassing up to 43% of the lumbosacral spinal canal.[13] When imaged with radiography, LTV demonstrated loss of epidural fat, Intervertebral disc margin bulging, and thecal sac displacement. Lumbosacral disease is generally treated surgically when lumbosacral pain is unresponsive to conservative management or neurological deficits are present.[14] Generally, surgical decompression of the lumbosacral area is achieved by dorsal laminectomy, with or without annulectomy. Facetectomy with a dorsal or medial extension to the lumbosacral Intervertebral foramen has been recommended if foraminal stenosis is noted. Lateral foraminotomy has been recently described to give easier access to the nerve root while maintaining stability.[15] The radiographic appearance of the costal processes depends on the projection of the sacrum. Therefore, other characteristics like separation of the spinous process of S1 and separation of the cranial articular processes of S1 from the assembly of the sacral wing should be assessed to assist in identification of a transitional segment.[16] In a published report of dogs with degenerative lumbosacral stenosis, the average age at presentation was 7 years.[5] In the present study, the affected dog was seven-year-old also. This condition is thought to have clinical significance and should be selected against in breeding, especially in the German shepherds.[4,8] Expensive and time-consuming training is not recommended in German shepherd dogs with LTV.[6] The role of these anomalies in the promotion of disc degeneration leading to conformations will be investigated further.

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چکیده

گزارش مهره واسطه‌ای خاجی- کمری نامتقارن تیپ-۳ در یک قلاده سگ ژرمن‌شفرد

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توصیف بیمار- در مطالعه حاضر، یک قلاده سگ ژرمن‌شفرد ماده ۷ ساله، با تاریخچه ۲ هفته‌ای از لنگش متناوب و درد در ناحیه خاجی- کمری، به بیمارستان دامپزشکی دانشگاه شهید چمران اهواز ارجاع داده شده بود.

یافته‌های بالینی- در معاینات بالینی معمول، پارامترهای حیاتی حیوان در محدوده نرمال بودند. یک رادیوگراف شکمی - پشتی، از لگن و مهره‌های کمری- خاجی تهیه شده و مهره واسطه‌ای خاجی- کمری نامتقارن تیپ-۳ (LTV)، تشخیص داده شد. نویسندگان یک مورد مهره واسطه‌ای خاجی- کمری نامتقارن را به جزئیات و بر اساس یافته‌های بالینی و رادیولوژیک توصیف می‌نمایند.

درمان و نتیجه- در مطالعه حاضر، پیشنهاد جراحی (لامینکتومی) به صاحب حیوان داده شد، اما او درخواست مرگ آسان (یوتانازیا)، بدلیل هزینه بالای درمان را داشت.

کاربرد بالینی- مهره واسطه‌ای خاجی- کمری یک بیماری ارثی است که اغلب در سگ‌های ژرمن شفرد تشخیص داده می‌شود. این عارضه، یک فاکتور خطر برای توسعه بی‌ثباتی مهره‌ای و سندرم کودا اکوئینا (CES) محسوب می‌شود. این وضعیت مشخص گردیده است که از اهمیت بالینی برخوردار است و می‌بایستی به هنگام نسل کشی، بویژه در سگ‌های ژرمن شفرد مد نظر قرار گیرد. بهتر است که از این نژاد، به‌عنوان سگ‌های کاری استفاده نشود.

کلمات کلیدی: مهره واسطه‌ای خاجی- کمری (LTV)، رادیوگرافی، سگ، اهواز.