

Scientific Report

Diffused idiopathic skeletal hyperostosis in a fighting Bulldog: a case report

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Summary

This case report illustrates the presence of diffuse idiopathic skeletal hyperostosis (DISH) in a fighting Bulldog. The dog was referred to the Veterinary Teaching Hospital, University of Agriculture Faisalabad Pakistan, with the presenting complaint of slowly progressing staggering gait, inability to stand on hind limbs and muscle stiffness in lumbo-sacral region. Hematological, sero-biochemical and clinical examination were insignificant except presence of extensive new bone formation in the radiograph on the ventral of last 4 consecutive body lumbar vertebrae (L4-L8) in lumbar region, running parallel to nuchal ligament. Diagnosis of DISH was made on the basis of clinical signs and radiographical examination which were suggestive of DISH. This report documents the first case of DISH in fighting Bulldog in Pakistan.

Key words: Diffuse idiopathic skeletal hyperostosis, Fighting Bulldog, Nuchal ligament

Introduction

Diffuse idiopathic skeletal hyperostosis (DISH), is a common systemic skeletal disorder affecting axial and appendicular structures as well as peripheral joints of the body of the humans and canines (Morgan and Stvenborn, 1991). It was first described by Forestier in the early fifties (Forestier and Rotes-Querol, 1950). Dogs affected with DISH usually show orthopedic along with neurological abnormalities (Westerveld *et al.*, 2009). DISH is usually characterized by the ossification of soft tissues such as ligaments, especially longitudinal ventral spinal ligament and entheses (Kranenburg *et al.*, 2010). The exact etiology of DISH is still unknown, but various factors such as diabetes mellitus type 2 (*DM* type 2), hyperuricaemia, old age, genetics, vitamin A toxicity and obesity are associated with the development of DISH in humans (Sarzi-Puttini *et al.*, 2004). Generally, prevalence of DISH in dogs is reported to be 3.8% and incidence is more in male dogs (Muraki *et al.*, 2009; Kranenburg *et al.*, 2010). In Boxer breed, prevalence of DISH is reported to be significantly higher (40.6%) in contrast to other breeds of dogs (Linbald *et al.*, 2005) due to genetics. DISH is an easily diagnosable disorder by thorough examination of radiographs, although the affected animal only shows mild to moderate vertebral muscle stiffness and reluctance to move (Olivieri *et al.*, 2007). In literature few studies are mentioned related to DISH in dogs.

Case presentation and diagnosis

A three-years-old, male fighting Bulldog weighing 30 kg was referred to University Teaching Hospital, University of Agriculture Faisalabad, Pakistan for the treatment of staggering gait and weakness of hindquarters. The patient had no history of trauma and dog fighting and was kept only for observation purpose. Upon physical examination temperature was 39°C, heart rate 65 beats/min and respiration rate 28 breaths/min. Physical, neurological and orthopedic examinations were normal except perception of severe pain while palpating at the lateral sides of lumbar vertebrae. Radiograph of lumbar region was recommended. The results of hematology, urinalysis, faecal examination and serum biochemistry profile were within the normal range. Radiographic evaluation revealed presence of new bone formation along the ventral aspect of last 4 consecutive lumbar (L4-L7) vertebrae parallel to nuchal ligament (Fig. 1). A combination of phenylbutazone (1 mg/kg; Inj. Fenylbutazone-20, VMD, Belgium) and dexamethasone (2 mg/kg; Inj. Decadron, OBS, Pakistan) was given twice a day for 3 days and the owner was advised to provide complete rest to the patient. A slight improvement in the pain reflex was noticed on re-examination (day 3) and treatment with dexamethasone (2 mg/kg, orally b.i.d) was recommended for the next 3 days. Four months later, the dog was brought back to the clinic with increased muscular stiffness and incoordination. Radiological findings (Fig. 2) were similar to what had been observed

in the radiograph (Fig. 1) taken on the first visit. In view of the history, clinical and radiographic examinations and response to the treatment, a diagnosis of DISH was reached. The owner declined euthanasia, however, ketoprofen (@ 1.2 mg/kg; Tab. Profenid, Aventis Ltd., Pakistan) was recommended to manage pain and patient was lost to follow up.

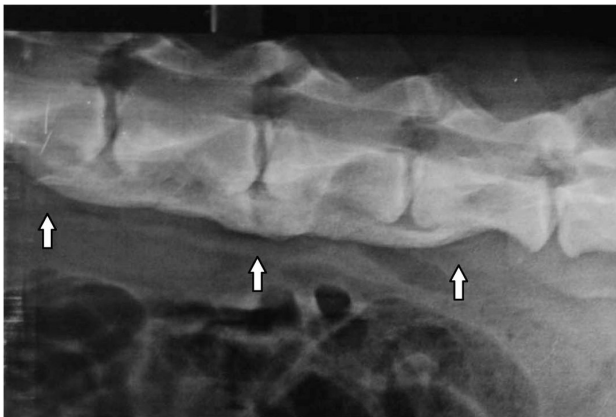


Fig. 1: Radiographs of the dog taken at the time of presentation. Arrows show the newly formed bone along the ventral aspect of last 4 lumbar vertebrae (L4-L7) in lateral radiographic view of caudal lumbar spine

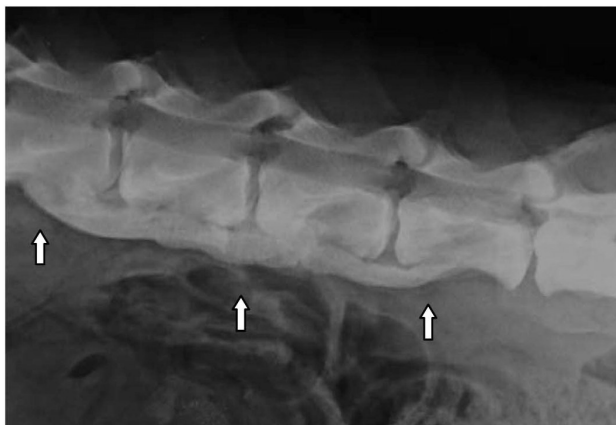


Fig. 2: Radiographs of the dog taken 4 months later. Arrows show the newly formed bone along the ventral aspect of last 4 lumbar vertebrae (L4-L7) in lateral radiographic view of caudal lumbar spine

Discussion

This case study describes the first report of DISH in a fighting Bulldog in Pakistan. This condition has been described under certain terms in literature; however, ankylosis hyperostosis of spine is the most popular term reserved for DISH. Mostly in dogs and humans DISH is supposed to be asymptomatic, however, it may lead to back bone pain, stiffness of the muscles and decreased spinal range of motion (Olivieri *et al.*, 2007). In severely affected dogs involvement of innervated periosteum of the bone and ossification of the newly formed bones put pressure on the adjacent tissues as well as muscles along the spinal column, resulting in stimulation of pain

receptors in that region and consequently, sever degree of pain in the affected portion of spinal column. Newly formed bones and ossified ligaments can be seen along the spinal column of affected animal in radiographic examination. In dogs, a flowing pattern along at least four adjoining vertebral bodies is a significant finding for DISH (Krenberg *et al.*, 2011). Kraneburg *et al.* (2010) reported a similar case of DISH in 8-year-old male Boxer dog affected with DISH at last 4 lumbar and 1st sacral vertebra. In one study DISH induced spinal fracture has been reported in dog after minor trauma (Kornmyer *et al.*, 2013). DISH can be diagnosed and differentiated from severe spondylosis, ossification of posterior longitudinal ligament, spinal osteoarthritis, fluorosis, vitamin A toxicity, hepatozoonosis infection and myositis ossificans on the basis of the following three postulates as given by Resnick and Niwayama (1976) including:

- 1) The presence of flowing calcification and ossification along the ventro-lateral side of at least four adjacent vertebral bodies with or without localized pointed excrescences at superseding vertebral body-disc junctions
- 2) The comparative conservation of disc height in the concerned areas and the absence of widespread radiographic changes of degenerative disc disease, including vacuum phenomena and vertebral body marginal sclerosis
- 3) The lack of apophyseal joint bony ankylosis and sacroiliac joint erosion, sclerosis or intra-articular bony fusion

Diagnosis can be made using radiographs, magnetic resonance imaging and computed tomography (Carnier *et al.*, 2004). Like human, in dog's surgical intervention and conservative treatment by weight reduction, physiotherapy and use of anti-inflammatory drugs such as NSAIDs are recommended but not successful. In literature 2 cases of DISH have been reported in dogs showing orthopedic and neurological problems. Dogs were euthanized due to severe clinical signs and non responsive to conservative treatment (Morgan and Stvenborn, 1991). Scrutiny of published reports indicated that this condition has not yet been reported in Pakistan in fighting Bulldogs. This report concludes that DISH is a slowly progressing condition which may be characterized by staggering gait, inability to stand and muscular stiffness of affected part of the body. Radiographic examination is sufficient to diagnose DISH, however, some cases need MRI and CT scans to differentiate this from other closely related conditions.

References

- Amort, K; Burger, M and Kornmayer, M** (2013). Spinal fracture in a dog with diffuse idiopathic skeletal hyperostosis. *Vet. Comp. Orthop. Traumatol.*, 26: 76-81.
- Atzeni, F and Sarzi-Puttini, P** (2004). New development in our understanding of DISH (diffuse idiopathic skeletal hyperostosis). *Curr. Opin. Rheumatol.*, 16: 287-292.
- Carnier, P; Gallo, L; Sturaro, E; Piccinini, P and Bittante,**

- G** (2004). Prevalence of spondylosis deformans and estimates of genetic parameters for the degree of osteophytes development in Italian Boxer dogs. *J. Anim. Sci.*, 82: 85-92.
- Cutro, MS; D'Angelo, S and Olivieri, I** (2007). Diffuse idiopathic skeletal hyperostosis may give the typical postural abnormalities of advanced ankylosing spondylitis. *J. Rheum Oxf.*, 46: 1709-1711.
- Forestier, J and Rotes-Querol, J** (1950). Senile ankylosing hyperostosis of the spine. *Ann. Rheum Dis.*, 9: 321-330.
- Grinwis, GCM; Kraneburg, HC and Voorhout, G** (2011). Diffuse idiopathic skeletal hyperostosis (DISH) and spondylosis in purebred dogs: a retrospective radiographic study. *Vet. J.*, 190: 84-90.
- Kraneburg, HC; Weserveld, LA and Verlaan, JJ** (2010). The dog as an animal model for DISH. *Eur. Spine J.*, 19: 1325-1329.
- Lindblad-Toh, K; Mikkelsen, TS and Wade, CM** (2005). Genome sequence, comparative analysis and haplotype structure of the domestic dog. *Nature*. 438: 803-819.
- Morgan, JP and Stvenborn, M** (1991). Disseminated idiopathic skeletal hyperostosis (DISH) in a dog. *Vet. Radio.*, 32: 65-70.
- Muraki, S; Oka, H; Akune, T; Mabuchi, A; En-Yo, Y; Yoshida, M; Saika, A; Suzuki, T; Yoshida, H; Ishibashi, H; Yamamoto, S; Nakamura, K; Kawaguchi, H and Yoshimura, N** (2009). Prevalence of radiographic lumbar spondylosis and its association with low back pain in elderly subjects of population-based cohorts: the road study. *Ann. Rheu. Dis.*, 68: 1401-1406.
- Murray, GC and Persillin, RH** (1981). Cervical fracture complicating ankylosing spondylitis: a report of 8 cases and review of the literature. *Am. J. Med.*, 70: 1933-1941.
- Niwayama, G and Resnick, D** (1976). Radiographic and pathologic features of spinal involvement in diffuse idiopathic skeletal hyperostosis (DISH). *J. Radio.*, 119: 559-568.
- Westerveld, LA; Verlaan, JJ and Oner, FC** (2009). Spinal fractures in patients with ankylosing spinal disorders: a systematic review of the literature on treatment, neurological status and complications. *Eur. Spine J.*, 18: 145-156.